

**APPENDIX – 27(R)**  
**UNIVERSITY OF MADRAS**  
**MASTER OF COMMERCE (M.Com.)**  
**(Choice Based Credit System)**

**REVISED REGULATIONS**  
**(w.e.f.2013 – 2014 onwards)**

**CONDITIONS FOR ADMISSIONS**

**1. MASTER OF COMMERCE (M.Com.)**

A candidate who has passed the B.Com, B.Com/B.A (Corporate Secretaryship), B.Com (Accounting & Finance) B.C.S., B.B.A., B.Com (Bank Management), B.Com. (Computer Applications), B.Com./B.A.(Co-operation), B.A. (Industrial Organization) and B.Sc.(Mathematics)/ B.Sc. (Statistics) or B.Sc. (Computer Science) or B.C.A. or any other UG degree with at least any two core/main papers offered at the B.Com shall be eligible for admission to M.Com Degree Program.

**5.Revised Scheme of Examinations**

**First Semester**

Course Components	Code	Subjects	Instructional Hours	Credits	Exam. Hours	Max. Marks		
						CIA	External	Total
Core Paper - I	Com 201	Advanced Corporate Accounting and Accounting Standards		4	3	25	75	100
Core Paper - II	Com 203	Financial Management		4	3	25	75	100
Core Paper - III	Com 205	Organizational Behaviour		4	3	25	75	100
Core Paper - IV	Com 207	Managerial Economics		4	3	25	75	100
Elective - I		Paper - I		3	3	25	75	100
Soft Skill - I				2	-	40	60	100

# Composition of marks: 80 % problems and 20 % theory

\$ Electives are to be chosen from the Groups of Electives listed at the end

**UNIVERSITY OF MADRAS**  
Chepauk, Chennai 600 020  
[Est. 1857, State University, NAAC 'A' Grade, CGPA 3.32, NIRF 2019 Rank:20]  
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**UNDERGRADUATE PROGRAMME IN CHEMISTRY**  
**CURRICULUM AND SYLLABUS FOR**

**B.Sc CHEMISTRY**  
(With effect from the academic year 2020 – 2021)

February 2020

**Note: The committee is requested to look into the Learning Outcome Based Curriculum Framework upload in UGC website for few UG Degree programmes**

**Curriculum and Syllabus for B.Sc Chemistry**  
(With effect from the academic year 2020 – 2021)

**I. Preamble**

The objective of a programme in Higher Education system is to prepare its students for the society. The University of Madras envisions all its programmes in the interest of its students and in this endeavour, offers Under-Graduate courses with Curriculum based on learning outcome.

The current pattern is designed to provide a focussed learning outcome-based syllabus at the under graduate level providing structured teaching-learning experiences catering to the needs of the students. This strengthens the students experiences while engaging in the programmes of their choice. The Under-Graduate courses will prepare the students both academically and in terms of employability.

Each programme elaborates its nature and promises the outcomes that are to be accomplished by studying these courses. The programme also inculcates various attributes at the graduation level. These attributes encompass values related to emotional stability, social justice, creative and critical thinking, well-being and various skills required for employability, thus preparing students for continuous learning and sustainability.

The new curriculum based on learning outcomes of BSc Chemistry offers knowledge of areas including organic, inorganic, physical, polymer and pharmaceutical chemistry. All the courses define clearly the objectives and the learning outcomes, enabling students to choose the elective subjects broadening their skills in the field of chemistry. The course also offers skills to pursue research in the field of Chemistry and thus would produce best minds to meet the demands of society.

## 2. Programme Learning Outcome

The learning outcome based curriculum is specific in nature in terms of changes in cognitive and psychomotor behavior of students. The present course give students ability to employ critical thinking and efficient problem solving skills in the core areas of chemistry including analytical, Inorganic, organic and physical chemistry. It also helps in understanding various concepts theoretical principles and experimental findings in chemistry. It develops effective oral and written communication skills especially the ability to transmit complex technical information in a clear and concise manner. It introduces the students to modern laboratory methods and principles using state of the art scientific experiments.

### Nature and Extent of the Programme

Chemistry can be defined as the science that studies systematically the composition, properties and reactivity of matter at the atomic and molecular level. Since matter is everything that can be touched, made visible, smelt or tasted, it follows that the scope of chemistry as a subject is very broad. The nature of chemistry is such that there are no distinct boundaries between the various branches of the subject. The subject comprises of organic chemistry-the chemistry of most substances containing the element carbon; Inorganic chemistry-the chemistry of all other substances; physical chemistry-the application of concepts and laws to chemical phenomena; and analytical chemistry, which is concerned with the identification and quantification of materials and the determination of composition.

Chemistry programmes are relevant to employment across the chemical science profession. Many higher education providers also award chemistry degrees with titles denoting a specialisation, for example medicinal chemistry, analytical chemistry and environmental chemistry. It is accepted that the extent study and the depth at which individual topics are treated, varies with the nature of specific chemistry programmes. It is however critical for employers of chemists that specialist learning objective in terms of chemistry are reflected in the title of the degree. It reflects the vocational nature of chemistry, as the higher education providers offer degree programmes that incorporate a period of study in industry. Such placements are designed on the basis of an agreed programme of work acceptable to both the higher education provider and the partner organization.

### Aim of the Programme

The general aims of degree programme-in chemistry are:

1. To instil in students an enthusiasm for chemistry, an appreciation of its application in different contexts, and to involve them in an intellectually stimulating and satisfying experience of learning and studying
2. To provide students with broad and balanced knowledge and understanding of key chemical concepts.
3. To develop in students a range of practical skills so that they can understand and assess risks and work safely and competently in the laboratory.
4. To develop in students the ability to apply standard methodology to the solution of problems in chemistry

5. To provide students with knowledge and skill towards employment or higher education in chemistry or multi-disciplinary areas involving chemistry.
6. To provide students with the ability to plan and carry out experiments independently and assess the significance of outcomes.
7. To develop in students the ability to adapt and apply methodology to the solution of unfamiliar types of problems.
8. To instill critical awareness of advances at the forefront of chemical sciences.
9. To prepare students effectively for professional employment or research degrees in chemical sciences.

#### **Graduate attributes**

Discipline-specific knowledge and associated technical as well as generic skills have represented distinct and separate aspects of chemical sciences. In addition to technical skills gained through laboratory training, employers now require a soft skill set such as strengths in analytical thinking, problem-solving, written and oral communication and collaboration. These skills require further integration with the human qualities needed to remain resilient to changing conditions which do not come naturally, but through training.

Graduation instills a strong sense of civic responsibility, creates environmental consciousness, develop soft skills, life skills and leadership qualities and confidence to compete with peers to achieve global competency.

Course structure

### 3. Course Structure

#### FIRST SEMESTER

Course Components	Subjects	Int. Hours	Credits	Exam Hours	Max. Marks		
					Ext. Marks	Int. Marks	Total
Part - I	Language – Paper – I	6	3	3	75	25	100
Part - II	English – Paper – I	6	3	3	75	25	100
Part - III	Core Paper – I – General Chemistry I	4	4	3	75	25	100
	Core Paper – II – Major Practical I	3	-	Examination will be held in IV semester			
	Allied Theory - Mathematics I	6	5	3	75	25	100
	Non Major Elective I (Chemistry in everyday life / Cottage Industry products / Textile chemistry)	2	2	3	75	25	100
Part - IV	Soft Skill – I	2	3		60	40	100

#### SECOND SEMESTER

Course Components	Subjects	Int. Hours	Credits	Exam Hours	Max. Marks		
					Ext. Marks	Int. Marks	Total
Part - I	Language – Paper – II	6	3	3	75	25	100
Part - II	English – Paper – II	6	3	3	75	25	100
Part - III	Core Paper – III – General Chemistry II	4	4	3	75	25	100
	Core Paper – II – Major Practical I	3	3	3	60	40	100
	Allied Theory - Mathematics II	6	5	3	75	25	100
Part - IV	Non Major Elective (Soil and agricultural chemistry / Dairy chemistry / Food Chemistry)	2	2	3	75	25	100
	Soft Skill – II	2	3		60	40	100

### THIRD SEMESTER

Course Components	Subjects	Int. Hours	Credits	Exam Hours	Max. Marks		
					Ext. Marks	Int. Marks	Total
Part - I	Language – Paper – III	6	3	3	75	25	100
Part - II	English – Paper – III	6	3	3	75	25	100
Part - III	Core Paper – IV – General Chemistry III	4	4	3	75	25	100
	Core Paper – V – Major Practical II	3	-	Examination will be held in IV semester			
	Allied Theory – Physics I	4	4	3	75	25	100
	Allied Practical – Physics	2	-	Examination will be held in IV semester			
Part - IV	Soft Skill – III	2	3		60	40	100
	Environmental Studies	2	-	Examination will be held in IV semester			

### FOURTH SEMESTER

Course Components	Subjects	Int. Hours	Credits	Exam Hours	Max. Marks		
					Ext. Marks	Int. Marks	Total
Part - I	Language – Paper – IV	6	3	3	75	25	100
Part - II	English – Paper – IV	6	3	3	75	25	100
Part - III	Core Paper – VI – General Chemistry IV	4	4	3	75	25	100
	Core Paper – V – Major Practical II	3	3	3	60	40	100
	Allied Theory- Physics II	4	4	3	75	25	100
	Allied Practical – physics	2	2	3	60	40	100
Part - IV	Soft Skill – IV	2	3	-	60	40	100
	Environmental Studies	2	2	3	75	25	100

**FIFTH SEMESTER**

Course Components	Subjects	Int. Hours	Credits	Exam Hours	Max. Marks		
					Ext. Marks	Int. Marks	Total
Part - III	Core Paper - VII - Inorganic Chemistry I	4	4	3	75	25	100
	Core Paper-VIII- Organic Chemistry I	4	4	3	75	25	100
	Core Paper - IX- Physical Chemistry I	4	4	3	75	25	100
	Core Paper -X- Gravimetric Analysis (Practical III)	3	-		Examination will be held in VI semester		
	Core paper - XI- Organic analysis and preparation(Practical IV)	3	-				
	Core Paper - XII - Physical Chemistry (Practical - V)	3	-				
	Elective Paper I (Pharmaceutical/Industrial)	4	5	3	75	25	100
	Elective Paper II (Nanomaterials/ Polymer Chemistry)	4	5	3	75	25	100
Part - IV	Value Education	1	2	3	75	25	100

**SIXTH SEMESTER**

Course Components	Subjects	Int. Hours	Credits	Exam Hours	Max. Marks		
					Ext. Marks	Int. Marks	Total
Part - III	Core Paper - XIII - Inorganic Chemistry II	5	5	3	75	25	100
	Core Paper-XIV- Organic Chemistry II	5	5	3	75	25	100
	Core Paper - XV- Physical Chemistry II	5	5	3	75	25	100
	Core Paper -X- Gravimetric Analysis (Practical III)	3	4	3	60	40	100
	Core paper - XI- Organic analysis and preparation(Practical IV)	3	4	3	60	40	100
	Core Paper - XII - Physical Chemistry (Practical - V)	3	4	3	60	40	100
	Elective Paper III (Spectroscopy/Analytical chemistry)	5	5	3	75	25	100
Part - V	Extension Activities	1	1				



#### 4. Course Learning Outcome and Syllabus

Semester I:

Core paper- I- General chemistry-I

- Learning outcomes**
1. To know the fundamental concepts of atomic structure and basics of quantum mechanics.
  2. To know the periodicity of properties of elements.
  3. To understand the various types of chemical bonding and basics of solid state.
  4. To learn the principles of inorganic qualitative and quantitative analysis.
  5. To understand the basic concepts of organic chemistry.

Semester	Subject	Subject Code	Hours	Credits
I	Core Paper- I -General Chemistry – I		75	5

**Unit - I Atomic Structure and Introduction to Quantum Mechanics** (15 hrs)  
Rutherford's atomic model, Planck's quantum theory of radiation, Photoelectric effect, Bohr's theory of hydrogen atom - postulates, Bohr's radius, energy of electron, origin of hydrogen spectrum. Particle and wave nature of electron - de Broglie's equation, Heisenberg's uncertainty principle and Compton effect - Schrodinger wave equation (no derivation) - Significance of  $\Psi$  and  $\Psi^2$ . Wave mechanical concept of atomic orbitals, - Shapes of orbitals - Quantum numbers - Zeeman effect, Pauli's exclusion principle, Aufbau principle - Effective nuclear charge, screening effect, Slater's rules -applications and limitations. Electronic configuration of first 30 elements - extra stability of half-filled and completely filled orbitals. Hund's rule - its basis and applications.

**Unit - II Classification of Elements and Periodicity of Properties** (10 hrs)  
Classification of elements - noble gases and s, p, d and f - block elements. Modern periodic table. Position of hydrogen in the periodic table-Variation of atomic volume, atomic and ionic radii, ionization potential, electron affinity, electronegativity along periods and groups-variation of metallic characters-factors influencing the above periodic properties.

#### Unit - III

##### 3.1 Chemical Bonding

(15 hrs)

Ionic bond - factors influencing the formation of ionic compounds - ionisation energy, electron affinity and lattice energy; inert pair effect, Fajan's rules.

Covalent bond - polarity of covalent bond, percentage ionic character of covalent bond, dipole moment and molecular structures of  $\text{CO}_2$ ,  $\text{H}_2\text{O}$ ,  $\text{NH}_3$  and  $\text{CH}_4$ , bond characteristics - bond length, bond angle and bond energy.

##### 3.2 Solid State

Classification of solids, isotropic and anisotropic crystals, representation of planes, Miller indices, space lattice, unit cell, crystal systems. X-ray diffraction-derivation of Bragg's equation, discussion of structures of  $\text{NaCl}$ ,  $\text{CsCl}$  and  $\text{ZnS}$ , determination of Avogadro's number.

#### Unit - IV Principles of Inorganic Qualitative and Quantitative Analysis

(10 hrs)

Common ion effect, solubility product, applications of the solubility product principle in qualitative analysis. Principle of elimination of interfering anions. Complexation reactions in qualitative analysis. Spot test reagents and tests with them - Cupferon, DMG, thiourea, magneson, alizarin and

Nessler reagent. Volumetric analysis - Definitions - normality, molarity, molality and mole fraction, primary and secondary standards, theories of acid - base, redox, complexometric, iodometric and iodimetric titrations, calculations of equivalent weights, theories of acid - base, redox, metal ion and adsorption indicators and choice of indicators.

Nanotechnology

(10 Hrs)

Introduction to nanoscience and nanotechnology - Types of nanoparticles, Techniques to synthesize nanoparticles, Physical methods - Physical vapour deposition (evaporation and sputtering) - chemical methods-reduction methods - sol-gel methods

#### Unit - V Basic Concepts of Organic Chemistry

(15 hrs)

Hybridisation and shapes of molecules - methane, ethane, ethylene, acetylene and benzene. Electron displacement effects - inductive, electromeric, mesomeric (resonance) and hyperconjugation. Steric effect. Cleavage of bonds - homolytic and heterolytic fissions. Reactive intermediates - carbocations, carbanions and free radicals - their formation and stability.

Nomenclature of organic compounds: IUPAC system of nomenclature of compounds containing upto 8 carbon atoms - mono and bifunctional compounds.

#### Textbooks :

1. Puri B.R., Sharma L.R. and Pathania M.S., Principles of Physical Chemistry, 47th ed., New Delhi, Vishal Publishing Co., 2016.
2. Puri B.R., Sharma L.R. and Kalia K.C., Principles of Inorganic Chemistry, 33th ed., New Delhi, Milestone Publishers and Distributors, 2016.
3. Soni P.L., and Chawla H.M., Textbook of Organic Chemistry, 29th ed., New Delhi, Sultan Chand & Sons, 2007.
4. T. Pradeep, Nano: The Essentials
5. H.M., Textbook of Organic Chemistry, 29th ed., New Delhi, Sultan Chand & Sons, 2007.
6. Fundamentals of Crystal Chemistry, T R N Kutty; J A K Tareen, Universities Press, Chennai, 2000
7. Basic Course in Crystallography, A, J A K Tareen; T R N Kutty, Universities Press, Chennai, 2000

#### Reference Books

1. Lee J.D. Concise Inorganic Chemistry, 5th ed., Blackwell Science, 2005.
2. Soni, P.L. and Mohan Katyal. Textbook of Inorganic Chemistry, 20th ed., Sultan Chand & Sons, 2006.
3. Glasstone Samuel. Textbook of Physical Chemistry, 2<sup>nd</sup> ed., Macmillan India Ltd., 1990.
4. Soni P.L., Dharmarha O.P. and Dash U.N Textbook of Physical Chemistry, 23<sup>rd</sup> ed., New Delhi, Sultan Chand & Sons, 2011.
5. Graham Solomons T.W. Organic Chemistry, 3<sup>rd</sup> ed., John Wiley & Sons.
6. Morrison R.T. and Boyd R.N., Organic Chemistry, 6<sup>th</sup> ed., Pearson Education, Asia, 2002.
7. C.N.R. Rao, Chemistry of Nanomaterials
8. Charles .P.Poole Jr., Frank.J.Owens, Introduction to Nanotechnology

**Semester I**  
**Non-Major electives**

**Non major elective**

**Semester I: Chemistry in everyday life**

**Learning outcomes**

1. To understand the importance of chemicals in everyday life and causes of air and water pollution and their impact.
2. To understand the chemistry of building materials and various polymers.
3. To understand the role of chemistry in food and cosmetics.
4. To understand the role of chemistry in fertilizers and fuels.
5. To learn about the chemistry of drugs and explosives

**1. CHEMISTRY IN EVERY DAY LIFE**

**(30 hours) 2 Credits**

**Unit-I**

- 1.1 General survey of chemicals used in everyday life.
- 1.2 Air-Components and their importance; photosynthetic reaction, air pollution, green house effect and their impact on our life style.
- 1.3 Water - Sources of water, qualities of potable water, soft and hard water, methods of removal of hardness-water pollution.

**Unit-II**

- 2.1 Building materials - cement, ceramics, glass and refractories - definition, composition and application only.
- 2.2 Plastics, polythene, PVC, bakelite, polyesters, melamine formaldehyde resins - preparation and uses only.

**Unit-III**

- 3.1 Food and Nutrition - Carbohydrates, Proteins, Fats - definition and their importance as food constituents- balanced diet- Calorie- minerals and vitamins (sources and their physiological importance).
- 3.2 Cosmetics - Tooth pastes, face powder, soaps and detergents, shampoos, nail polish, perfumes - general formulation and preparations- possible hazards of cosmetics use.

**Unit-IV**

- 4.1 Chemicals in food production - fertilizers - need, natural sources; urea, NPK fertilizers and super phosphate.
- 4.2 Fuel - classification - solid, liquid and gaseous; nuclear fuel - examples and uses.

## Unit-V

- 5.1 Pharmaceutical drugs - analgesics and antipyretics - paracetamol and aspirin.
- 5.2 Colour chemicals - pigments and dyes - examples and applications.
- 5.3 Explosives - classification and examples.

## REFERENCES

1. Chemical Process Industries (4<sup>th</sup> Edition) R. Norris Shreve, Joseph A. Brink, Jr.
2. Perfumes, Cosmetics and Soaps V. V. A. Poucher (Vol.3)
3. Drugs, G L David Krupadanam;D Vijaya Prasad;K Varaprasad Rao;K L N Reddy;C Sudhakar, Universities Press, Chennai, 2001

## Semester: Cottage Industry

Units	Learning outcomes
1.	To understand the manufacturing process and uses of simple household materials.
2.	To understand the different type of soaps and their manufacturing process.
3.	To understand the manufacturing process of paints and varnishes.
4.	To learn about the different types of detergents and their types.
5.	To understand about the shave and shampoo manufacture and industries.

## COTTAGE INDUSTRY PRODUCTS (30 Hours) 2Credits

### Unit I: Household materials

Manufacturing process - composition and uses of safety matches, agarbathis, naphthalene balls, wax candles, writing/fountain pen ink, chalk crayons and gum paste.

### Unit II: Soaps

Soaps - introduction - types - hot process - batch process - continuous process - manufacture of soap by continuous process, toilet and transparent soaps, laundry soaps - oils to be used in soaps - cleaning action of soaps

### Unit III: Paints and varnishes

Paints - introduction - manufacture - setting of the paint, pigments - definition - classification, varnishes - introduction - types - manufacture - solvents and thinner

Unit IV: Detergents - introduction - principal groups of synthetic detergents - classification of surface active agents - biodegradability of surfactants - anionic detergents - oxo process - Alfol process - Welsh process - cationic detergents

### Unit V: Shave lotion and shampoo

Shave lotion - introduction - factors for growth of shave lotion industries - uses- formulation with process, hair shampoo - introduction, properties, uses and applications - raw materials - types of shampoo - protein and egg shampoo, herbal shampoo, vitamin shampoo, antidandruff shampoo - manufacturing process

### References

1. Sharma B.K., Industrial Chemistry, Goel Publishing House, 6<sup>th</sup> ed., 1994.
2. Chattopadhyay P.K., Modern Technology of Soaps, Detergents and Toiletries, 2<sup>nd</sup> ed., 2005

## Textile chemistry

Units	Learning outcomes
1.	To understand the classification of various types of natural fibres.
2.	To understand about the classification of various types of synthetic fibres
3.	To learn different methods of removal of impurities from fibres
4.	To learn the methods of dyeing silk and wool.
5.	To learn the methods of finishing given to fibre.

### 3. TEXTILE CHEMISTRY

(30 Hours), 2 credits

**UNIT I :** 1. General classification of fibres-chemical structure, production, properties and uses of the following natural fibres (a) natural cellulose fibres (cotton) (b) natural protein fibre (wool).

**UNIT II :** Chemical structure, production, properties and uses of the following synthetic fibres. (i) Man made cellulosic fibres (Rayon) (ii) Polyamide fibres (different types of nylons) (iii) Poly ester fibres.

**UNIT III :** Impurities in raw cotton and grey cloth, wool and silk- general principles of the removal - Scouring - bleaching - Desizing- Kierboiling- Chemicking.

**UNIT IV :** Dyeing - Dyeing of wool and silk -Fastness properties of dyed materials - dyeing of nylon, terylene and other synthetic fibres.

**UNIT V :** Finishing- Finishes given to fabrics- Mechanical finishes on cotton, wool and silk, method used in process of mercerizing -Anti-crease and Anti-shrink finishes -Water proofing.

#### Reference

1. Introduction to Textile Science -3rd edition, Maryory L. Joseph.
2. Textile Chemistry -Vol. II R. H. Peters, Elsevier, Amsterdam.
3. Dyeing and chemical Technology of Textile fibres-5th Edition, E. R. Trotman, Charles Griffin & Co Ltd
4. Chemistry of dyes & Principles of Dyeing -V. A. Chennai, Sevak Publications.
5. A Students Text Book of Textile Science-A. J. Hall.
6. Text book of Fabric Science: Fundamentals to finishing. Seema Sekhri; Prentice Hall India Learning Private Limited; Second edition (2016)

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**B.Sc. DEGREE COURSE IN CHEMISTRY**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BCY-DSC02**

**CORE-II: GENERAL CHEMISTRY – II**

**Units Learning outcomes**

1. To equip the learners with concepts of s block elements through comparative study.
2. To equip the learners with concepts of p block elements through comparative study.
3. To understand the aspects of gaseous state.
4. To understand the aspects of liquid state, colloids and carbon nanotubes, fullerenes
5. To understand the chemistry of organic compounds like alkanes, cycloalkanes, alkenes, alkynes and the conformational analysis.

Semester	Subject	Hours	Credits
II	General Chemistry - II	75	4

**UNIT-I Chemistry of s- Block Elements [Group IA and IIA]**

(10 hrs)

Hydrogen: Position of hydrogen in the periodic table.  
 Alkali metals: Comparative study of the elements with respect to oxides, hydroxides, halides, carbonates and bicarbonates. Diagonal relationship of Li with Mg. Extraction of Li from its silicate- ores. Preparation, properties and uses of NaOH, Na<sub>2</sub>CO<sub>3</sub>, KBr, KClO<sub>3</sub>.  
 alkaline earth metals: Comparative study of the elements with respect to oxides, hydroxides, sulphates, halides and carbonates. Extraction and anomalous behaviour of Be.

(10 hrs)

**UNIT-II Chemistry of p- Block Elements**

2.1 Boron Family[Group-IIIA]: preparation and structure of diborane and borazine. Chemistry of borax. Extraction of Al and its uses. Alloys of Al. 2.2 Carbon Family (Group -IV A) : comparison of carbon with silicon. Carbon-di-sulphide – Preparation , properties , structure and uses. Percarbonates , per monocarbonates and per dicarbonates. Tin- Allotropic forms of Tin, alloys of tin, tinning, tin plating. Lead-lead accumulator (discharging and recharging), leadpigments.

(15 hrs)

**UNIT-III Gaseous State**

Postulates of kinetic theory of gases, derivation of gas laws from the kinetic gas equation. Kinetic energy and temperature-average translational kinetic energy and its calculation. Maxwell's distribution of molecular velocities(no derivation)-mean, root mean square and most probable velocity. Collision diameter, collision number, collision frequency, mean free path. Principle of equipartition of energy. Real gases- van der Waals equation of state-derivation. Boyle temperature. Significance of critical constants.

**UNIT-IV**

(20 hrs)

**4.1 Liquid State**

Some Properties of Liquids(molecular basis)-Equilibrium vapour pressure of a liquid, boiling point, heat of evaporation; heat of condensation, freezing point. Surface tension- definition, measurement of surface tension, effect of temperature on surface

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tension. Parachor-definition, calculation and applications.

Viscosity or fluidity-definition, measurement and calculation, factors affecting viscosity.

4.2 Nanoparticles of Au, Ag and TiO<sub>2</sub> -preparation, properties and uses. Carbon nanotubes-Types- preparation, properties and uses-Fullerene - Introduction only

**UNIT-V**

(20 hrs)

5.1 Chemistry of Alkanes and Cycloalkanes : General methods of preparation and properties of alkanes and cycloalkanes ,Conformational analysis of ethane and n-butane. Baeyer's strain theory.

5.2 Alkenes, Alkynes and Dienes: Preparation of alkenes (dehydrogenation, dehydrohalogenation and dehydration), preparation of alkynes(dehydrohalogenation, dehalogenation).Addition (with mechanisms) of H<sub>2</sub>, X<sub>2</sub>, HX, HOX, B<sub>2</sub>H<sub>6</sub> and O<sub>3</sub> to alkenes and alkynes. Addition of HBr (peroxide effect; free radical reaction mechanism) to alkenes and alkynes. . Allylic substitution of alkenes by NBS. Dienes types, stability; preparation of- 1,3-butadiene, isoprene, and chloroprene. Reactivity: 1,2- and 1,4-additions to butadiene. Diels-Alder reaction.

**Textbooks :**

1. Puri B.R., Sharma L.R. and Pathania M.S., Principles of Physical Chemistry, 47th ed., New Delhi, Vishal Publishing Co.,2016.
2. Puri B.R., Sharma L.R. and Kalia K.C., Principles of Inorganic Chemistry, 33th ed., New Delhi, Milestone Publishers and Distributors,2016.
3. Soni P.L., and Chawla H.M., Textbook of Organic Chemistry, 29th ed., New Delhi, Sultan Chand & Sons, 2007.
4. Understanding Chemistry, C N R Rao, Universities Press Private Limited, Chennai,1999
5. The Chemistry of the p-Block Elements: Syntheses, Reactions and Applications, Anil J Elias, Universities Press Private Limited, Chennai,2019
6. T. Pradeep, Nano: The Essentials, New Delhi, McGraw Hill,2007

**Reference Books**

1. Lee J.D. Concise Inorganic Chemistry, 5th ed., Blackwell Science,2005.
2. Jain M.K, Sharma S.C. Modern Organic Chemistry, Vishal Publishing Co.,2017
3. Soni, P.L. and Mohan Katyal. Textbook of Inorganic Chemistry, 20th ed., Sultan Chand & Sons, 2006.
4. Glasstone Samuel. Textbook of Physical Chemistry, 2<sup>nd</sup> ed., Macmillan India Ltd.,1990.
5. Soni P.L., Dharmarha O.P. and Dash U.N Textbook of Physical Chemistry, 23<sup>rd</sup> ed., New Delhi, Sultan Chand & Sons,2011.
6. Graham Solomons T.W. Organic Chemistry, 3<sup>rd</sup> ed., John Wiley&Sons.
7. Morrison R T and Boyd R N, Organic Chemistry, 6<sup>th</sup> ed., Pearson Education, Asia,2002.
8. C. N. R. Rao, Chemistry of Nanomaterials: Synthesis, Properties and Applications, Wiley-VCH Verlag GmbH & Co. KgaA,2004
9. Charles P. Poole Jr., Frank J. Owens, Introduction to Nanotechnology, New Jersey, John Wiley & Sons, 2003



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BCY-DSC03

**CORE-III: MAJOR PRACTICALS - I**  
(90 HOURS: I & II SEMESTERS 3 CREDITS)

[The procedure for the practical examination will be given by the examiner]  
The following volumetric analyses are prescribed.

1. Estimation of HCl by NaOH using a standard oxalic acid solution
2. Estimation of  $\text{Na}_2\text{CO}_3$  by HCl using a standard  $\text{Na}_2\text{CO}_3$  solution
3. Estimation of oxalic acid by  $\text{KMnO}_4$  using a standard oxalic acid.
4. Estimation of Ferrous sulphate by  $\text{KMnO}_4$  using a standard Mohr's salt solution.
5. Estimation of  $\text{KMnO}_4$  by sodium thiosulphate using a standard  $\text{K}_2\text{Cr}_2\text{O}_7$  solution
6. Estimation of iron by  $\text{K}_2\text{Cr}_2\text{O}_7$  solution using a standard Ferrous sulphate solution
7. Estimation of Copper sulphate using a standard  $\text{K}_2\text{Cr}_2\text{O}_7$  solution.
8. Estimation of Mg(II) by EDTA solution using standard Zinc sulphate solution.
9. Estimation of Zn(II) by EDTA solution using standard Magnesium sulphate solution.
10. Estimation of total hardness of water.

The following inorganic preparations are prescribed

1. Preparation of Ferrous ammonium sulphate or Mohr's salt
2. Preparation of potash alum or potassium aluminium sulphate
3. Preparation of microcosmic salt
4. Preparation of tetrammine copper(II) sulphate

Learning outcomes

1. To understand about the origin and physical properties of Soil.
2. To understand the chemical properties of soil and methods of analysing.
3. To learn about the different types of plant nutrients and their importance.
4. To learn about the fertilizers and their uses.
5. To understand about the classification of various pesticides, fungicides and herbicides.

## Semester II

- Learning outcomes
1. To understand about the origin and physical properties of Soil.
  2. To understand the chemical properties of soil and methods of analysing.
  3. To learn about the different types of plant nutrients and their importance.
  4. To learn about the fertilizers and their uses.
  5. To understand about the classification of various pesticides, fungicides and herbicides.

### 1. SOIL AND AGRICULTURAL CHEMISTRY

(30 Hours ) 2 credits

#### Unit I: Origin and Physical properties of Soil

Definition of soil - origin - igneous - metamorphic and sedimentary rocks - rock systems - main components of soil- minerals of importance with respect to agriculture. Physical properties of soil - soil texture and textural classification - soil structure and soil colour - soil air, soil temperature, their importance in plant growth.

#### Unit II: Chemical properties of Soil and Analysis

Origin of problems in soils, their properties- acid, alkali and saline soils - diagnosis - remediation of acid and salt affected soils. Soil testing - concept, objectives and basis - soil sampling, collection processing - Bio-conversion of agricultural wastes.

#### Unit III: Plant Nutrients

Plant nutrients - macro and micro nutrients - their role in plant growth - sources- forms of nutrient absorbed by plants - factors affecting nutrient absorption - deficiency symptoms in plants.

#### Unit IV: Fertilizers

Fertilizers - classification of NPK fertilizers - sources - natural and synthetic - their properties, uses- micro nutrient fertilizers, biofertilizers with examples

#### Unit V: Pesticides, Fungicides and Herbicides

Pesticides: Definition - Classification - organic and inorganic pesticides with examples.  
Fungicides: definition - classification and each classification with examples  
Herbicides: definition - classification and each classification with examples  
Acaricides- rodenticides - attractants - repellants- fumigants, defoliant

#### References:

1. Biswas, T. D. and Mukherjee, S. K. Textbook of Soil Science, 1987 .
2. Daji, A.J. A Textbook of Soil Science, Asia Publishing House, Madras, 1970 .
3. Tisdale, S.L., Nelson, W.L. and Beaton, J. D. Soil Fertility and Fertilizers, Macmillan Publishing Company, New York, 1990.
4. Hesse PR, A Textbook of Soil Chemical Analysis, John Murray, New York, 1971.
5. SreeRamula, U. S. Chemistry of Insecticides and Fungicides, Oxford and IBH Publishing Co., New Delhi, 1979

## Dairy Chemistry

### Learning outcomes

1. To understand about the composition of milk and adulterants and preservatives added to milk.
2. To learn the various methods of processing the milk and the chemistry involved.
3. To learn about the major products of milk and their compositions.
4. To understand about the different types of milk their composition and properties.
5. To understand about various types of milk products their manufacture and uses..

## 2. DAIRY CHEMISTRY

(30 hours) 2 Credits

### Unit I: COMPOSITION OF MILK

Milk - definition - general composition of milk - constituents of milk - lipids, proteins, carbohydrates, vitamins and minerals - physical properties of milk - colour, odour, acidity, specific gravity, viscosity and conductivity - Recrnaged effect - factors affecting the composition of milk - adulterants, preservatives with neutralizer - examples and their detection - estimation of fat, acidity and total solids in milk.

### Unit II: PROCESSING OF MILK

Microbiology milk - destruction of micro organisms in milk - physico- chemical changes taking place in milk due to processing - boiling, pasteurization - types of pasteurization - Bottle, Batch and HTST (High Temperature Short Time) - Vacuum pasteurization - Ultra High Temperature Pasteurization.

### Unit III: MAJOR MILK PRODUCTS

Cream - definition - composition - chemistry of creaming process - gravitational and centrifugal methods of separation of cream - estimation of fat in cream. Butter- definition - composition - theory of churning - desibutter- salted butter estimation of acidity and moisture content in butter. Ghee- major constituents - common adulterants added to ghee and their detection - rancidity - definition - prevention - antioxidants and synergists - natural and synthetic.

### Unit IV: SPECIAL MILK

Standardised milk - definition - merits - reconstituted milk - definition - flow diagram of manufacture - Homogenised milk - flavoured milk - vitaminised milk - toned milk - Incitation milk - Vegetable toned milk - humanized milk - condensed milk - definition , composition and nutritive value.

### Unit V: FERMENTED AND OTHER MILK PRODUCTS

Fermented milk products - fermentation of milk - definition, conditions, cultured milk - definition of culture - example, conditions - cultured cream butter milk - Bulgaxious milk - acidophilous milk - yoheer Indigenous products - khoa and chchana definition - . Ice cream - definition - percentage composition- types - ingredients - manufacture of ice-cream stabilizers - emulsifiers and their role milk powder - definition - need for making milk powder - drying process - types of drying.

## BOOKS FOR REFERENCE

1. Robert Jenness and Patom S., Wiley, Principles of Dairy Chemistry, New York.
2. Rangappa K.S. and Acharya K.T., Indian Dairy Products.
3. Wond F.P., Fundamentals of Dairy Chemistry, Springer..

## Semester II: Food chemistry

### Units Learning outcomes

1. To learn about the adulterants in food and methods to remove.
2. To know about the usage of pesticides and their effect.
3. To know about the types of food additives used in food industry.
4. To learn about the various beverages and their effect.
5. To know about the chemistry of fats and oils and their properties.

### 3. FOOD CHEMISTRY

(30 hours) 2 Credits

#### Unit I: FOOD ADULTERATION

Sources of food, types, advantages and disadvantages. Food adulteration - contamination of Wheat, Rice, Alia, Milk, Butter etc. with clay stones, water and toxic chemicals - Common adulterants. Common adulterants Ghee adulterants and their detection. Detection of adulterated Foods by simple analytical techniques.

#### Unit II: FOOD POISON

Food Poisons - natural poisons (alkaloids - nephrotoxin) - pesticides, (DDT, BHC, Malathion)-Chemical poisons - First aid for Poison consumed victims.

#### Unit III: FOOD ADDITIVES

Food additives - artificial sweeteners- Saccharin - Cyclamate and aspartame. Food flavours - esters, aldehydes and heterocyclic compound. Food colours - Emulsifying agents- preservatives - leavening agents. Baking powder - yeast - taste makers - MSG vinegar.

#### Unit IV: BEVERAGES

Beverages - soft drinks - soda - fruit juices - alcoholic beverages examples. Carbonation - addiction to alcohol - diseases of liver and social problems.

#### Unit V: EDIBLE OILS

Fats, Oils - Sources of oils - Production of refined vegetable oils - Preservation. Saturated and unsaturated fats - iodine value - role of MUFA and PUFA in preventing heart diseases - determination of iodine value, RM value, saponification values and their significance.

#### BOOKS FOR REFERENCE

1. Swaminathan M., Food Science and Experimental foods, Ganesh and Company.

2. Jayashree Ghosh, Fundamental concepts of Applied chemistry, S. Chand & Co. Publishers.
3. Thangamma Jacob, Text Books of applied chemistry for Home Science and Allied Sciences, Macmillan.

## Semester III

### PAPER IV

#### GENERAL CHEMISTRY III - Learning Outcomes

1. To understand the general characteristics of Nitrogen and Oxygen families.
2. To know about the chemistry of Halogens and noble gases.
3. To learn the mechanism of Nucleophilic substitution and Elimination reactions.
4. To know about the reaction mechanisms of aromatic and heterocyclic compounds.
5. To understand the basic concepts of Thermodynamics and Thermochemistry.

SEMESTER	Subject Title	Subject Code	Total Hours	Credit
III	PAPER - IV GENERAL CHEMISTRY - III		75	5

#### UNIT-I: CHEMISTRY OF NITROGEN AND OXYGEN FAMILIES (15hrs)

1.1 Group VA elements: General characteristics of Group VA elements; chemistry of  $H_2N-NH_2$ ,  $NH_2OH$ ,  $HN_3$  and  $HNO_3$ . Chemistry of  $PH_3$ ,  $PCl_3$ ,  $PCl_5$ ,  $POCl_3$ ,  $P_2O_5$  and oxyacids of phosphorous ( $H_3PO_3$  and  $H_3PO_4$ ).

1.2 Group VIA elements: General properties of group VIA elements - Structure and allotropy of elements-chemistry of ozone - Classification and properties of oxides - oxides of sulphur and selenium - Oxyacids of sulphur (Caro's and Marshall's acids).

#### UNIT II: CHEMISTRY OF HALOGENS AND NOBLE GASES (15hrs)

2.1 Chemistry of Halogens: General characteristics of halogen with reference to electro-negativity, electron affinity, oxidation states and oxidizing power. Peculiarities of fluorine. Halogen acids ( $HF$ ,  $HCl$ ,  $HBr$  and  $HI$ ), oxides and oxyacids ( $HClO_4$ ). Inter-halogen compounds ( $ICl$ ,  $ClF_3$ ,  $BrF_3$  and  $IF_7$ ), pseudo halogens [ $(CN)_2$  and  $(SCN)_2$ ] and basic nature of Iodine.

2.2 Noble gases: Position in the periodic table. Preparation, properties and structure of  $XeF_2$ ,  $XeF_4$ ,  $XeF_6$  and  $XeOF_4$ ; uses of noble gases- clathrate compounds.

#### UNIT III: NUCLEOPHILIC SUBSTITUTION AND ELIMINATION REACTIONS (10hrs)

3.1 Nucleophilic substitution :  $S_N1$ ,  $S_N2$  and  $S_Ni$  reactions-mechanisms- stereochemistry - effect of solvent, structure of substrate, nucleophilicity of the reagent [nucleophile] and nature of the leaving group.

3.2 Elimination reactions:  $E1$ ,  $E2$  and  $E1cB$  reactions and mechanisms: Hofmann and Saytzeff rules. Elimination vs Substitution.

#### UNIT IV: BENZENE AND POLYNUCLEAR AROMATIC HYDROCARBONS (15hrs)

Aromaticity - conditions for aromaticity - resonance stabilization energy - Hückel rule with respect to benzene, naphthalene, anthracene and phenanthrene; Electrophilic substitution in benzene-general mechanism; nitration, sulphonation, halogenations, Friedel-Crafts alkylation and acylation. Orientation [directive influence] and reactivity in mono substituted benzenes. Polynuclear hydrocarbons-naphthalene, anthracene and phenanthrene-preparation, properties and uses.

#### UNIT V: THERMODYNAMICS - I

(20 hrs)

5.1 Terminology of thermodynamics-Thermodynamic equilibrium-nature of work and heat-First law of Thermodynamics-statement-definition of Internal Energy (E), Enthalpy (H) and Heat capacity. Relation between  $C_p$  and  $C_v$ . Calculation of  $W$ ,  $q$ ,  $dE$  and  $dH$  for expansion of ideal and real gases under isothermal and adiabatic condition of reversible and irreversible processes. Joule-Thompson effect and Coefficient ( $\mu_{JT}$ )-Calculation of  $\mu_{JT}$  for ideal and real gases - Inversion temperature.

5.2 Thermochemistry - Relation between enthalpy of reaction at constant volume ( $q_v$ ) and at constant pressure ( $q_p$ ) - Temperature dependence of heat of reaction - Kirchoff equation-Derivation and application-Enthalpy of formation and combustion - Bond energy and its calculation from thermochemical data.

#### Textbooks :

1. Puri B.R., Sharma L.R. and Pathania M.S., Principles of Physical Chemistry, 47th ed., New Delhi. Vishal Publishing Co., 2016.
2. Puri B.R., Sharma L.R. and Kalia K.C., Principles of Inorganic Chemistry, 33th ed., New Delhi, Milestone Publishers and Distributors, 2016.
3. Soni P.L., and Chawla H.M., Textbook of Organic Chemistry, 29th ed., New Delhi, Sultan Chand & Sons, 2007.
4. Jain M K and Sharma S C, Modern Organic Chemistry, Vishal Publications, 2018.

#### Reference Books

1. Lee J.D. Concise Inorganic Chemistry, 5th ed., Blackwell Science, 2005.
2. Soni, P.L. and Mohan Katyal. Textbook of Inorganic Chemistry, 20th ed., Sultan Chand & Sons. 2006.
3. Glasstone Samuel. Textbook of Physical Chemistry, 2<sup>nd</sup> ed., Macmillan India Ltd., 1990.
4. Soni P.L., Dharmarha O.P. and Dash U.N Textbook of Physical Chemistry, 23<sup>rd</sup> ed., New Delhi, Sultan Chand & Sons, 2011.
5. Graham Solomons T.W. Organic Chemistry, 3<sup>rd</sup> ed., John Wiley & Sons.
6. Morrison R.T. and Boyd R.N., Organic Chemistry, 6<sup>th</sup> ed., Pearson Education, Asia, 2002.



## Semester IV

### PAPER VI

#### GENERAL CHEMISTRY IV - Learning Outcomes

1. To understand the chemistry of Redox reactions.
2. To understand the General characteristics of d-Block elements
3. To learn about the preparation and properties of Heterocyclic compounds and dyes.
4. To know about the nomenclature, preparation and properties of alcohols, thiols, ethers and thioethers.
5. To understand the limitation of I law of thermodynamics and the need of II law of thermodynamics.

SEMESTER	Subject Title	Subject Code	Total Hours	Credit
IV	PAPER - VI GENERAL CHEMISTRY - IV		75	5

#### UNIT I: CHEMISTRY OF REDOX REACTIONS

(10 hrs)

Covalency- oxidation number- oxidation state - difference between oxidation number and valency- rules for calculating oxidation number - definition of oxidation and reduction - redox reactions and half reactions - oxidising agents and reducing agents - equivalent weights of oxidising and reducing agents - auto oxidation and induced oxidation - balancing of redox equations by oxidation number method and ion-electron method

#### UNIT II: CHEMISTRY OF d- BLOCK ELEMENTS

(15 hrs)

Transition Elements - Electronic configuration - General periodic trend -Atomic and ionic radii, metallic character, melting and boiling points, ionisation energy, oxidation state, reactivity, colour and tendency to form complexes- Group study of Titanium, Vanadium, Chromium, Manganese, Iron, Cobalt, Nickel and Zinc groups - galvanization, Evidences for the existence of mercurous ion as  $Hg_2^{2+}$ .

#### UNIT III: HETEROCYCLIC COMPOUNDS AND DYES (15 hrs)

##### 3.1 Hetero cyclic compounds

(15 hrs)

Nomenclature, Preparation and properties of Furan, Pyrrole, Thiophene and Pyridine. Comparative study of basicity of pyrrole and pyridine with aliphatic amines. Synthesis and reactions of Indole, Quinoline and Isoquinoline

##### 3.2 Dyes

Theory of colour and constitution. Preparation and uses of: Azo dye - Bismark brown, Triphenyl methane dye - malachite green, phthalein dye - fluorescein, anthraquinone dye- alizarin and vat dye- indigo.

#### UNIT IV:

##### 4.1 Alcohols and thiols

(15 hrs)

Monohydric, dihydric (Ethylene glycol) and trihydric (Glycerol) alcohols: Nomenclature, preparation of alcohols from alkenes, alkyl halides, Grignard reagent and carbonyl compounds. Reactions of alcohols-Dehydration, oxidation, action of Grignard reagent, dehydrogenation using copper and esterification.

Thiols: Nomenclature, structure, preparation and properties

##### 4.2 Ethers and thioethers

Ethers: Nomenclature, structure, preparation, properties and uses of dimethyl ether, diethyl ether, ethyl methyl ether, anisole and phenetole.  
Thioethers: Nomenclature, structure, preparation, properties and uses.

**UNIT 5: Thermodynamics-II**

(20 hrs)

Second Law of Thermodynamics - Limitations of first law & Need for the second law - Different statements of the law - Carnot's cycle and efficiency of heat engine-Carnot's theorem- Concept of Entropy - Definition and physical significance of entropy - Entropy as a function of P, V and T- Entropy changes during phase changes - Entropy of mixing- Gibb's free energy (G) and Helmholtz free energy ( $\Delta$ ) - Variation of  $\Delta$  and G with P, V and T - Gibb's Helmholtz equation and its applications - Thermodynamic equation of state - Maxwell's relations.

**Text Books**

1. Puri B.R., Sharma L.R. and Pathania M.S., Principles of Physical Chemistry, 44th ed., New Delhi, Vishal Publishing Co., 2009.
2. Puri B.R., Sharma L.R. and Kalia K.C., Principles of Inorganic Chemistry, 30th ed., New Delhi, Milestone Publishers and Distributors, 2009.
3. Soni P.L., and Chawla H.M., Textbook of Organic Chemistry, 29th ed., New Delhi, Sultan Chand & Sons, 2007.

**Books for References**

1. Glasstone S. And Lewis D., Elements of Physical Chemistry, 2<sup>nd</sup> ed., MacMillan & Co. Ltd., London.
2. Morrison R.T. and Boyd R.N., Organic Chemistry, 6th ed. Pearson Education, Asia, 2002
3. Bahl B.S. and ArunBahl, Advanced Organic Chemistry, 12<sup>th</sup> ed., Sultan Chand & Co., New Delhi, 1997.
4. Madan R.D. SathyaPrakash's Modern Inorganic Chemistry, 2<sup>nd</sup> ed., S.Chand& Co. Ltd, New Delhi, 1990.

## PAPER - V

### MAJOR CHEMISTRY PRACTICAL

Semester III & IV	Subject Title	Subject Code	Total Hours	Credit
	SEMIMICRO INORGANIC QUALITATIVE ANALYSIS		90	2

#### Semi-Micro Qualitative Analysis

1. Analysis of simple acid radicals: carbonate, sulphate, chloride, bromide, iodide, nitrate
2. Analysis of interfering acid radicals: Fluoride, oxalate, borate, phosphate
3. Elimination of interfering acid radicals and Identifying the groups of basic radicals
4. Analysis of basic radicals (group-wise): Lead, copper, bismuth, cadmium, iron, aluminium, zinc, manganese, nickel, cobalt, calcium, strontium, barium, magnesium, ammonium
5. Analysis of a mixture containing two cations and two anions (of which one is interfering type)

Each student is expected to do the analysis of at least 10 mixtures.

#### Book for Reference

1. Venkateswaran V, Veeraswamy R., Kulandivelu A.R., Basic Principles of Practical Chemistry, 2<sup>nd</sup> edition, New Delhi, Sultan Chand & Sons (1997)

**Semester V  
PAPER VII**

**INORGANIC CHEMISTRY – I**

**Learning Outcomes**

1. Learning the unique characteristics of lanthanide and actinide series
2. Learning the fundamentals of coordination chemistry and its applications in analytical chemistry ; Understanding the biological importance of complexes
3. Learning the theories of acids and bases

Semester V	Subject Title	Subject Code	Total Hours	Credit
	<b>PAPER VII INORGANIC CHEMISTRY – I</b>		60	4

**UNIT I: CHEMISTRY OF f-BLOCK ELEMENTS**

(15 hrs)

General characteristics of f-block elements - Comparative account of lanthanides and actinides - Occurrence, Oxidation states, Magnetic properties, Colour and spectra - Lanthanides and Actinides Separation by ion-Exchange and Solvent extraction methods - Lanthanide contraction-Chemistry of thorium and Uranium-Occurrence, Ores, Extraction, properties and uses - Preparation, Properties and uses of ceric ammonium sulphate, thorium dioxide and uranyl acetate.

**UNIT II: COORDINATION CHEMISTRY**

(15 hrs)

Types of ligands, IUPAC Nomenclature, Isomerism - Ionisation, hydrate, linkage, ligand and coordination isomerism. Stereoisomerism-geometrical and optical isomerism in 4 & 6 coordinated complexes. Theories of coordination compounds - Werner and Sidgwick EAN concept, Valence Bond theory - hybridisation, geometry and magnetic properties of  $[\text{Ni}(\text{CN})_4]^{2-}$ ,  $[\text{NiCl}_4]^{2-}$ ,  $[\text{Fe}(\text{CN})_6]^{4-}$ ,  $[\text{Co}(\text{NH}_3)_6]^{3+}$  and  $[\text{CoF}_6]^{3-}$ . Crystal field theory - spectrochemical series, splitting of d-orbitals in octahedral and tetrahedral complexes, low spin & high spin complexes. Explanation of colour and magnetic properties using CFT, comparison of VBT and CFT.

**UNIT III: APPLICATION OF COORDINATION COMPOUNDS**

(12 hrs)

Application of coordination compounds - Estimation of nickel using DMG and aluminium using oxine. Estimation of hardness of water using EDTA. Biologically important coordination compounds - Chlorophyll, haemoglobin, vitamin - B<sub>12</sub>. (their structure and applications). Metal Carbonyls : Mono and Poly nuclear Carbonyls of Ni, Fe, Cr, Co and Mn- Synthesis, structures and bonding.

**UNIT IV: CHEMISTRY OF BINARY COMPOUNDS**

(10 hrs)

Classification, preparation, properties and uses of hydrides, borides, carbides and nitrides

**UNIT V: CONCEPTS OF ACIDS AND BASES**

(8 hrs)

Theories of acids and bases - Arrhenius theory, Bronsted- Lowry theory - basicity of an acid and acidity of a base - relative strengths of acids and bases, Cady - Esley concept - general theory of solvent system, Lux - Flood concept - Lewis acids - bases concept in coordination chemistry - classification of Lewis acids, Usanovich concept. Concept of Hard and Soft Acids and Bases (HSAB).

Types of solvents: Protic and aprotic solvents-aqueous and non aqueous solvents-liquid ammonia and liquid HF as solvents.

### TEXT BOOK

1. Puri B.R., Sharma L.R. and Kalia K.C., Principles of Inorganic Chemistry, 33<sup>rd</sup> ed., New Delhi, Mile stone publishers and distributors, 2016.
2. Textbook of Inorganic Chemistry, R Gopalan, Universities Press, Chennai, 2009

### BOOKS FOR REFERENCE

1. Lee J.D., Concise Inorganic Chemistry, 5<sup>th</sup> ed., Blackwell Science, 2005.
2. Sharpo Alm G, Inorganic Chemistry, ELBS and Longman, 1981.
3. Soni P.L., and Mohan Katyal, Text book of Inorganic Chemistry, 20<sup>th</sup> ed., S.Chand & Co., New Delhi, 2006.
4. Malik Wahid U., Tuli G.D. and Madan R.D., Selected Topics in Inorganic Chemistry, 7<sup>th</sup> ed., S.Chand & Company Ltd., New Delhi, 2007.
5. James Ellulacey, Ellen AKeiter, Richard LKeiter and OkhlikMedhi, Inorganic Chemistry: Principles of Structure and Reactivity, 4<sup>th</sup> ed., Pearson India, 2011.
6. Gurdeep Raj Chatwal and Harish Mehra, Advanced Inorganic Chemistry, 7<sup>th</sup> ed., Goei Publishing House, Meerut.

## PAPER -VIII

### ORGANIC CHEMISTRY - I

#### Learning Outcomes

1. Understanding acidic nature of phenol and its properties
2. Learning the reactions of aldehydes and ketones
3. Learning the chemistry of carboxylic acids and their derivatives
4. Learning the chemistry of nitro compounds and amines
5. Learning the basics of green chemistry .

Semester V	Subject Title	Subject Code	Total Hours	Credit
	PAPER - VIII ORGANIC CHEMISTRY -I		60	4

#### UNIT-I: CHEMISTRY OF PHENOLS AND AROMATIC ALCOHOLS (12 hrs)

Phenols: Nomenclature, synthesis of phenol from benzene sulphonic acid, chlorobenzene and cumene - Properties - Acidity of phenols and substituted phenols (explanation on the basis of resonance stabilization). Reactions similar to those of alcohols, ring substitution in phenol-orientation of phenolic group towards electrophiles, halogenation, nitration and sulphonation, Libermannitrosoreaction, mechanism of Reimer-Tiemann reaction, Kolbe-Schmidt reaction and coupling with diazonium salts and condensation reactions. Alkylation and acylation of phenols.

Dihydric phenols and benzyl alcohols-preparation, properties and uses

#### UNIT-II: CHEMISTRY OF CARBONYL COMPOUNDS. (15 hrs)

Nomenclature, structure of carbonyl compounds, acidity of alpha-hydrogen atom, keto-enol Tautomerism (proof for the two forms). Mechanism of nucleophilic addition with HCN, ROH, NaHSO<sub>3</sub>, ammonia (NH<sub>2</sub>OH, NH<sub>2</sub>NH<sub>2</sub> and C<sub>6</sub>H<sub>5</sub>NHNH<sub>2</sub>). Mechanism of Meerwein-Ponndorf-Verley reduction, Clemmenson reduction, Wolf-Kishner reduction, aldol condensation, Claisen-Schmidt reaction, Cannizaro reaction, haloform reaction, Perkin and Benzoin condensation reaction - Diekmann condensation.

#### UNIT-III: CHEMISTRY OF CARBOXYLIC ACIDS AND THEIR DERIVATIVES (12 hrs)

Acidity of carboxylic acids, Effect of substituents on acidity, comparison of acid strengths of halogen substituted acetic acid and substituted benzoic acid.

Dicarboxylic acids: General methods of preparation - from alkyl cyanides, cyclic ketones and halo esters. Reactions - action of heat, action of PCl<sub>5</sub> and NH<sub>3</sub>.

Acid derivatives (Aliphatic): Synthesis and important properties of acid derivatives (acid chlorides, acid anhydrides, esters and amides). Acetoacetic and malonic esters-Preparation and synthetic applications.

#### UNIT-IV: CHEMISTRY OF NITROGEN COMPOUNDS (12 hrs)

Nitrobenzene- preparation, reduction in different media, conversion of nitrobenzene to m-dinitrobenzene and TNT. Amines: Nomenclature, Basicity of amines, effect of substituents on basicity of aliphatic and aromatic amines. Preparation of primary amines by Gabriel synthesis and reduction of nitriles, secondary and tertiary amines-by the reduction of N-alkyl substituted amides. Reactions of amines-primary aliphatic and aromatic amines with nitrous acid, diazotization, coupling and carbylamines reactions.

UNIVERSITY OF MADRAS  
B.Sc. DEGREE COURSE IN CHEMISTRY  
SYLLABUS WITH EFFECT FROM 2020-2021

**UNIT-IV: CHEMISTRY OF NITROGEN COMPOUNDS**

(12hrs)

Nitrobenzene- preparation, reduction in different media, conversion of nitrobenzene to m- dinitrobenzene and TNT. Amines: Nomenclature, Basicity of amines, effect of substituents on basicity of aliphatic and aromatic amines. Preparation of primary amines by Gabriel synthesis and reduction of nitriles, secondary and tertiary amines-by the reduction of N-alkyl substituted amides. Reactions of amines-primary aliphatic and aromatic amines with nitrous acid, diazotization, coupling and carbylamines reactions.

**UNIT - V: GREEN CHEMISTRY**

(9 hrs)

Concept and principles of green chemistry – need of green chemistry – Atom economy reactions (substitution, elimination, hydrogenation, addition and rearrangement reaction – basic concepts only)-green solvents-types and simple applications.

Green Catalysis – Heterogeneous – use of zeolites, silica, alumina, supported catalysis – bio catalysis: Enzymes, microbes, phase transfer catalysis (miscellar / surfactant).

Microwave, ultrasound and light promoted reactions (few examples for each type).

**TEXT BOOKS**

1. ArunBahl and Bahl B.S., A Text book of Organic Chemistry, S.Chand Publishing,2016.
2. Soni, P.L., and Chawla H.M., Text book of Organic Chemistry, 29<sup>th</sup>ed., New Delhi, Sultan Chand & Sons, 2007.
3. Textbook of Organic Chemistry, C N Pillai, Universities Press Private Limited, Chennai,2010

**REFERENCE BOOKS:**

1. Jain M.K, Sharma S.C. Modern Organic Chemistry, Vishal Publishing Co.,2018
2. Morrison, R.T. and Boyd R.N., Organic Chemistry, 6<sup>th</sup>ed., Pearson Education, Asia2002.
3. Environmental Chemistry with green chemistry by Asim.K.Das, Books and Allied Pvt. Ltd., Reprint 2015.
4. Graham Solomons T.W., Organic Chemistry, 3 rd ed., John Wiley & Sons.
5. Carey Francis A., Organic Chemistry , 7<sup>th</sup> ed., New Delhi, Tata McGraw Hill Education Pvt Ltd., 2009.
6. Finar I.L., Organic Chemistry, 6<sup>th</sup>, Vol.(1& 2), England, Wesley Longman Ltd.1996.
7. John E. McMurry, Organic Chemistry, 9<sup>th</sup> ed., Cengage Learning,2015.
8. Agarwal O.P., Organic Chemistry Reactions & Reagents, 49<sup>th</sup> ed., Goel Publishing House,2014.

## Learning Outcomes

1. Introduced to concepts of thermodynamics such as equilibrium constant and entropy
2. Learning fundamental concepts about solutions and the basis of separation techniques such as steam distillation and solvent extraction
3. Introduced to phase rule and its application to one component and two component systems
4. Introduced to colligative properties and methods of their determination
5. Introduced to the concept of conductance in electrochemistry

Semester	Subject Title	Subject Code	Total Hours	Credit
V	PAPER - IX PHYSICAL CHEMISTRY - I		60	4

**UNIT I: THERMODYNAMICS III**

(12 hrs)

Equilibrium constant and free energy change - Thermodynamic derivation of law of mass action - Equilibrium constants in terms of pressure and concentration ( $K_p$  and  $K_c$ ) and their relation - Thermodynamic interpretation of Lechatelier principle (Concentration, temperature, pressure and addition of inert gases). Systems of variable composition - Partial molar quantities - Chemical potential - Variation of chemical potential with T, P and X (mole fraction) - Gibbs-Duhem equation - Duhem-Margules equation. van't Hoff reaction isotherm - van't Hoff's isochore - Clapeyron equation and Clausius- Clapeyron equation - Applications - Nernst heat theorem - Third Law of Thermodynamics - Statement of third law and concept of residual entropy - Evaluation of absolute entropy from heat capacity data- exception to third law (CO, ortho and para hydrogen).

**UNIT II: SOLUTIONS**

(12 hrs)

Ideal and Non-ideal solutions. Concept of activity and activity coefficients - Completely miscible liquid systems - benzene and toluene. Raoult's law and Henry's law. Deviation from Raoult's law and Henry's law. Azeotropes- HCl-water and Ethanol-water system - Partially miscible liquid systems (Upper and lower CST)- phenol-water, triethylamine-water and Nicotine-water systems. Completely immiscible liquids - principle and applications of steam distillation - Nernst Distribution Law- thermodynamic derivation, application to solvent extraction, limitations of distribution law

**UNIT III: THERMODYNAMICS OF PHASE TRANSITIONS**

(10 hrs)

Definition of terms in the phase rule - Derivation and application to one component system water and sulphur - super cooling, sublimation. Two component systems - reduced phase rule - solid-liquid equilibria, simple eutectic (lead-silver), desilverisation of lead -Compound formation with congruent melting point. (Mg-Zn) and incongruent melting point (Na-K). Solid solutions - (Ag- Au) - freezing mixtures - KI-H<sub>2</sub>O system.

**UNIT IV: DILUTE SOLUTIONS AND COLLIGATIVE PROPERTIES**

(10 hrs)

Colligative properties - relative lowering of vapour pressure, osmosis - Law of osmotic pressure- isotonic solutions, effect of concentration and temperature on osmotic pressure - thermodynamic derivation of elevation of boiling point and depression in freezing point - determination of molecular masses using the above properties [experimental details not required]- abnormal molecular masses and van't Hoff factor - degree of association and degree of dissociation.



### UNIT V: ELECTROCHEMICAL CONDUCTANCE

(16 hrs)

Electrical transport and conductance in metal and in electrolytic solution. Specific conductance and equivalent conductance. Measurement of equivalent conductance. Using Kohlrausch's bridge. Arrhenius theory of electrolytic dissociation and its limitations. Weak and strong electrolyte according to Arrhenius theory Ostwald's dilution laws- applications and limitation. Variation of equivalent conductance with concentration. Migration of ion-ionic mobility Kohlrausch's law and its applications. The elementary treatment of the Debye-Hückel Onsager equation for strong electrolytes. Evidence for ionic atmosphere. Wien effect and Debye-Falkenhagen effect. Transport number - Determination by Hittorf method and moving boundary method. Application of conductance measurements - Determination of  $\Lambda_0$  of strong electrolytes. Determination of  $K_a$  of weak acids. Determination of solubility product of a sparingly soluble salt. Conductometric titrations.

#### TEXT BOOK

1. Puri B.R., Sharma L.R., Pathania M.S., Principles of Physical Chemistry, 4<sup>th</sup> ed., Vishal Publishing Co., 2016.
2. Textbook of Physical Chemistry, M V Sengaranarayanan, V Mahadevan, Universities Press, Chennai, 2011

#### REFERENCE BOOKS

1. Atkins P.W., Physical Chemistry, 5<sup>th</sup> ed., Oxford Universities Press, 1994.
2. Castellan G.V., Physical Chemistry, New Delhi, Orient Longmans.
3. Levine I.N., Physical Chemistry 6<sup>th</sup> ed., 2009.
4. Rajaram J. and Kuriacose J.C., Thermodynamics for students of chemistry 3<sup>rd</sup> ed., ShobanLal & Co., 2013.
5. Bajpai D.N., Advanced Physical Chemistry, S.Chand Publishing, 2001.
6. Negi A.S. and Anand S.C., A Textbook of Physical Chemistry, John Wiley & Sons Pvt. Ltd., 1986.

## PAPER X

Learning the gravimetric estimation of some anions and cations

Semester	Subject Title	Subject Code	Total Hours	Credit
V & VI	INORGANIC QUANTITATIVE ANALYSIS - GRAVIMETRIC ANALYSIS		90	3

1. Estimation of Lead as Lead chromate
2. Estimation of Barium as Barium chromate
3. Estimation of Nickel as Nickel - DMG complex.
4. Estimation of Calcium as Calcium oxalate
5. Estimation of Barium as Barium sulphate
6. Estimation of sulphate as Barium sulphate.
7. Estimation of Aluminium as Aluminium oxinate (for demonstration )
8. Estimation of Silver as Silver chloride (for demonstration)

### Books for References

1. Venkateswaran, V. Veeraswamy R. Kulandaivelu A.R., Basic Principles of Practical Chemistry, 2nd Edition, New Delhi, Sultan Chand & Sons, (1997).
2. Jeffery G.H., Bassett J., Mendham J. And Denney R.C, Vogel's Text book of Quantitative Chemical Analysis, 5<sup>th</sup> ed., John Wiley & Sons Inc., New York, 1989.

**PAPER XI**  
**ORGANIC ANALYSIS AND PREPARATION**  
 Learning to identify functional groups and elements present in organic compounds; Preparation of some simple organic compounds

Semester V & VI	Subject Title	Subject Code	Total Hours	Credit
	<b>ORGANIC ANALYSIS AND PREPARATION</b>		90	3

**ORGANIC ANALYSIS:**

Analysis of simple organic compounds (a) characterization functional groups (b) confirmation by preparation of solids derivatives / characteristic colour reaction.

Note : 1. Mono - functional compounds are given for analysis. In case of bi-functional compounds, students are required to report any one of the functional groups.

2. Each student is expected to do the analysis of at least 10 different organic substances.

Recommended to adopt micro scale technique of organic analysis

**ORGANIC PREPARATIONS**

Preparation of Organic compounds involving the following chemical conversions:

1. Oxidation of benzaldehyde
2. Reduction of nitrobenzene
3. Esterification of salicylic acid
4. Acetylation of aniline
5. Hydrolysis of methyl salicylate
6. Nitration of phenol
7. Bromination of acetanilide

**Books for Reference**

1. Venkateswarar, V, Veeraswamy R and Kulkarni V A R; Basic Principles of Practical Chemistry, 2<sup>nd</sup> ed., New Delhi, Satián Chand & Sons (1997).
2. Furniss, B.S.; et al. Vogel's Textbook of Practical Organic Chemistry, 5<sup>th</sup> ed., Prentice Hall, 1989.
3. College Practical Chemistry; V K Ahluwalia; Sunita Daingra; Adarsh Gulati, Universities Press, Chennai, 2005.
4. Comprehensive Practical Organic Chemistry: Preparations and Quantitative Analysis, V K Ahluwalia; Eenu Aggarwal, Universities Press, Chennai, 2004.

PAPER - XII

PHYSICAL CHEMISTRY PRACTICAL.

Learning determination of order of chemical reactions; potentiometric and conductometric titrations

Semester V & VI	Subject Title	Subject Code	Total Hours	Credit
	PHYSICAL CHEMISTRY PRACTICAL.		90	3

Physical Chemistry Experiments

1. Critical Solution Temperature
2. Effect of impurity on critical solution temperature of phenol-water system[NaCl]
3. Rast method
4. Transition temperature
5. Heat of neutralization
6. Phase diagram ( Simple Eutectic )
7. Kinetics of saponification
8. Kinetics of acid catalyzed ester hydrolysis
9. Kinetics of Persulphate- Iodide reaction.
10. Partition coefficient and Equilibrium constant of  $KI + I_2 \rightarrow KI_3$
11. Determination of cell constant, specific conductance and equivalent conductance of strong electrolyte.
12. Estimation of HCl by conductometric titration
13. Estimation of acetic acid conductometric titration
14. Estimation of  $BaCl_2$  by conductometric titration.
15. Estimation of HCl by potentiometric titration
16. Estimation of FAS by potentiometric titration

Books for Reference

1. Venkateswaran, V. Veeraswamy R., Kulandaivelu A.R., Basic Principles of Practical Chemistry, 2<sup>nd</sup> ed., Sultan Chand & Sons, 1997.
2. Daniels et al., Experimental Physical Chemistry, 7<sup>th</sup> ed., McGraw Hill, 1970.
3. Findlay, A., Practical Physical Chemistry, 7<sup>th</sup> ed., Longman, 1989.
4. Ahluwalia, V.K., Dingra, S. and Gulati, A. College Practical Chemistry, Orient Longman Pvt. Ltd., Hyderabad 2005.
5. Sharma, K.K. and Sharma, D.S. Introduction to Practical Chemistry, Vikas Publishing House, New Delhi, 2005).

**INORGANIC CHEMISTRY - II****PAPER - XIII****Learning Outcomes**

1. Learning the theories of metallic bonding
2. Introduced to organometallic compounds
3. Introduced to fundamental concepts of nuclear chemistry and radioactivity
4. Learning the chemistry of clathrates, phosphazenes, silicates

Semester VI	Subject Title	Subject Code	Total Hours	Credit
	PAPER - XIII INORGANIC CHEMISTRY - II		75	5

**UNIT I: METALLIC BONDING****(15hrs)**

Metallic state - Packing of atoms in metal (BCC, FCC, HCP and simple cube) - Theories of metallic bonding - Electron gas, Pauling and band theories - Semi conductors- n- type and p- type, transistors - Uses - superconductors - examples, types - structures of alloys - substitutional and interstitial solid solutions- Hume-Rothery ratio.

**UNIT II: CHEMISTRY OF ORGANOMETALLIC COMPOUNDS****(15 hrs)**

Introduction - Preparation, properties uses of Organomagnesium, Organozinc, Organolithium, Organocopper, Organolead, Organophosphorus and Organoboron compounds. Preparation, properties, uses and structure of ferrocene- Preparation and uses of Ziegler-Natta catalyst.

**UNIT III: NUCLEAR CHEMISTRY****(15 hrs)**

Introduction - composition of nucleus - nuclear binding energies -structure of nucleus- nuclear shell model and liquid drop model - magic numbers - nuclear stability - theories of nuclear stability - nuclear binding energy theory - meson theory of nuclear forces - nuclear fluid theory - isotopes, isobars, isotones, nuclear isomers and mirror nuclei - detection of isotopes -Aston's mass spectrograph separation of isotopes - electromagnetic method - the whole number rule and packing fraction.

**UNIT IV: RADIOACTIVITY****(15 hrs)**

Radioactive Emanations, Alpha rays, Beta rays and Gamma rays. The Disintegration theory- Group Displacement Law. Rate of disintegration and Half-life period. Radioactive disintegration series. The Geiger-Nuttall rule - Artificial radioactivity. Induced radioactivity. Nuclear fission-Atom bomb, Nuclear fusion-hydrogen bomb- Stellar energy - Hazards of radiation. Applications of Radioisotopes. Radiocarbon dating.

**UNIT V: SOME SPECIAL TYPE OF COMPOUNDS****(15 hrs)**

Clathrates - examples and structures, interstitial and non-stoichiometric compounds -composition, manufacture, structure, properties and uses of phosphazenes -composition and uses of beryl, asbestos, talc, mica, zeolites and ultramarines.

**TEXT BOOK**

1. Puri, B.R., Sharma L.R. and Kalia K.C., Principles of Inorganic Chemistry, 30<sup>th</sup> ed., Mile stone publishers and distributors, 2009.

#### REFERENCES FOR REFERENCE

1. Lee J. D., *University Inorganic Chemistry* 4th ed., Blackwell Science, 2001.
2. Sharpe Alan G. *Inorganic Chemistry* B.I. Hill and Longman, 1981.
3. Miessler D. L. and Donald, A. Tarr, *Inorganic Chemistry* 4<sup>th</sup> ed., Pearson, 2010.
4. Malik, Wahid U., Tuli D. B. and Madan B. D., *Selected Topics in Inorganic Chemistry*, 7<sup>th</sup> ed., B. Chand & Company Ltd., 2007.
5. Hardsep B. J. Chaturvedi and Harish Mehra, *Advanced Inorganic Chemistry*, 7<sup>th</sup> ed., Goyal Publishing House, Meerut.

PAPER -XIV

ORGANIC CHEMISTRY -II

- Learning Outcomes
1. Learning the chemistry of biopolymers - carbohydrates and proteins
  2. Understanding vitamins
  3. Learning the chemistry of natural products - alkaloids and terpenoids
  4. Learning the mechanism of various types of molecular rearrangement
  5. Introduced to the concepts of stereochemistry

Semester	Subject Title	Subject Code	Total Hours	Credit
VI	PAPER - XIV ORGANIC CHEMISTRY -II		75	5

**UNIT 1: CHEMISTRY OF CARBOHYDRATES** (15 hrs)  
 Carbohydrates - Definition and Classification of carbohydrates with examples. Mono saccharides- glucose and fructose - epimers and anomers with examples. Mechanism mutarotation, mutarotation. Absolute configurations of glucose and fructose. Structural elucidation of glucose and fructose (including cyclic and Haworth structure). Interconversions, ascending and descending the sugar series. Disaccharide - Sucrose, Maltose - Structural elucidation. Polysaccharide - Starch and Cellulose (Elementary treatment).

**UNIT 2: CHEMISTRY OF PROTEINS AND VITAMINS** (15 hrs)  
 Amino acids - Classification. General methods of preparation and reactions, zwitter ion, isoelectric point. Peptides and proteins - Peptide linkage- Preparation of dipeptides by Bergmann's method. Classification of proteins, primary structure (Ind group analysis - Sanger's method and Edman method) - secondary structure, tertiary structure, denaturation.  
 Vitamins - Classification, biological importance of Vitamins. Structure of vitamin C.

**UNIT 3: CHEMISTRY OF ALKALOIDS AND TERPENOIDS** (15 hrs)  
 Chemistry of natural products - Alkaloids - Isolation, classification, general methods of elucidating structure. Structural elucidation of nicotine and pipazine. Terpenes- classification, isoprene rule, special isoprene rule - isolation and structural elucidation of citral,  $\alpha$ -terpenol and menthol.

**UNIT 4: MOLECULAR REARRANGEMENTS** (10 hrs)  
 Molecular rearrangements - Types of rearrangements, Mechanisms for the following rearrangements: pinacol-pinacolone, benzil-benzilic acid, benzidine, Favorskii, Claisen, Fries, Hofmann, Curtius, Schmidt and Beckmann.

**Unit-5: STEREOCHEMISTRY OF ORGANIC COMPOUNDS** (20 hrs)  
 Stereoisomerism - definition, classification into geometric and optical isomerism. Optical isomerism - Optical activity, asymmetric centre(chirality), symmetry elements ( $C_n$ ,  $S_n$  and  $i$ ), relative and absolute configurations, concept of enantiomerism and diastereoisomerism; Racemisation - methods of Racemisation (by substitution and tautomerism), Resolution - methods of resolution (by mechanical, seeding and biochemical), Walden inversion. Projection formulae- Fischer, flying wedge, Sawhorse and Newman projections, notation of optical isomerism: Cahn-Ingold and Prelog rules, R and S notations for one and two chirality (stereogenic) centres, erythro and threo representations. Geometrical isomerism: cis - trans; syn- anti; E - Z descriptors.

### TEXTBOOK

1. Bahl BS and ArunBahl, Advanced Organic Chemistry, 12<sup>th</sup> ed., Sultan Chand and Co., New Delhi, 1997.
2. Chemistry of Natural Products: A Unified Approach, N R Krishnaswamy, Universities Press, Chennai, 2010

### BOOKS FOR REFERENCE

1. Finar IL, Organic Chemistry, Vol. 1&2, 6<sup>th</sup> ed., Addison Wesley Longman Ltd., London, 1996.
2. Morrison RT, Boyd RN, Organic Chemistry, 4<sup>th</sup> ed., Allyn& Bacon Ltd., New York, 1976.
3. Pine SH, Organic Chemistry, 4<sup>th</sup> ed., McGraw-Hill International Book Company, (1986)
4. Peter Sykes A, Guidebook to Mechanism in Organic Chemistry, 6<sup>th</sup> ed., Pearson Education, 2003.
5. Kalsi PS, Stereochemistry of Organic Compounds: Principles and Applications, New Age International, 2011.
6. Sujata V Bhat, Nagasampagi BA, and MeenakshiSivakumar, Chemistry of Natural Products, Springer, 2006.
7. Agarwal OP, Organic Chemistry Reactions & Reagents, 49<sup>th</sup> ed., Goel Publishing House, 2014.
8. Ahluwalia, V.K., Kidwai, M., New trends in Green Chemistry, 1<sup>st</sup> ed., Anamaya Publishers, New Delhi, 2004.
9. Anatas P.T., and Warner J.C., Green Chemistry Theory and Practice



PAPER -XV

PHYSICAL CHEMISTRY- II

Learning Outcomes

1. Learning the basics of chemical kinetics
2. Understanding the basics of catalysis and adsorption
3. Introduced to the fundamentals of photochemistry
4. Learning the fundamentals of electrochemical cells

Semester	Subject Title	Subject Code	Total Hours	Credit
VI	PAPER - XV PHYSICAL CHEMISTRY- II		75	5

**UNIT I: CHEMICAL KINETICS**

(20hrs)

Rate of reaction- Average and instantaneous rates, factors influencing rate of reaction - molecularity of a reaction - rate equation - order and molecularity, Rate laws - Rate constants - derivation of rate constants and characteristics for zero, first, second and third order (equal initial concentration) - Derivation of time for half change. Methods of determination of order of reactions - Experimental methods of determination of rate constant of a reaction - Volumetry, manometry and polarimetry.

Effect of temperature on reaction rate - temperature coefficient - concept of activation energy - energy barrier - Arrhenius equation. Theories of reaction rates - Collision theory - derivation of rate constant of bimolecular gaseous reaction - Failure of collision theory. Theory of absolute reaction rates - Derivation of rate constant for a bimolecular reaction - significance of entropy and free energy of activation. Comparison of collision theory and ARRT.

**UNIT II: CATALYSIS AND ADSORPTION**

(15 hrs)

Catalysis - general characteristics of catalytic reactions, auto catalysis, promoters, negative catalysis, poisoning of a catalyst - theories of homogenous and heterogenous catalysis - Kinetics of Acid - base and enzyme catalysis- Mechanism (lock and key, induced fit), Michaelis-Menton equation (no derivation) - Heterogenous catalysis  
Adsorption - Difference between absorption and adsorption - Chemical and physical adsorption and their general characteristics- distinction between them Different types of isotherms - Freundlich and Langmuir. Adsorption isotherms and their limitations - BET theory (no derivation)

**UNIT III: PHOTOCHEMISTRY**

(10 hrs)

Photophysical processes - Jablonski diagram - Laws of photo chemistry - Lambert - Beer, Grotthus-Draper and Stark - Einstein. Quantum efficiency. Fluorescence and Phosphorescence. Photo chemical reactions - rate law - Kinetics of  $H_2-Cl_2$  and  $H_2-I_2$  reactions, comparison between thermal and photochemical reactions.

**UNIT IV : GROUP THEORY and COMPUTATIONAL CHEMISTRY**

(10 hrs)

Symmetry elements and symmetry operation symmetry operation of  $H_2O$  molecule, Illustration of mathematical rules for the group using symmetry operations of  $H_2O$  molecule. Construction of multiplication table, for  $H_2O$  molecule. Point group - Definition Elements (symmetry operations) of the following point groups  $C_n$  ( $C_2, C_3$ ),  $C_{nv}$  ( $C_{2v}, C_{3v}$ ) and  $C_{nh}$  ( $C_{2h}, C_{3h}$ )  
Introduction to computational chemistry - Use of software for computing structures - eg. Avogadro

(20 hrs)

### UNIT V: ELECTROCHEMICAL CELLS

Electrolytic & Galvanic cells - Reversible and irreversible cells. Conventional representation of electrochemical cells. Electromotive force of a cell and its measurement computation of E.M.F. calculation of thermodynamic quantities of cell reactions ( $\Delta G$ ,  $\Delta H$ ,  $\Delta S$  and  $K_{eq}$ ) Application of Gibbs Helmholtz equation. Calculation of E.M.F. Types of reversible electrodes - Gas/metal ion-metal/metal ion; metal/insoluble salt/anion and Redox electrodes. Electrode reactions - Nernst equation - Derivation of cell E.M.F. and single electrode potential - standard hydrogen electrode - reference electrodes (Calomel electrode)- standard electrodes reduction potentials - sign convention - Electrochemical series and its significance. Concentration cell with and without transport. Liquid junction potential. Application of EMP concentration cells. Valency of ion, solubility product and activity co-efficient. Potentiometric titrations. Determination of pH using Hydrogen, quinhydrone and glass electrodes. Determination of  $pK_a$  of acids by potentiometric method Fuel cells - Corrosion - general and electrochemical theory - passivity - prevention of corrosion.

### TEXT BOOKS

1. Puri B.R., Sharma L.R. and Pathania M.S., Principles of Physical Chemistry, 4<sup>th</sup> ed., Vishal Publishing Company, 2016.
2. Sharma K.K. and Sharma L.K., A Text Book of Physical Chemistry, 6<sup>th</sup> ed., S Chand, 2016.
3. Group Theory In Chemistry: Bonding and Molecular Spectroscopy, Asok K Mukherjee, Bankim Chandra Ghosh, Universities Press, Chennai, 2018
4. Problems and Solutions: Physical Chemistry, C Kalidas and M V Sangaranarayanan, Universities Press, Chennai, 2020
5. Simple Approach to Group Theory in Chemistry, A, S Swarnalakshmi, T Saroja, R M Ezhilarasi, Universities Press, Chennai, 2008
6. Chemical and Electrochemical Energy Systems, R Narayan, B Viswanathan, Universities Press, Chennai, 1998

### Books for References

1. Maron S.H. and Lando J.B. Fundamentals of Physical Chemistry, Macmillan.
2. Glasstone S. and Lewis. D., Elements of Physical Chemistry, Macmillan
3. Kheterpal S.C. Pradeep Physical Chemistry, Volume I & II, Pradeep Publications Jalandhur, 2004.
4. Jain D.V.S. and Jainhar S.P., Physical Chemistry, Principles and Problems, Tata McGraw Hill, New Delhi, 1988.
5. Bajpai D.N., Advanced Physical Chemistry, S Chand Publishing, 2001.
6. Negi A.S. and Anand S.C., A Textbook of Physical Chemistry, John Wiley & Sons Pvt. Ltd., 1986.

**ALLIED CHEMISTRY - I (60 Hours) 4 Credits**  
(For Maths and Physics Students)

**Learning Outcome**

1. To know the fundamentals of nuclear chemistry
2. To understand the industrial application of fuels, fertilizers and polymers
3. To understand the basic concepts of Organic Chemistry
4. To study the various laws of thermodynamics
5. To learn the fundamentals of chemical kinetics and basics of photochemistry

**Unit I: NUCLEAR CHEMISTRY**

(10 Hours)

Fundamental particles of nucleus, isobars, isotones and isomers - Differences between chemical reactions: fusion and fission - Radioactive series, group displacement law - Mass defect, derivation of  $1 \text{amu} = 931 \text{ MeV}$  - nuclear binding energy and calculation - Applications of radio isotopes - carbon dating and in medicine.

**Unit II: INDUSTRIAL CHEMISTRY**

(15 Hours)

Fuels- Classification-gaseous fuels like water gas, producer gas, liquefied petroleum gas, gobar gas, compressed natural gas - Fertilizers - Classification - urea, Ammonium sulphate, superphosphate, Triple super phosphate, potassium nitrate- manufacture and uses - Silicones - Preparation, properties and applications. Hardness of water: temporary and permanent hardness, disadvantages of hard water -Softening of hard water - Zeolite process, demineralization process and reverse osmosis - Purification of water for domestic use: use of chlorine, ozone and UV light - definition and determinations of BOD and COD. Polymers: General method of preparation and properties of the following: PVC, Polyethylene, Teflon, Bakelite, Nylon 6 and Nylon 6,6.

**Unit III: FUNDAMENTALS OF ORGANIC CHEMISTRY**

(10 Hours)

Classification of organic compounds -Hybridization in methane, ethane, ethylene, acetylene, benzene - classification of reagents - electrophiles, nucleophiles and free radicals - Classification of reactions- addition, substitution, elimination and polymerisation.

**Unit IV: THERMODYNAMICS(10 Hours)**

Definition of certain terms - system, surrounding, reversible and irreversible processes - Limitations of I law , Need for II Law - Different Statements of II. Law - Carnot cycle - Efficiency - Carnot Theorem - Thermodynamic Scale of Temperature - Entropy- Definition, Unit and change of entropy for phase transformation, Free energy - nature of process in terms of free energy and entropy-Statement of Third Law.

**Unit V: CHEMICAL KINETICS AND PHOTOCHEMISTRY**

(15 Hours)

Rate of chemical reaction- Differential rate expression - order and molecularity - Integrated rate expression for first and second, order reactions (same concentration of reactants only)-Half-life period- Effect of temperature on rate - Activation energy . Arrhenius equation - Homogeneous and heterogeneous catalysis. Photochemistry - Statement of Grothaus- Draper Law, Stark-Einstein's Law, Quantum Yield. Hydrogen chlorine reaction (elementary idea only) Photosynthesis, Photosensitisation, Phosphorescence Fluorescence, Chemiluminescence- Definition with examples.

### BOOKS FOR REFERENCE

1. Gopalan R. and Sundaram S., Allied Chemistry, Sultan Chand & Sons Publishers, New Delhi 2<sup>nd</sup> ed.
2. Soni P.L. and Mohan Katyal, Text Book of Inorganic Chemistry, Sultan Chand and Company Pvt. Ltd, New Delhi, 20<sup>th</sup> ed.
3. Bahl B.S. and ArunBahl, A text book of Organic Chemistry 21<sup>st</sup> ed., S. Chand and Company Pvt. Ltd.

## ALLIED CHEMISTRY - II (60 Hours) 4 Credits

(For Maths and Physics Students)

### Learning Outcome

1. To understand the fundamentals of coordination chemistry and its applications
2. To learn the structural aspects of biologically important compounds
3. To know the applications of phase rule and freezing mixtures
4. To explain the basics of electrochemistry
5. To understand the basics of Analytical chemistry

### Unit I: COORDINATION CHEMISTRY

(15 Hours)  
Definition of terms - Classification of Ligands - Nomenclature - Chelation - EDTA and its application - Werner's Theory - Effective Atomic Number - Pauling's theory - Postulates - Hybridisation, Geometry and magnetic properties of  $[\text{Ni}(\text{CN})_4]^{2-}$ ,  $[\text{NiCl}_4]^{2-}$ ,  $[\text{Fe}(\text{CN})_6]^{4-}$ ,  $[\text{Co}(\text{NH}_3)_6]^{3+}$  and  $[\text{CoF}_6]^{3-}$  - Biological Role of haemoglobin and Chlorophyll (elementary idea only) - Identification of metal ions like Cu, Fe and Ni.

### Unit II: BIOMOLECULES

(10 Hours)  
Classification, preparation and reactions of glucose and fructose. Interconversion of glucose to fructose and vice versa - Preparation and properties of sucrose. Diabetes - causes and control: measures RNA and DNA (elementary idea only) - Amino acids: classification, preparation and properties of alanine.

### Unit III: PHASE DIAGRAM

(15 Hours)  
Phase rule: Definition of terms, application of phase rule to water system - reduced phase rule and its application to Pb-Ag system. Freezing mixture - Completely miscible and partially miscible liquid systems - upper and lower critical solution temperatures

### Unit IV: ELECTROCHEMISTRY

(10 Hours)  
Electrolytic conductance in metals and in electrolytic solution - specific conductance and equivalent conductance - Arrhenius theory of electrolytic dissociation and its limitations - weak and strong electrolytes according to Arrhenius theory - Ostwald's dilution law - applications and limitations - Conductometric titrations - strong acid vs strong base only.

### Unit V: ANALYTICAL CHEMISTRY

(10 Hours)  
Introduction to Qualitative and Quantitative Analysis - Separation techniques - extraction - crystallization - Chromatographic separations - Principles and applications of column, paper, thin layer, gas-liquid and ion-exchange.

### BOOKS FOR REFERENCE

1. Gopalan R. and Sundaram S., Allied Chemistry, Sultan Chand & Sons Publishers, New Delhi 2<sup>nd</sup> ed.
2. Soni P.L. and Mohan Katyal, Text Book of Inorganic Chemistry, Sultan Chand and Company Pvt. Ltd, New Delhi, 20<sup>th</sup> ed.
3. Bahl B.S. and ArunBahl, A text book of Organic Chemistry 21<sup>st</sup> ed., S. Chand and Company Pvt. Ltd.

# ALLIED CHEMISTRY - II (60 Hours) 4 Credits (BRANCHES OTHER THAN MATHS AND PHYSICS)

## Learning Outcome

1. To understand the fundamentals of coordination chemistry and its applications
2. To learn the structural aspects of biologically important compounds
3. To know the applications of phase rule and freezing mixtures
4. To explain the basics of electrochemistry
5. To understand the basics of Analytical chemistry

## Unit I: COORDINATION CHEMISTRY

(15 Hours)

Definition of terms-classification of ligands-Nomenclature-chelation-EDTA and its applications-Werner's Theory-Effective Atomic Number-Pauling's Theory-Postulates-Biological role of haemoglobin and chlorophyll, (Elementary idea only)

## Unit II: CARBOHYDRATES

(10 Hours)

Classification, preparation and reactions of glucose and fructose. Interconversion of glucose to fructose and vice versa. Structure of starch. Cellulose and derivatives of cellulose -Diabetes - Causes and control measures.

## Unit III: PROTEINS

(15 Hours)

Amino acids-Classification, Preparation and properties of alanine - Preparation of dipeptide using Bergman method - Proteins -Classification according to composition, biological functions and shape - Denaturation and colour reactions of Proteins - Primary and secondary structure of Proteins - Nucleic acids: DNA and RNA-Their components and biological functions.

## Unit IV:

### 4.1 ELECTROCHEMISTRY

(10 Hours)

Electrolytic conductance in metals and in electrolytic solution - specific conductance and equivalent conductance - Arrhenius theory of electrolytic dissociation and its limitations - weak and strong electrolytes according to Arrhenius theory - ostwald's dilution law - applications and limitations - Conductometric titrations - strong acid vs strong base only.

### 4.2 CATALYSIS

(10 Hours)

Characteristics of catalytic reaction, auto catalysis, promoters, catalytic poisons - Types of catalysis - homogeneous and heterogeneous - Enzyme catalysis (no derivation, elementary idea only)

## Unit V: ANALYTICAL CHEMISTRY

(10 Hours)

Introduction to Qualitative and Quantitative Analysis - Principle of volumetric analysis - Separation techniques - extraction - distillation - crystallization - Chromatographic separations - Principles and application of column, paper, thin layer.

## BOOKS FOR REFERENCE

1. Gopalan R. and Sundaram S., Allied Chemistry, Sultan Chand & Sons Publishers, New Delhi 2<sup>nd</sup> ed.
2. Bahl B.S. and ArunBahl, A text book of Organic Chemistry 21<sup>st</sup> ed., S. Chand and Company Pvt. Ltd.
3. Puri B.R., Sharma L.R. and Pathania M.S., Principles of Physical Chemistry, 47<sup>th</sup> ed., Vishal Publishing Company, 2016.

**ALLIED CHEMISTRY PRACTICALS  
COMMON FOR MATHEMATICS AND NON  
MATHEMATICS STUDENTS**

**1. VOLUMETRIC ANALYSIS**

- 1 Estimation of Sodium hydroxide using standard Sodium Carbonate.
- 2 Estimation of Hydrochloric acid using standard Oxalic acid.
- 3 Estimation of Ferrous sulphate using standard Mohr's salt
- 4 Estimation oxalic acid using standard Ferrous Sulphate.
- 5 Estimation of Potassium permanganate using standard Sodium hydroxide.
- 6 Estimation of iron from iron tablets using standard potassium permanganate
- 7 Estimation of magnesium using EDTA.
- 8 Estimation of calcium from calcium tablets using EDTA
- 9 Estimation of Ferrous ion using diphenylamine as internal indicator.

**2. Systematic analysis of Organic compounds**

The analysis must be carried out as follows

- a) Functional group tests (Carboxylic acid (Benzoic acid, phthalic acid), Phenol, Urea, Glucose, Benzaldehyde, Aniline  
(Aniline not to be given for exam)
- b) Detection of elements (N,S, Halogens)
- c) Distinguish between aliphatic and aromatic
- d) Saturated and unsaturated compounds

**REFERENCES**

1. Basic Principles of Practical Chemistry, Venkateswaran, Veerasamy&Kulandaivel S Chand & Co.



**ELECTIVE - I**  
**a) PHARMACEUTICAL CHEMISTRY (OR) b) INDUSTRIAL CHEMISTRY**

**a) PHARMACEUTICAL CHEMISTRY**

Learning Outcomes

Learning various terminologies in pharmacology; Types of drugs and their action

Semester	Subject Title	Subject Code	Total Hours	Credit
V	a)PHARMACEUTICAL CHEMISTRY		60	5

**UNIT 1 (12 hrs)**

Important terminologies used in pharmaceutical chemistry - drug pharmacology, pharmacognosy, pharmacodynamics, pharmacokinetics, antimetabolites, pharmacopeia (BP,IP,USP), National formulary, chemotherapy, vaccines, primary immunization, synergism, antagonist LD50, ED50. therapeutic index and drug dosage.

Various sources of drugs, pharmacologically active constituents in plants. Classification of drugs. chemical -biological - mechanism of drug action - action at cellular sites. Drug receptors and biological responses. Mechanism of different types of drug action.

**UNIT 2 (12 hrs)**

Absorption of drugs - factors affecting absorption of drugs, routes of administration - local, enema. oral and external, parental routes - advantages and disadvantages -

Common diseases - infective diseases insect borne - air borne and water borne. Common diseases of the respiratory system and nervous system.

Indian medicinal plants - tulsi, neem, keezhanelli. AIDS - symptoms and prevention.

**UNIT 3 (12 hrs)**

Anaesthetics - general - ether, chloroform, ethyl chloride, halothane, nitrous oxide, local - esters - cocaine, benzocaine, procaine, amides - lignocaine, cinchocaine. Analgesics - Narcotic and synthetic

Antipyretics and anti-inflammatory agents, Antibiotics - penicillin, streptomycin, chloramphenicol, tetracycline. Antiseptics and disinfectants - phenol and its derivatives, nitrofurantoin derivatives.

**UNIT 4 (12 hrs)**

Composition of blood - blood grouping and matching. Blood pressure - systolic and diastolic - hypertensive drugs. Diabetes - causes - hyperglycemic drugs.

Cardiovascular drugs - cardiac glycosides - antiarrhythmic drugs, antianginal drugs, vasodilators, antipsychotic drugs - antidepressants - sedatives and hypnotics.

**UNIT 5 (12 hrs)**

Anticonvulsant agents - Barbiturates - oxazoline diones - acetyl urea derivatives - succinimides. Diagnostic agents for kidney function (aminohippuric acid) - for liver function (sulfobromophthalein). Lipid profile - HDL, LDL, cholesterol and lipid lowering drugs.

Vitamins - fat soluble and water soluble - sources, biological role and deficiency conditions. Medicinal importance of inorganic compounds - compounds of aluminium - phosphorus - arsenic - mercury and Iron. Biological importance of inorganic compounds - sodium and its compounds - potassium and its compounds - copper and its compounds.

**REFERENES**

1. Jayashree Ghosh, A Text book of Pharmaceutical Chemistry, 5<sup>th</sup> ed., S Chand & Company Ltd., 2014.
2. Lakshmi S, Pharmaceutical Chemistry, S Chand & Sons, New Delhi, 1995.

3. AshuttoshKar, Medicinal Chemistry, Wiley Eastern Ltd., New Delhi, 1993.
4. Hakishan. V.K. Kapoor, Medicinal and Pharmaceutical Chemistry, VallabhPrakashan, 2012.

## b) INDUSTRIAL CHEMISTRY

Learning Outcomes

Learning the industrial manufacture of various chemical based products

Semester	Subject Title	Subject Code	Total Hours	Credit
V	b) INDUSTRIAL CHEMISTRY		60	5

### UNIT 1: INDUSTRIAL REQUIREMENTS

Requirements of an industry - location - water - industrial water treatment - safety measures - pilot plants. Fuels - types of fuels with examples - coal - carbonization of coal - coal for distillation - liquid fuels - gaseous fuels - selection of fuels - nuclear fuels. Energy - sources of energy - renewable and non-renewable energies - non conventional energies. (12 hrs)

### UNIT 2: PETROCHEMICAL INDUSTRIES

Crude oil - constitution and distillation - composition of different distillates - ignition point, flash point octane number - cracking - catalysts used in petroleum industries - structure, selectivity and applications. Manufacture of synthetic petrol - Dergius and Fischer Tropsh processes - Manufacture of petrochemicals and petrochemical polymers - Manufacture of higher olefins, Acetaldehyde. Acetic acid, Phenol, Carbon disulphide, Vinyl acetate, Butane diols, Xylencs. (12 hrs)

### UNIT 3: FERTILIZERS AND SPECIALITY CHEMICALS

Manufacture - Properties and industrial uses of solvents - DMF, DMSO, THF and Dioxane. Fertilizers - Raw materials, manufacture (flow chart - chemical process with equations) of ammonium nitrate, ammonium sulphate, urea, calcium cyanamide, calcium ammonium nitrate. sodium nitrate, ammonium chloride, ammonium phosphate, super phosphate of lime, NPK fertilizers. (12hrs)

### UNIT 4: OILS, SOAPS AND DETERGENTS

Oils - difference between oils and fats - manufacture of cotton seed oil and soya bean oil - manufacture of soaps - toilet and transparent soaps - Detergents - synthetic detergents - surface active agents and their classification - manufacture of anionic, cationic and non ionic detergents and shampoo. (12hrs)

### UNIT 5: METALLURGY

General methods of metallurgy - ores - types - methods of concentration of ores - hydro metallurgy, Pyrometallurgy- various of reduction process, refining of metals - extraction of Cr, Mn, V, Co, Pt, U and Th. Environmental problems of chemical industries - methods of control - sewage treatment and waste management. Man power in chemical industries - labour problems - Six Sigma (Basic concept only). (12hrs)

#### Books for Reference

1. Sharma B.K., Industrial Chemistry, Goel Publishing House, Meerut, 2003.
2. Dryden CE, Outlines of Chemical Technology, Gopala Rao, Eastwest Press, New Delhi.
3. Shreve RV, Chemical Process Industries, Tata McGraw Hill publishing company, Mumbai.
4. Steines H, Introduction to Petrochemicals, Pergaman Press.
5. Alan Cottrel, An Introduction to Metallurgy, Orient Longman, 2000.
6. James A. Kent, Riegel's Handbook of Industrial Chemistry, Springer Science & Business Media, 2013.
7. Davis K.H., Handbook of Industrial Chemistry, Vol2, CBS Publishers & Distributors, 2004.

## b) NANOMATERIALS AND GREEN CHEMISTRY (OR) POLYMER CHEMISTRY

## a) NANOMATERIALS AND GREEN CHEMISTRY

## Learning Outcome

Introduction to Nanotechnology; Nanomaterials and their characterization; Green chemistry

Semester	Subject Title	Subject Code	Total Hours	Credit
V	a) NANOMATERIALS AND GREEN CHEMISTRY		60	5

**Unit 1 (12 hrs)**

Nanophase materials - Introduction - Types of nano materials (carbon nanotubes and nanoclays- Microstructure - Properties - Application in different fields. Techniques for synthesis of nanophase materials - sol gel synthesis - electrodeposition - inert gas condensation - mechanical alloying - properties and applications of synthesized nanophase materials.

**Unit 2 (12 hrs)**

Nanotechnology - Background and definition of nanotechnology - nanotube technology - fillers - nanodendrimers- nanopore channels - fibres - scaffolds - CVD- FCVA technology and its applications - nanoimaging techniques.

**Unit 3(12 hrs)**

Classification based on dimensionality-Quantum Dots,Wells and Wires- Carbon- based nano materials (buckyballs, nanotubes, graphene)- Metalbased nano materials (nanogold, nanosilver and nanometal oxides) -Nanocomposites- Nanopolymers- Nanoglasses -Nano ceramics -Biological nanomaterials. Characterization techniques - X-ray diffraction - Electron microscopy (SEM, TEM)

**Unit 4 (12 hrs)**

Green Chemistry: Introduction- concept and principles of green Chemistry - need of green Chemistry - Green synthesis- Evaluation of the type of the reaction - atom economy reactions - Rearrangements - Addition reaction .Wittig reaction. Selection of solvent - Aqueous phase reactions - Reactions in ionic liquids, Heck reaction, epoxidation.Super critical CO<sub>2</sub>: Preparation, properties and applications - decaffeination, dry cleaning.

**Unit 5 (12 hrs)**

Green catalysis: Heterogeneous catalysis, use of zeolites, silica, alumina, supported Catalysis - biocatalysis: Enzymes, microbes Phase transfer catalysis (micellar/surfactant) microwave technology on chemistry - microwave heating - microwave assisted reactions - sonochemistry and green chemistry

**REFERENCES**

1. Anatas P.T., and Warner J.C., Green Chemistry Theory and Practice.
2. AhluwaliaNarosa V.K, Green Chemistry, New Delhi.
3. Thomas JM,Thomas M.J., John Principles and practice of heterogeneous catalysis,
4. MurtyBS, ShankarP,RajB. RathB B, MurdayJ, A textbook of nanoscience and nanotechnology, Springer Science and Business Media, 2013

5. Manasi Karkare, Nanotechnology: Fundamentals and Applications. I K International Publishing House, 2008.
6. Ahluwalia, V.K., Kidwai, M., New trends in Green Chemistry, 1<sup>st</sup> ed., Anamaya Publishers, New Delhi, 2004.
7. Textbook of Nanoscience and Nanotechnology, B S Murty; P Shankar; Baldev Raj; B B Rath; James Murday, Universities Press, Chennai, 2012
8. Collection of Interesting General Chemistry Experiments, Anil J Elias, Universities Press, Chennai, 2008

a) **POLYMER CHEMISTRY**

Learning Outcome  
Introduction to types of polymers and their properties; mechanism of polymerization, polymerisation techniques; Polymer processing; Chemistry of industrially important polymers

Semester	Subject Title	Subject Code	Total Hours	Credit
V	b) POLYMER CHEMISTRY		60	5

**UNIT 1**

Introduction to polymers – general characteristics of polymers in comparison with common organic compounds. Basic concept of monomers and polymers. Classification of polymers - natural and synthetic polymers. Distinction between plastics, elastomers and fibres. Types of polymers - thermoplastics and thermosetting plastics. Geometrical structures of polymer molecules - microstructures - chemical structures - geometrical structures - Cross-linked polymers - stereoregular polymers  
Mechanism of polymerization: chain polymerization, free radical polymerization, ionic and coordination polymerization. Polyaddition and polycondensation polymerization, ring opening and group transfer polymerization. (12 hrs)

**Unit 2**

Molecular weight of polymers - number average, weight average and viscosity average. Determination of polymer molecular weights - Osmometry (membrane, vapour phase), Viscometry methods. Light scattering and ultra centrifugation methods. Molecular weight and degree of polymerization - practical significance of polymer molecular weight.  
Glass transition temperature - transition and associated properties - factors affecting Glass transition temperature- importance - glass transition temperature of copolymers.  
Polymer crystallinity - crystallisability- effect of crystallinity on properties. (12 hrs)

**Unit 3**

Industrially important polymers - preparation, properties and applications. Polyethylene, polypropylene, polyamides, polyvinylchloride, polymethylmethacrylate, polyesters, polycarbonates, polyurethanes, phenol - formaldehyde, melamine - formaldehyde, polysilanes, polyaniline (12 hrs)

**Unit 4**

Degradation of polymers by thermal - oxidative, mechanical and photodegradation methods. Polymerisation techniques - bulk, solution, suspension, emulsion, polycondensation and interfacial polycondensation. (12 hrs)  
Polymer processing - compression moulding, casting, extrusion, fibre spinning, injection moulding, thermoforming, vulcanization of elastomers.

**Unit 5**

Polymer reactions - hydrolysis, Acidolysis, Aminolysis, hydrogenation, addition and substitution - cyclisation reactions - crosslinking reactions. (12 hrs)  
Natural polymers - Rubber, Silk, Cellulose - structure and applications  
Supramolecular polymers - introduction - properties - applications.

**REFERENCES**

1. BillmeyerFW, Textbook of polymer Science, 3<sup>rd</sup> ed., John Wiley and Sons, 1984.
2. GowarikerV R, ViswanathanNVandSreedharJ, Polymer Science, 3<sup>rd</sup> ed., New Age International Publishers, New Delhi, 2015.
3. SharmaBK, Polymer Chemistry, Goel Publishing House, Meerut, 2014.
4. Odian, G., Principles of Polymerization, 4<sup>th</sup> ed., John Wiley, 2004.

**ELECTIVE III**  
**a) ANALYTICAL CHEMISTRY (OR) b) SPECTROSCOPY**

**a) ANALYTICAL CHEMISTRY**

**Learning Outcome**

Learning terminology; Separation techniques; Principles and instrumentation of chromatographic, gravimetric, thermal, spectroscopic and electroanalytical techniques.

Semester	Subject Title	Subject Code	Total Hours	Credit
VI	a) ANALYTICAL CHEMISTRY		75	5

**Unit - I**

Data Analysis - Theory of errors - idea of significant figures and its importance with examples - Precision - accuracy - methods of expressing accuracy - error analysis - minimizing errors methods of expressing precision - average deviation - standard deviation and confidence limit. (10hrs)

Purification of solid compounds - extraction - use of immiscible solvents - soxhlet extraction  
 Purification of liquids - experimental techniques distillation - fractional distillation - vacuum distillation - steam distillation - tests for purity. (20hrs)

**Unit - II**

Principles of gravimetric analysis - characteristics of precipitating agents - choice of precipitants and conditions of precipitation - specific and selective precipitants - DMG, cupferron, salicylaldehyde, ethylenediamine- use of sequestering agents - co-precipitation - post precipitation - peptisation- differences- reduction of error - precipitation from homogeneous solutions - calculations in gravimetric methods - use of gravimetric factor.

Thermal analytical methods - Principle involved in thermogravimetric analysis and differential gravimetric analysis - discussion of various components with Block diagram - characteristics of TGA and DTA - factors affecting TGA and DTA curves- thermometric titrations.

Chromatography Techniques - Principles - adsorption, partition and ion exchange chromatography, column chromatography - adsorbents - preparation of column - elution, recovery of substance and applications. TLC - choice of adsorbent and solvent - preparation of chromatogram ( $R_f$  value) and applications - Paper chromatography - Solvents used - factors affecting  $R_f$  value- separation of amino acid mixtures. (15hrs)

**Unit - III**

Definition of spectrum - electromagnetic radiation - quantisation of different forms of energies of molecules - translational, vibrational, rotational, vibrational and electronic energies.

UV - Visible spectroscopy - absorption laws -theory- electronic spectra - types of electronic transitions - chromophores and auxochromes -absorption bands and intensity - factors governing absorption maxima and intensity - instrumentation



IR spectroscopy - vibrations of diatomic molecules- harmonic and anharmonic oscillators, zero point energy, force constant, condition for a molecule to be IR active, selection rules - instrumentation

(15 hrs)

#### Unit - IV

NMR spectroscopy - principle - equivalent and non-equivalent protons - shielded and deshielded protons, chemical shift - TMS, delta tau scales, spin-spin coupling- analysis of spectrum of ethanol - instrumentation

#### Mass spectrometry:

Basic principles of mass spectrum Instrumentation and Block diagram molecular ion peak, base peak, isotopic peak, fragmentation - Nitrogen rule - determination of molecular formulae - fragmentation and mass spectrum of simple organic compounds - alcohols and carbonyl compounds- McLafferty rearrangement.

(15 hrs)

#### Unit -V

Polarography - principle - concentration polarization - dropping mercury electrode - advantages and disadvantages - migration and diffusion currents - Ilkovic equation (derivation not required) and significance - experimental assembly - electrodes - capillary - current voltage curve - oxygen wave - influence of temperature and agitation on diffusion layer - polarography as an analytical tool in quantitative and qualitative analysis . Amperometry- basic principles and uses

#### References

1. Gopalan R., Rengarajan K., and Subramanian P.S., Elements of Analytical Chemistry, 3<sup>rd</sup> ed. Reprint, Sultan Chand & Sons, 2013.
2. SkoogDA, West DM, James Holler F and Stanley R, Fundamentals of Analytical Chemistry, 9<sup>th</sup> ed., 2013
3. Khopkar S.M., Analytical Chemistry, New Age International.
4. Analytical Methods: Interpretation, Identification, Quantification, R. Gopalan and K S Viswanathan, Universities Press, Chennai, 2018
5. Analytical Chemistry, G L David Krupadanam;D Vijaya Prasad;K Varaprasad Rao;K L N Reddy;C Sudhakar, Universities Press, Chennai, 2001

## b) SPECTROSCOPY

### Learning Outcome

Learning about electromagnetic spectrum; Principles of microwave, UV-visible, IR and Raman, NMR and mass spectroscopy and their instrumentation. Application of various spectroscopic techniques to simple molecules.

Semester	Subject Title	Subject Code	Total Hours	Credit
VI	b) SPECTROSCOPY		75	5

(15 hrs)

**UNIT-I**  
Definition of spectrum - Electromagnetic radiation - quantization of different forms of energies in molecules (translational, rotational, vibrational and electronic) - Born Oppenheimer approximation. Microwave Spectroscopy - theory of microwave spectroscopy - selection rule - Calculation of moment of inertia and bond length of diatomic molecules.

(15 hrs)

**UNIT-II**  
UV - Visible Spectroscopy - Absorption laws. Calculations involving Beer-Lambert's law - instrumentation - photo colorimeter and spectrophotometer- block diagrams with description of components - theory - types of electronic transitions - chromophore and auxochromes- Absorption bands and intensity - factors governing absorption maximum and intensity.

(15hrs)

**UNIT-III**  
IR Spectroscopy - principle - modes of vibration of diatomic, triatomic linear ( $\text{CO}_2$ ) and nonlinear triatomic molecules ( $\text{H}_2\text{O}$ ) - stretching and bending vibrations - selection rules. Expression for vibrational frequency (derivation not needed) - instrumentation - sampling techniques Applications of IR Spectroscopy - interpretation of the spectra of alcohols, aldehydes, ketones and esters - aliphatic and aromatic. Hydrogen bonding. Raman Spectroscopy: Rayleigh and Raman scattering, Stokes and anti-Stokes lines. Differences between Raman and IR Spectroscopy. Rotational Raman spectra of Noncentrosymmetric molecules ( $\text{HCl}$ ). Mutual exclusion principle ( $\text{CO}_2$  and  $\text{N}_2\text{O}$ )-instrumentation

(15hrs)

**UNIT-IV**  
NMR Spectroscopy principle of nuclear magnetic resonance - basic instrumentation - number of signals - chemical shift - shielding and deshielding. Spin-spin coupling and coupling constants. TMS as NMR standard. Interpretation of Proton NMR spectra of simple organic compounds such as Ethanol, Acetone, Benzaldehyde, Ethyl acetate, Ethylamine, Ethyl bromide, Toluene and Isopropyl phenyl ketone.

(15 hrs)

**UNIT-V**  
Mass spectroscopy - basic principles instrumentation - molecular ion peak, base peak, metastable peak, isotopic peak their uses. Fragmentation - Nitrogen rule - determination of molecular formulae - mass spectrum of simple organic compounds - identification - alcohols, aldehydes, aromatic hydrocarbons. Interpretation of mass spectra of simple organic compounds such as Ethanol, Acetone, Anisole, Benzaldehyde, Ethyl acetate, Ethylamine, Ethyl bromide, Toluene and Isopropyl phenyl ketone. McLafferty rearrangement.

### Reference Books:

1. Gopalan R., Subramanian P.S., Rengarajan K., Elements of Analytical Chemistry, S. Chand and sons, 2013.
2. Chatwal Anand, Instrumental Methods of Chemical Analysis, Himalaya Publishing House - (2000).
3. William Kemp, Organic Spectroscopy, 3<sup>rd</sup> ed., Palgrave Macmillan, 2008.

4. Singh P.R. and Dikshit S.K., Molecular spectroscopy, S. Chand & Company Pvt. Ltd., New Delhi.
5. Donald L. Pavia, Introduction to Spectroscopy, 4<sup>th</sup> ed., Cengage Learning, 2015.
6. Electronic Absorption Spectroscopy and Related Techniques, D N Sathyanarayana, Universities Press, Chennai, 2001

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## 5. Examination and Evaluation

### Scheme of examination for First and Second semesters

Sem	Course Component	Course	Paper Title	H/hrs work	Credits	Theory/ Pract	Exam Duration	Internal Marks	External Marks	Total Marks
	Part I	Language Paper I		4	3	Theory	3 hrs	25	75	100
	Part II	English		4	3	Theory	3 hrs	25	75	100
I	Part III	Core-1	General Chemistry -1	3	4	Theory	3 hrs	25	75	100
	Part III	Core-2	Major Practicals- 1	3	-	Practicals	3 hrs	40	60	100
	Part III	Allied-1	Allied - 1	6	3	Theory				
	Part IV	Non Major Based Elective -1	Chemistry in Everyday life / Cottage industry products/ Textile Chemistry	2	2	Theory	3 hrs	25	75	100
	Part IV	Skill Based Elective I SOFT SKILL	-	2	2	-	-	-	-	-
	Part I		Language Paper II	6	3	Theory	3 hrs	25	75	100
	Part II		English	6	3	Theory	3 hrs	25	75	100
II	Part III	Core-3	General Chemistry II	5	4	Theory	3 hrs	25	75	100
	Part III	Core-4	Major Practicals I	3	4	Practicals	3 hrs	40	60	100
	Part III	Allied 1	Allied - 1	6	3	***				
	Part IV	Non Major Based Elective II	Soil and Agricultural Chemistry / Dairy Chemistry/Food Chemistry	2	2	Theory	3 hrs	25	75	100
	Part IV	Skill Based ve Elective II SOFT SKILL	-	2	3	-	-	-	-	-

\*\* At the end of even semesters.

\*\*\* Allied Subjects involving practicals -

Theory - 4 Hrs - 3 credits

Practical - 2 Hrs - 2 credits

	Internal	External	Total
Theory	25	75	100

THIRD SEMESTER

Course Components	Subjects	Int. Hrs	Credits	Exam Hrs.	Max. Marks		
					Ext. Marks	Int. Marks	Total
Part - I	Language- Paper - III	6	3	3	75	25	100
Part - II	English - Paper - III	6	3	3	75	25	100
Part - III	Core Paper -IV - General Chemistry III	5	5	3	75	25	100
	Core Paper V - Major-Practical II	3			Examination will be held in IV semester		
	Paper - III- Allied Theory	4	3	3	75	25	100
	Paper III-Allied Practical	2	2		Examination will be held in IV Semester		

Part - IV	2. Soft Skill -III	2	3		60	40	100
	3. Environmental Studies	2	-		Examination will be held in IV Semester		

## FOURTH SEMESTER

Allied : Theory - 4 hrs - 3 Credits  
 Practical- 2 hrs- 2 Credits

Course Components	Subjects	Inst. Hrs.	Credits	Exam Hrs.	Max. Marks		
					Ext. Marks	Int. Marks	Total
Part - I	Language- Paper - IV	6	3	3	75	25	100
Part - II	English - Paper - IV	6	3	3	75	25	100
Part - III	Paper - VI - General Chemistry - IV	5	5	3	75	25	100
	Paper - V - Major-Practical II	3	2	3	60	40	100
	Paper - IV - Allied Theory	4	3	3	75	25	100
	Paper - I - Allied Practicals	2	2	3	60	40	100
Part - IV	2. Soft Skill -IV	2	3		60	40	100
	3.Environmental studies	2	-	3	75	25	100

**FIFTH SEMESTER**

Course Components	Subjects	Inst. Hrs.	Credits	Exam Hrs.	Max. Marks		
					Ext. Marks	Int. Marks	Total
Part - III	Core Paper - VII - Inorganic Chemistry I	4	4	3	75	25	100
	Core Paper - VIII - Organic Chemistry I	4	4	3	75	25	100
	Core Paper - IX - Physical Chemistry I	4	4	3	75	25	100
	Core Paper - X - Gravimetric Analyses, (Practical-III)	3					
	Core Paper - XI - Organic analysis and preparation (Practical - IV)	3					
	Core Paper - XII - Physical Chemistry (Practical - V)	3					
	Elective Paper - I (Pharmaceutical/ Industrial)	4	5	3	75	25	100
Elective Paper - II (Nanomaterials/ Polymer Chemistry)	4	5	3	75	25	100	
Part - IV	Value Education	1	2	3	75	25	100

**SIXTH SEMESTER**

Course Components	Subjects	Inst. Hrs.	Credits	Exam Hrs.	Max. Marks		
					Ext. Marks	Int. Marks	Total
Part - III	Core Paper - XIII - Inorganic Chemistry II	5	5	3	75	25	100
	Core Paper - XIV - Organic Chemistry II	5	5	3	75	25	100
	Core Paper - XV - Physical Chemistry II	5	5	3	75	25	100
	Core Paper - X Gravimetric Analysis (Practical-III)	3	3	3	60	40	100
	Core Paper - XI - Organic analysis and preparation (Practical - IV)	3	3	3	60	40	100
	Core Paper - XII Physical Chemistry (Practical-V)	3	3	3	60	40	100
	Elective Paper - III (Spectroscopy/ Analytical Chemistry)	5	5	3	75	25	100
Part - V	Extension Actives	1	1				

Practical Examination will be held at the end of VI semester.





APPENDIX  
 UNIVERSITY OF MADRAS  
 M.Sc. DEGREE COURSE IN COMPUTER SCIENCE  
 REVISED REGULATIONS  
 Choice Based Credit System  
 (Effective from the academic year 2015-2016)

1. Eligibility for Admission

Candidates with B.Sc. degree in Computer Science or Computer Science & Technology or B.C.A. degree of this University or any other degree accepted as equivalent thereto by the Syndicate.

5. Course of Study and scheme of examinations:

List of courses are given below:

First Semester

Course components	Name of Course	Cr	Ed	Max. Marks	
				IA	UE
Core -1	Design and Analysis of Algorithms	4	3	25	75
Core -2	Advanced Java Programming	4	3	25	75
Core -3	Systems Software	4	3	25	75
Core -4	Practical - I: Algorithms Lab	2	3	40	60
Core -5	Practical - II: Advanced Java Lab.	2	3	40	60
Extra Disciplinary Elective -1	Theoretical Foundations of Computer Science	4	3	25	75
SoftSkill-1		2	3		

Second Semester

Course components	Name of Course	Cr	Ed	Max. Marks	
				CIA	UE
Core-6	Computer Networks	4	3	25	75
Core-7	Digital Image Processing	4	3	25	75
Core-8	Practical - III: RDBMS Lab.	2	3	40	60
Elective 1	Elective - I	3	3	25	75
Core-9	Practical - IV: Image Processing using Java Lab	2	3	40	60
Extra Disciplinary Elective -2	Object Oriented Analysis and Design	3	3	25	75
SoftSkill-2		2	3	40	60
SoftSkill-3		2	3	40	60
Internship	4 to 6 weeks of Internship during summer vacation of 1 Year				

### Third Semester

Course components	Name of Course	L	T	Max. Marks	
				CIA	UE
Core-10	Principles of Compiler Design	4	3	25	75
Core-11	Information Security	4	3	25	75
Core - 12	Artificial Intelligence	4	3	25	75
Elective	Elective –II	4	3	25	75
Elective	Elective – III	4	3	25	75
Core-13	Practical – V: Mini Project	2	3	40	60
Soft Skill-4		2	3	40	60
Internship	During summer vacation 4 to 6 weeks of 1 Year	2			100

### Fourth Semester

Course components	Name of Course	Credits	Exam. Duration	Max. Marks	
				CIA	UE
Core-14	Project & Viva-Voce	20	-	20	60+ 20

#### Elective - I

Mobile Computing OR Computer Simulation and Modeling OR Computer Graphics

#### Elective - II

Big data Analytics OR Cryptography OR Distributed Database Systems

#### Elective - III

Multimedia Systems OR E-Commerce OR Cloud Computing

UNIVERSITY OF MADRAS  
M.Sc. DEGREE COURSE IN COMPUTER SCIENCE  
Revised Syllabus  
Choice Based Credit System

Title of the Course/ Paper

Title of the Course/ Paper	Design and Analysis of Algorithms		
Core - 1	I Year & First Semester	Credit: 4	

**Unit 1:** Introduction - Definition of Algorithm – pseudocode conventions – recursive algorithms – time and space complexity –big-“oh” notation – practical complexities – randomized algorithms – repeated element – primality testing - Divide and Conquer: General Method - Finding maximum and minimum – merge sort.

**Unit-2:** Divide and conquer contd. – Quicksort, Selection, Strassen's matrix multiplication – Greedy Method: General Method –knapsack problem - Tree vertex splitting - Job sequencing with dead lines – optimal storage on tapes.

**Unit 3:** Dynamic Programming: General Method - multistage graphs – all pairs shortest paths – single source shortest paths - String Editing – 0/1 knapsack. Search techniques for graphs – DFS-BFS-connected components – biconnected components.

**Unit 4:** Back Tracking: General Method – 8-queens - Sum of subsets - Graph Coloring – Hamiltonian cycles. Branch and Bound: General Method - Traveling Salesperson problem.

**Unit 5:** Lower Bound Theory: Comparison trees - Oracles and advisory arguments - Lower bounds through reduction - Basic Concepts of NP-Hard and NP-Complete problems.

**Recommended Texts:**

- 1) E. Horowitz, S. Sahni and S. Rajasekaran, 2007, Computer Algorithms, 2<sup>nd</sup> Edition, Universities Press, India. — NO .

**Reference Books**

- 1) G. Brassard and P. Bratley, 1997, Fundamentals of Algorithms, PHI, New Delhi.
- 2) A.V. Aho, J.E. Hopcroft, J.D. Ullmann, 1974, The design and analysis of Computer Algorithms, Addison Wesley, Boston.
- 3) S.E.Goodman and S.T.Hedetniemi, 1977, Introduction to the Design and Analysis of algorithms, Tata McGraw Hill Int. Edn, New Delhi.

**E-learning resources**

- 1) <http://www.cise.ufl.edu/~raj/BOOK.html>

Title of the Course/ Paper	Advanced Java Programming		
Core - 2	I Year & First Semester	Credit: 4	

**Unit 1:** Servlet Overview – Servlet life cycle - The Java Web Server – Simple Servlet – Servlet Packages – Using Cookies - - Session Tracking - Security Issues – using JDBC in Servlets – HTML to Servlet Communication - applet to servlet communication.

**Unit 2:** Java Beans: The software component assembly model- The java bean development kit- developing beans – notable beans – using infobus - Glasgow developments - Application Builder tool- JAR files-Introspection-Bound Properties-Persistence-customizers - java beans API.

**Unit 3:** EJB: EJB architecture- EJB requirements – design and implementation – EJB session beans- EJB entity beans-EJB Clients – deployment tips, tricks and traps for building distributed and other systems – implementation and future directions of EJB-Variable in perl- perl control structures and operators – functions and scope

**Unit 4:** RMI – Overview – Developing applications with RMI: Declaring & Implementing remote interfaces-stubs & skeletons, Registering remote objects, writing RMI clients –Pushing data from RMI Servlet – RMI over Inter-ORB Protocol

**Unit 5:** JSP –Introduction JSP-Examining MVC and JSP -JSP scripting elements & directives-Working with variables scopes-Error Pages - using Java Beans in JSP Working with Java Mail-Understanding Protocols in Java mail-Components-Java mail API-Integrating into J2EE-Understanding Java Messaging Services-Introducing Java Transactions.

**Recommended Text:**

- 1) James McGovern, Rahim , Adata, Yakor Fain, 2003, J2EE 1.4 Bible, Wiley-dreamtech India Pvt. Ltd, New Delhi
- 2) Herbert Schildt, 2002, Java 2 Complete Reference, 5<sup>th</sup> Edition, Tata McGraw Hill, New Delhi
- 3) Jamie Jaworski, 1999, Java 2 Platform – Unleashed, First Edition, Techmedia-SAMS.

**Reference books:**

- (1) K. Moss, 1999, Java Servlets, Second edition, Tata McGraw Hill, New Delhi.
- (2) D. R.Callaway,1999, Inside Servlets, Addison Wesley, Boston
- (3) Joseph O'Neil, 1998, Java Beans from the Ground Up, Tata McGraw Hill, New Delhi.
- (4) T. Valesky, T.C. Valesky, 1999, Enterprise JavaBeans, Addison Wesley.
- (5) Cay S Horstmann & Gary Cornell, 2013, Core Java Vol II Advanced Features, 9<sup>th</sup> Edition, Addison Wesley.

Code of the Course/ Paper	System Software		
Credits - 3	I Year & First Semester	Credit: 4	

**Unit 1:** Language processors – Language processing activities and fundamentals – Language specification – Development Tools – Data Structures for Language processing- Scanners and Parsers.

**Unit 2:** Assemblers: Elements of Assembly language programming - Overview of the Assembly process Design of a Two-pass Assembler - A single pass Assembler for the IBM PC.

**Unit 3:** Macros and Macro processors – Macro definition, call and expansion – Nested macro calls – Advanced macro facilities - Design of a macro preprocessor - Compilers: Aspects of compilation.

**Unit 4:** Compilers and Interpreters – Memory allocation - Compilation of Expressions and Control structures - Code optimization – Interpreters.

**Unit 5 :** Linkers: Linking and Relocation concepts – Design of a linker – Self relocating Programs – A linker for MS DOS - Linking for over-lays – loaders - Software tools: Software tools for program development - Editors - Debug monitors - Programming environments – User interfaces.

**Recommended Texts**

- 1) D. M. Dhamdhere, 1999, Systems Programming and Operating Systems, Second Revised Edition, Tata McGraw-Hill, New Delhi.

**Reference Books**

- 1) L. L. Beck, 1996, System Software An Introduction to System Programming, 3<sup>rd</sup> edition, Addison-Wesley.

Title of the Course/ Paper	Practical – I: Algorithms Lab		
Core – 4	I Year & First Semester	Credit: 2	

1. Divide and Conquer :
  - a. Merge Sort
  - b. Quick Sort
  - c. Maximum and Minimum
2. Greedy Method :
  - a. Knapsack Problem
  - b. Tree vertex splitting
  - c. Job Sequencing
3. Dynamic Programming :
  - a. Multistage graphs
  - b. All Pairs Shortest Paths
  - c. String Editing,
  - d. BFS and DFS.
4. Back Tracking :
  - a. 8 Queen Problems
  - b. Hamiltonian Cycles.

Title of the Course/ Paper	Practical – II: Advanced Java Programming Lab		
Core – 5	I Year & First Semester	Credit: 2	

1. HTML to Servlet Applications
2. Applet to Servlet Communication
3. Designing online applications with JSP
4. Creating JSP program using JavaBeans
5. Working with Enterprise JavaBeans
6. Performing Java Database Connectivity.
7. Creating Web services with RMI.
8. Creating and Sending Email with Java
9. Building web applications

Title of the Course/ Paper	Theoretical Foundations of Computer Science		
Extra Disciplinary Elective -I	First Year & First Semester		

Unit 1: Propositions and Compound Propositions – Logical Operations – Truth Tables –Tautologies and Contradictions – Logical Equivalence –Algebra of Propositions – Conditional and Biconditional Statements –Arguments – Logical Implication – Quantifiers – Negation of Quantified Statements – Basic Counting Principles – Factorial – Binomial Coefficients – Permutations – Combinations – Pigeonhole Principle – Ordered and Unordered Partitions.

Unit 2: Order and Inequalities – Mathematical Induction – Division Algorithm – Divisibility – Euclidean Algorithm – Fundamental Theorem of Arithmetic – Congruence Relation – Congruence Equations – Semigroups – Groups – Subgroups – Normal Subgroups – Homomorphisms – Graph Theory: basic definitions-paths, reachability, connectedness matrix representation of graphs, trees.

Unit 3: Finite Automata and Regular Expressions: Finite State Systems – Basic definitions – Non-deterministic finite automata – Finite automata with moves – Regular expressions.

Unit 4: Properties of Regular sets: Pumping lemma – Closure properties – Decision Algorithms – My hill – Nerode Theorem – Context Free Grammars – Derivation Trees.

Unit 5: Simplifying Context free grammars - Chomsky normal forms – Greibach Normal forms – Pushdown automata and context-free languages.

#### 1. Recommended Texts

- (i) J.P. Tremblay and R. Manohar, 1997, Discrete Mathematical Structures with applications to Computer Science, Tata McGraw-Hill, New Delhi.
- (ii) P. Linz, 1997, An Introduction to Formal Languages and Automata, Second Edition, Narosa Pub. House, New Delhi.
- (iii) S. Lipschutz and M. Lipson, 1999, Discrete Mathematics, Second Edition, Tata McGraw-Hill, New Delhi.
- (iv) J.E.Hopcraft and J.D.Ullman, 1993, Introduction to Automata Theory, Languages and Computation, Narosa Publishing House, New Delhi.

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#### 2. Reference Books

- (i) D.C.Kozen, 1997, Automata and Computability, Springer-Verlag, New York.
- (ii) J. Martin, 2003, Introduction to Languages and the Theory of Computation, 3<sup>rd</sup> Edition, Tata McGraw-Hill, New Delhi.

Title of the Course/ Paper	Computer Networks		
Core - 6	I Year & Second Semester	Credit: 4	

**Unit 1:** Introduction – Network Hardware – Software – Reference Models – OSI and TCP/IP models – Example networks: Internet, 3G Mobile phone networks, Wireless LANs –RFID and sensor networks - Physical layer – Theoretical basis for data communication - guided transmission media

**Unit-2:** Wireless transmission - Communication Satellites – Digital modulation and multiplexing - Telephones network structure – local loop, trunks and multiplexing, switching. Data link layer: Design issues – error detection and correction.

**Unit 3:** Elementary data link protocols - sliding window protocols – Example Data Link protocols – Packet over SONET, ADSL - Medium Access Layer – Channel Allocation Problem – Multiple Access Protocols.

**Unit 4:** Network layer - design issues - Routing algorithms - Congestion control algorithms – Quality of Service – Network layer of Internet- IP protocol – IP Address – Internet Control Protocol.

**Unit 5:** Transport layer – transport service- Elements of transport protocol - Addressing, Establishing & Releasing a connection – Error control, flow control, multiplexing and crash recovery - Internet Transport Protocol – TCP - Network Security: Cryptography.

**Recommended Texts:**

- 1) A. S. Tanenbaum, 2011, Computer Networks, Fifth Edition, Pearson Education, Inc.

**Reference Books**

- 1) B. Forouzan, 1998, Introduction to Data Communications in Networking, Tata McGraw Hill, New Delhi.
- 2) F. Halsall, 1995, Data Communications, Computer Networks and Open Systems, Addison Wessley.
- 3) D. Bertsekas and R. Gallager, 1992, Data Networks, Prentice hall of India, New Delhi.
- 4) Lamarca, 2002, Communication Networks, Tata McGraw Hill, New Delhi.

**Website, E-learning resources**

- 1) <http://peasonhighered.com/tanenbaum>



Title of the Course/ Paper	Digital Image Processing		
Core - 7	I Year & Second Semester	Credit: 4	

**Unit 1:** Introduction – steps in image processing - Image acquisition - representation - sampling and quantization - relationship between pixels. – color models – basics of color image processing. **Unit-2:** Introduction – steps in image processing - Image acquisition - representation - sampling and quantization - relationship between pixels. – color models – basics of color image processing.

**Unit 3:** Image enhancement in Frequency domain – Introduction to Fourier transform: 1- D, 2 –D DFT and its inverse transform - smoothing and sharpening filters.

**Unit 4:** Image restoration: Model of degradation and restoration process – noise models – restoration in the presence of noise- periodic noise reduction. - Image segmentation: Thresholding and region based segmentation.

**Unit 5:** Image compression: Fundamentals – models – information theory – error free compression – Lossy compression: predictive and transform coding - JPEG standard.

**Recommended Texts:**

- 1) .C. Gonzalez, R.E. Woods, 2009, Digital Image processing, 3<sup>rd</sup> Edition, Pearson Education.

**Reference Books**

- 1) Pratt.W.K., Digital Image Processing, 3rd Edition, John Wiley & Sons.
- 2) Rosenfled A. & Kak, A.C, 1982, Digital Picture Processing, vol .I & II, Academic Press.

**Website and e-Learning Source:**

- 1) <http://www.imageprocessingplace.com/DIP/dip-downloads>.

Title of the Course/ Paper	Practical – III: RDBMS Lab		
Core - 8	1 Year & Second Semester	Credit: 2	

1. Library Information Processing.
2. Students Mark sheet processing.
3. Telephone directory maintenance.
4. Gas booking and delivery system.
5. Electricity Bill Processing.
6. Bank Transactions (SB).
7. Pay roll processing.
8. Inventory
9. Question Database and conducting quiz.
10. Purchase order processing.

Title of the Course/ Paper	Practical – IV: Image Processing using Java Lab		
Core – 9	1 Year & Second Semester	Credit: 2	

- 1) Basic image manipulation (reading, writing, quantization, sub sampling)
- 2) Basic Intensity transformation
- 3) Histogram Processing
- 4) Filtering in spatial domain-2D FFT and smoothing filters
- 5) Image coding using transformations with SPIHT algorithm
- 6) Color image Enhancement with spatial sharpening.

Title of the Course/ Paper	Object Oriented Analysis and Design		
Extra Disciplinary Elective - 2	I Year & Second Semester	Credit: 3	

**Unit 1:** System Development - Object Basics - Development Life Cycle - Methodologies - Patterns - Frameworks - Unified Approach - UML.

**Unit-2:** Use-Case Models - Object Analysis - Object relations - Attributes - Methods – Class and Object responsibilities - Case Studies.

**Unit 3:** Design Processes - Design Axioms - Class Design - Object Storage - Object Interoperability - Case Studies.

**Unit-4:** User Interface Design - View layer Classes - Micro-Level Processes - View Layer Interface - Case Studies.

**Unit-5:** Quality Assurance Tests - Testing Strategies - Object orientation on testing - Test Cases - test Plans - Continuous testing - Debugging Principles - System Usability - Measuring User Satisfaction - Case Studies.

#### Recommended Texts

- (i) Ali Bahrami, Reprint 2009, Object Oriented Systems Development, Tata McGraw Hill International Edition.

#### Reference Books

- (i) G. Booch, 1999, Object Oriented Analysis and design, 2<sup>nd</sup> Edition, Addison Wesley, Boston
- (ii) Roger S.Pressman, 2010, Software Engineering A Practitioner's approach, Seventh Edition, Tata McGraw Hill, New Delhi.
- (iii) Rumbaugh, Blaha, Premerlani , Eddy, Lorensen, 2003, Object Oriented Modeling And design , Pearson education, Delhi.

Title of the Course/ Paper	Principles of Compiler Design		
Core - 10	II Year & Third Semester	Credit: 4	

**Unit 1:** Introduction to Compilers - Finite Automata and lexical Analysis.

**Unit-2:** Syntax Analysis: Context free grammars - Derivations and parse trees – Basic parsing techniques - LR parsing.

**Unit 3:** Syntax - directed translation, symbol tables.

**Unit 4:** Code optimization - More about code optimization.

**Unit 5:** Code generation - Error detection and recovery.

**Recommended Texts:**

1) A.V. Aho, J.D.Ullman, 1985, Principles of Compiler Design, Narosa Pub-House.

**Reference Books**

- 1) D.Gries, 1979, Compiler Construction for Digital Computers, John Wiley & Sons.
- 2) A.V.Aho, Ravi Sethi, and J.D.Ullman, 1986, Compilers Principles, Techniques and Tools, Addison Wesley Pub. Co.

Title of the Course/ Paper	Information Security		
Core - 11	II Year & Third Semester	Credit: 4	

**Unit 1: Introduction: Security- Attacks- Computer criminals- Method of defense Program Security: Secure programs- Non-malicious program errors- Viruses and other malicious code- Targeted malicious code- Controls against program threats**

**Unit 2: Operating System Security: Protected objects and methods of protection- Memory address protection- Control of access to general objects- File protection mechanism- Authentication: Authentication basics- Password- Challenge-response- Biometrics.**

**Unit 3: Database Security: Security requirements- Reliability and integrity- Sensitive data- Interface- Multilevel database- Proposals for multilevel security**

**Unit 4: Security in Networks: Threats in networks- Network security control- Firewalls- Intrusion detection systems- Secure e-mail- Networks and cryptography- Example protocols: PEM- SSL- Ipsec.**

**Unit 5: Administrating Security: Security planning- Risk analysis- Organizational security policies- Physical security - Legal- Privacy- and Ethical Issues in Computer Security - Protecting programs and data- Information and law- Rights of employees and employers- Software failures- Computer crime- Privacy- Ethical issues in computer society- Case studies of ethics.**

#### Recommended Text

- 1) C. P. Pfleeger, and S. L. Pfleeger, Security in Computing, Pearson Education, 4<sup>th</sup> Ed, 2003
- 2) Matt Bishop, Computer Security: Art and Science, Pearson Education, 2003.

#### Reference Books

- 1) Stallings, Cryptography & N/w Security: Principles and practice, 4<sup>th</sup> Edition, 2006
- 2) Kaufman, Perlman, Speciner, Network Security, Prentice Hall, 2<sup>nd</sup> Edition, 2003
- 3) Eric Maiwald, Network Security : A Beginner's Guide, TMH, 1999
- 4) Macro Pistoia, Java Network Security, Pearson Education, 2<sup>nd</sup> Edition, 1999
- 5) Whitman, Mattord, Principles of information security, Thomson, 2<sup>nd</sup> Edition, 2005

#### Website and e-Learning Source

- 1) <http://www.cs.gsu.edu/~cscyqz/courses/ai/ai.lectures.html>
- 2) <http://www.eecs.qmul.ac.uk/~mmlh/AINotes/>

Title of the Course/ Paper	Artificial Intelligence		
Core 12	II Year & Third Semester	Credit: 4	

**Unit 1:** Introduction - Intelligent Agents- Problem Solving - by Searching - Informed Search and Exploration - Constraint Satisfaction Problems - Adversarial Search

**Unit-2:** Knowledge and Reasoning - Logical Agents - First-Order Logic - Inference in First-Order Logic - Knowledge Representation

**Unit 3:** Planning – Planning and Acting in the Real World - Uncertain knowledge and reasoning - Uncertainty - Probabilistic Reasoning - Probabilistic Reasoning Over Time - Making Simple Decisions - Making Complex Decisions

**Unit 4:** Learning - Learning from Observations - Knowledge in Learning - Statistical Learning Methods - Reinforcement Learning

**Unit 5:** Communicating, Perceiving, and Acting - Communication - Probabilistic Language Processing - Perception – Robotics.

**Recommended Texts:**

- 1) Stuart Russell and Peter Norvig, 2003, Artificial Intelligence: A Modern Approach, 2nd Edition, Prentice Hall of India, New Delhi.

**Reference Books**

- 1) Elaine Rich and Kevin Knight, 1991, Artificial Intelligence, 2nd Edition, Tata McGraw-Hill, New Delhi.
- 2) Herbert A. Simon, 1998, The Sciences of the Artificial Intelligence, 3rd Edition, MIT Press.
- 3) N.J. Nilson, 1983, Principles of AI, Springer Verlag.

**Website and e-Learning Source:**

- 1) <http://aima.eecs.berkeley.edu/slides-pdf/>

Title of the Course/ Paper	Practical – V:Mini Project		
Core – 13	II Year & Third Semester	Credit: 2	

Each student will develop and implement individually application software based on any emerging latest technologies.

Title of the Course/ Paper	Project & Viva-Voce		
Core-14	II Year & Fourth Semester	Credit: 20	

The project work is to be carried out either in a software industry or in an academic institution for the entire semester and the report of work done is to be submitted to the University.

### LIST OF ELECTIVES

Title of the Course/ Paper	Mobile Computing		
Elective - 1	I Year & Second Semester	Credit: 3	

**Unit 1:** Introduction - Mobile and Wireless Devices – Simplified Reference Model – Need for Mobile Computing –Wireless Transmissions –Multiplexing – Spread Spectrum and Cellular Systems- Medium Access Control – Comparisons.

**Unit 2:** Telecommunication Systems – GSM – Architecture – Sessions – Protocols – Hand Over and Security – UMTS and IMT – 2000 – Satellite Systems.

**Unit 3:** Wireless Lan - IEEE 802.11 – Hiper LAN – Bluetooth – Security and Link Management.

**Unit 4:** Mobile network layer - Mobile IP – Goals – Packet Delivery – Strategies – Registration – Tunneling and Reverse Tunneling – Adhoc Networks – Routing Strategies

**Unit 5:** Mobile transport layer - Congestion Control – Implication of TCP Improvement – Mobility – Indirect – Snooping – Mobile – Transaction oriented TCP - TCP over wireless – Performance.

#### **Recommended Text**

- 1) J. Schiller, 2003, Mobile Communications, 2nd edition, Pearson Education, Delhi.

#### **Reference Books**

- 1) Hansmann, Merk, Nicklous, Stober, 2004, Principles of Mobile Computing, 2nd Edition, Springer (India).

- 2) Pahlavan, Krishnamurthy, 2003(2002), Principle of wireless Networks: A unified Approach, Pearson Education, Delhi.
- 3) Martyn Mallick, 2004, Mobile and Wireless Design Essentials, Wiley Dreamtech India Pvt. Ltd., New Delhi.
- 4) W. Stallings, 2004, Wireless Communications and Networks, 2nd Edition, Pearson Education, Delhi.

#### Website and e-Learning Source

- 1) <http://csbdu.in/pdf/mobile%20communication.pdf>

Title of the Course/ Paper	Computer Simulation and Modeling		
Elective - 1	I Year & Second Semester	Credit: 3	

**Unit 1:** Introduction to Simulation -Simulation Examples: Simulation of queuing systems, inventory systems and other examples - General Principles: Concepts in discrete event system simulation - List Processing

**Unit 2:** Programming Languages for Simulation: FORTRAN, GPSS. Simulation of Queuing Systems: Queuing System Characteristics - Queueing Notation - Transient and Steady-State Behaviour of Queues - Long-Run Measures of Performance of Queuing Systems - Steady- State Behaviour of Infinite-Population Markovian Models - Network of Queues.

**Unit 3:** Random-Number Generation: Properties of Random Numbers - Generation of Pseudo-Random Numbers - Techniques for Generating Random Numbers - Tests for Random Numbers. Random Variate Generation: Inverse Transformation Technique:- Uniform Distribution - Exponential Distribution - Weibull Distribution - Triangular Distribution - Empirical Continuous Distribution - Discrete Distribution - Direct Transformation for the Normal Distribution - Convolution Method for Erlang Distribution - Acceptance-Rejection Technique: Poisson Distribution - Gamma Distribution.

**Unit 4:** Input Data Analysis: Data Collection - Identifying the Distribution with Data - Parameter Estimation - Goodness-of-Fit Tests: Chi-Square Test - Kolmogorov-Smirnov Test; Selecting Input Models without Data - Multivariate and Time-Series Input Models. Verification and Validation of Simulation Models: Model Building, Verification and Validation - Verification of Simulation Models - Calibration and Validation of Models:- Face Validity - Validation of Model Assumptions - Validating Input-Output Transformations - Input-Output Validation using Historical Input Data - Input-Output .



Validation using a Turing Test

**Unit 5: Output Data Analysis: Stochastic Nature of Output Data - Types of Simulation with respect to Output Analysis - Measures of Performance and their Estimation - Output Analysis for Terminating Simulations - Output Analysis for Steady-State Simulation**

**Recommended Text**

1) J. Banks, J. S. Carson II and B. L. Nelson, 1995, Discrete-Event System Simulation, 2nd Edition, Prentice Hall of India, New Delhi.

**Reference Books**

1) Averill M. Law and W. David Kelton, 1991, Simulation Modeling & Analysis, 2nd Edn., Tata McGraw Hill.

2) Geoffrey Gardon, 1992, System Simulation, 2nd Edn., Printice Hall of India.

3) Narsingh Deo, 1979, System Simulation with Digital Computers, Prentice Hall of India.

4) C. Dennis Pegden, Robert E. Shannon and Randall P. Sadowski, 1995, Introduction to Simulation using SIMAN, 2nd Edn., Tata McGraw-Hill.

**E-learning resources**

1) <http://www.bcnn.net>

Title of the Course/ Paper	Computer Graphics		
Elective - 1	I Year & Second Semester	Credit: 3	

**Unit 1:** Introduction to computer Graphics – Video display devices – Raster Scan Systems – Random Scan Systems - Interactive input devices – Hard Copy devices - Graphics software – Area fill attributes – Character attributes inquiry function - Output primitives – line drawing algorithms – initializing lines – line function – Circle Generating algorithms – Ellipse Generating algorithms - Attributes of output primitives – line attributes – Color and Grayscale style.

**Unit 2:** – Two dimensional transformation – Basic transformation – Matrix representation and Homogeneous co-ordinates - Composite transformation – Matrix representation – other transformations – two dimensional viewing – window – to- viewport co-ordinate transformation.

**Unit 3:** Clipping algorithms – Point clipping -line clipping - polygon clipping – Curve clipping - text clipping – Exterior clipping — Three dimensional transformations – translation- rotation- scaling – composite-shears and reflections - Three dimensional viewing – Projection – Orthogonal and oblique parallel projections.

**Unit 4:** – Viewing - perspective projection – Three dimensional clipping algorithms- Visible surface detection methods – backface detection, depth buffer, A-buffer, scan-line, depth sorting, BSP-tree, area subdivision, octree and other methods.

**Unit 5:** Computer Animation - Three dimensional object representations – Spline representation - Bezier curves and surfaces – B-Spline curves and surfaces – Color models and color applications.

**Recommended Text**

- 1) D. Hearn, M.P. Baker, and W.R. Carithers, 2011 – Computer Graphics with OpenGL, 4<sup>th</sup> Edition, Pearson Education

**Reference Books**

- 1) W.M. Neumann and R. F. Sproull, Principles of Interactive Computer Graphics, Tata McGraw-Hill, New Delhi.
- 2) S. Harrington, 1989, Fundamentals of Computer Graphics, Tata McGraw-Hill, New Delhi.
- 3) D. F. Rogers, J. A. Adams, 2002, Mathematical elements for Computer Graphics, 2<sup>nd</sup> Edition, Tata McGraw-Hill, New Delhi.
- 4) D. F. Rogers, 2001, Procedural elements for Computer Graphics, 2<sup>nd</sup> Edition, Tata McGraw-Hill, New Delhi.
- 5) Foley, Van Dan, Feiner, Hughes, 2000, Computer Graphics, Addison Wesley, Boston

**Website and E-Learning Source**

- 1) <http://forum.jntuworld.com/showthread.php?3846-Computer-Graphics-Notes-All-8-Units>
- 2) <http://www.cs.kent.edu/~farrell/cg05/lectures/index.html>

Title of the Course/ Paper	Big Data Analytics		
Elective - 2	II Year & Third Semester	Credit: 4	

**Unit 1:** Basic nomenclature - Analytics process model - Analytics model requirements - Types of data sources – Sampling - types of data elements - Visual Data Exploration and Exploratory Statistical Analysis - Missing Values - Outlier Detection and Treatment - Standardizing Data – Categorization - weights of evidence coding - Variable selection -Segmentation.

**Unit 2:** Predictive Analytics: Target Definition - Linear Regression - Logistic Regression - Decision Trees - Neural Networks - Support Vector machines - Ensemble Methods - Multiclass Classification

Techniques - Evaluating Predictive Models.

**Unit 3:** Descriptive Analytics: Association Rules - Sequence Rules - Segmentation. Survival Analysis: Survival Analysis Measurements - Parametric Survival Analysis.

**Unit 4:** Social Network Analytics: Social Network Definitions - Social Network Metrics - Social Network Learning - Relational Neighbor Classifier - Probabilistic Relational Neighbor Classifier - Relational logistic Regression - Collective Inference.

**Unit 5:** Benchmarking - Data Quality - Software - Privacy - Model Design and Documentation - Corporate Governance. Example applications: Credit Risk Modeling - Fraud Detection - Recommender Systems - Web Analytics.

**Recommended Text:**

- 1) Baesens, 2014, Analytics in a Big Data World: The Essential Guide to Data Science and Its applications, Wiley India Private Limited

**Reference Books**

- 1) Michael Minelli, Michele Chambers, 2013, Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses, Wiley CIO
- 2) Stephan Kudyba, 2014, Big Data, Mining and Analytics: Components of Strategic Decision Making, CRC Press.
- 3) Frank J. Ohlhorst, 2013, Big data Analytics: Turning Big Data into Big Money, Wiley and SAS Business Series.
- 4) Foster Provost, Tom Fawcett, 2013, Data Science for Business, SPD.

Title of the Course/ Paper	Cryptography		
Elective - 2	II Year & Third Semester	Credit: 4	

**Unit 1:** Conventional Encryption: Conventional encryption model - DES - RC 5 - Introduction to AES - Random number generation.

**Unit-2:** Number Theory: Modular arithmetic - Euler's theorem - Euclid's algorithm - Chinese remainder theorem - Primarily and factorization - Discrete logarithms - RSA algorithm

**Unit 3:** Public key Cryptography: Principles - RSA algorithm - key management- Diff - Hellman key exchange

**Unit 4:** Message Authorization and Hash functions: Hash functions- Authentication requirements -

Authentication function- Message authentication codes –Secure Hash algorithms

Unit 5: Digital Signature and Authentication Protocols : Digital Signature- Authentication Protocols – Digital signature standard.

**Recommended Texts:**

1) Stallings, W., 2005 , Cryptography and Network Security Principles and Practice, Pearson Education, Delhi.

**Reference Books**

- 1) Charlie Kaufman, Radia Perlman, Mike specimen, Network Security- Private Communication in a world. public
- 2) Michael Welschenbach, 2005, Cryptography in C & C++", John Wiley.
- 3) Bruce Schneier , 2001 Applied Cryptography , John Wiley and sons.
- 4) Kailash N.Gupta , Kamlesh N. Agarwala, Pratek A. Agarwala, 2005, Digital signature Network security practices , PHI, New Delhi.

Title of the Course/ Paper	Distributed Database Systems		
Elective - 2	II Year & Third Semester	Credit: 4	

Unit 1: Features of Distributed versus Centralized Databases – Why Distributed Databases – Distributed Database Management Systems (DDBMSs)- Review of Databases – Review of Computer Networks- Levels of Distribution Transparency- Reference Architecture for Distributed Databases – Types of Data Fragmentation – Distribution Transparency for read-only Applications – Distribution transparency for Update Applications – Distributed Database Access Primitives – Integrity Constraints in Distributed Databases - A Framework for Distributed Database Design – The Design of Database Fragmentation – The Allocation of Fragments.

Unit-2: Equivalence Transformations for Queries – Transforming Global Queries into Fragment Queries – Distributed Grouping and Aggregate Function Evaluation – Parametric Queries -Optimization of Access Strategies - A Framework for Query Optimization – Join Queries – General Queries. A Framework for Transaction Management – Supporting Atomicity of Distributed Transactions – Concurrency Control for Distributed Transactions – Architectural Aspects of Distributed Transactions.

Unit 3: Foundations of Distributed Concurrency Control – Distributed Deadlocks – Concurrency Control Based on Timestamps – Optimistic Methods for Distributed Concurrency Control - Reliability – Basic

Concepts Nonblocking Commitment Protocols – Reliability and Concurrency Control – Determining a Consistent View of the Network – Detection and Resolution of Inconsistency – Checkpoints and Cold Restart – Distributed Database Administration – Catalog Management in Distributed Databases – Authorization and Protection.

Unit-4: Distributed object database management systems – Fundamental object concepts and Models – Object – Abstract Data Types – Composition (Aggregation) – Class – Collection – Subtyping and Inheritance. – Object Distribution Design – Horizontal Class Partitioning – Vertical Class Partitioning – Path Partitioning – Class Partitioning Algorithms – Allocation – Replication – Alternative Client / Server Architectures – Cache Consistency – Object Identifier Management – Pointer Switching Object Migration – Distributed Object Storage – Object Query Processor Architectures – Query Processing Issues – Query Execution – Correctness Criteria – Transaction Models and Object Structures – Transactions Management in Object DBMSs – Transactions as Objects – Conclusion – Bibliographic Notes – Exercises.

Unit-5 : Parallel Database Systems – Database Server Approach – Database Servers and Distributed Databases – Parallel System Architectures – Objectives – Functional Aspects – Parallel Data Processing – Parallel Query Optimization – Data Placement – Query Parallelism – Parallel Execution Problems – Initialization – Interferences and Convoy Effect – Load Balancing – Parallel Execution for Hierarchical Architecture – Problem Formulation – Basic Concepts – Load Balancing Strategy – Performance Evaluation – Conclusion – Bibliographic Notes – Exercises.

**Recommended Text:**

- 1) Stefano Ceri, Giuseppe Pelagatti, Distributed Databases Principles & Systems, McGraw-Hill.
- 2) M.Tamer Ozsu, Patrick Valduriez, Distributed database systems, 2<sup>nd</sup> Edition, Prentice Hall of India, New Delhi.

Title of the Course/ Paper	Multimedia Systems
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**Unit 1: Introductory Concepts:** Multimedia – Definitions, CD-ROM and the Multimedia Highway, Uses of Multimedia, Introduction to making multimedia – The Stages of project, the requirements to make good multimedia, Multimedia skills and training, Training opportunities in Multimedia. Motivation for multimedia usage, Frequency domain analysis, Application Domain.

**Unit 2: Multimedia-Hardware and Software:** Multimedia Hardware – Macintosh and Windows production Platforms, Hardware peripherals – Connections, Memory and storage devices, Media software – Basic tools, making instant multimedia, Multimedia software and Authoring tools, Production Standards.

**Unit 3: Multimedia – making it work – multimedia building blocks –** Text, Sound, Images, Animation and Video, Digitization of Audio and Video objects, Data Compression: Different algorithms concern to text, audio, video and images etc., Working Exposure on Tools like Dream Weaver, Flash, Photoshop Etc.,

**Unit 4: Multimedia and the Internet:** History, Internet working, Connections, Internet Services, The World Wide Web, Tools for the WWW – Web Servers, Web Browsers, Web page makers and editors, Plug-Ins and Delivery Vehicles, HTML, VRML, Designing for the WWW – Working on the Web, Multimedia Applications – Media Communication, Media Consumption, Media Entertainment, Media games.

**Unit 5 : Multimedia-looking towards Future:** Digital Communication and New Media, Interactive Television, Digital Broadcasting, Digital Radio, Multimedia Conferencing, Assembling and delivering a project-planning and costing, Designing and Producing, content and talent, Delivering, CD-ROM technology.

**Recommended Texts:**

1. S. Heath, 1999, Multimedia & Communication Systems, Focal Press, UK.
2. T. Vaughan, 1999, Multimedia: Making it work, 4<sup>th</sup> Edition, Tata McGraw Hill, New Delhi.
3. K. Andleigh and K. Thakkar, 2000, Multimedia System Design, PHI, New Delhi.

**Reference Books**

- 1) Keyes, "Multimedia Handbook", TMH, 2000.
- 2) R. Steinmetz and K. Naharstedt, 2001, Multimedia: Computing, Communications & Applications, Pearson, Delhi.
- 3) S. Rimmer, 2000, Advanced Multimedia Programming, PHI, New Delhi.

**Website and e-Learning Source :**

- 1) [http://www.cikon.de/Text EN/Multimed.html](http://www.cikon.de/Text_EN/Multimed.html)

Elective - 3	II Year & Third Semester	Credit: 4	
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**Unit 1:** Introduction to Electronic Commerce: Electronic Commerce Framework – Electronic Commerce and Media Convergence – The Anatomy of E-Commerce Applications – Electronic Commerce Consumer Applications – Electronic Commerce Organization Applications. The Network Infrastructure for Electronic Commerce: Components of the I way – Network Access Equipment – Global information Distribution Networks.

**Unit 2:** The Internet as a Network Infrastructure: The Internet Terminology – NSFNET: Architecture and Components – National Research and Education Network – Globalization of the Academic Internet - Internet Governance – An overview of Internet Applications. The Business of Internet Commercialization: Telco/Cable/On-Line Companies - National Independent ISPs – Regional Level ISPs – Local –level ISPs – Service Provider Connectivity - Internet Connectivity options.

**Unit 3:** Network Security and Firewalls: Client Server Network Security and Threats. Electronic Commerce and the World Wide Web: Architectural Framework for Electronic commerce – World Wide Web (WWW) as the Architecture – Hypertext Publishing - Technology behind the Web – Security and the Web. Consumer-Oriented Electronic Commerce: Consumer-Oriented Applications – Mercantile process models – Mercantile Models from the Consumers and the Merchant’s Perspective.

**Unit 4:** Electronic Payment Systems: Types of Electronic Payment Systems – Digital Token based Electronic Payment Systems – Smart Cards and Credit Card – Based Electronic Payment Systems – Risk and Electronic Payment Systems – Designing Electronic Payment Systems. Inter-organizational Commerce and EDI: Electronic Data Interchange –Applications in Business –Legal, Security and Privacy issues - Internet –Based EDI.

**Unit 5:** Advertising and the Marketing on the Internet: The New Age of Information based marketing and Advertising on the Internet – Consumer Search and Resource Discovery Paradigms and Retrieval - Electronic Commerce Catalogs or Directories – Information filtering – Consumer – Data Interface : Emerging Tools. On Demand Education and Digital Copyrights: Computer based Education and Training – Technological Components of Education on demand. Software Agents: Characteristics and Properties of Agents – The Technology behind Software Agents – Applets, Browsers and Software Agents- Software Agents in Action.

#### Recommended Texts

1) Ravi Kalakota and Andrew B. Whinston, Eleventh Impression, 2011., Frontiers of Electronic Commerce, Pearson Education Inc., Delhi.

**Reference Books**

(1) Daniel Minoli, and Emma Minoli, Seventh Reprint 2003, Web commerce Technology Handbook, Tata McGraw Hill, New Delhi.

Title of the Course/ Paper	Cloud Computing		
Elective - 3	II Year & Third Semester	Credit: 4	

**Unit 1: UNDERSTANDING CLOUD COMPUTING:** Cloud Computing –History of Cloud Computing – Cloud Architecture –Cloud Storage –Why Cloud Computing Matters –Advantages of Cloud Computing – Disadvantages of Cloud Computing –Companies in the Cloud Today –Cloud Services

**Unit 2: DEVELOPING CLOUD SERVICES:** Web-Based Application –Pros and Cons of Cloud Service Development –Types of Cloud Service Development –Software as a Service –Platform as a Service- Infrastructure as a service –Web Services –On-Demand Computing –Discovering Cloud Services Development Services and Tools –Amazon Ec2 –Google App Engine –IBM Clouds

**Unit 3: CLOUD COMPUTING FOR EVERYONE:** Centralizing Email Communications –Collaborating on Schedules –Collaborating on To-Do Lists –Collaborating Contact Lists –Cloud Computing for the Community –Collaborating on Group Projects and Events –Cloud Computing for the Corporation

**Unit 4: USING CLOUD SERVICES:** Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications –Exploring Online Planning and Task Management – Collaborating on Event Management –Collaborating on Contact Management –Collaborating on Project Management –Collaborating on Word Processing –Collaborating on Databases –Storing and Sharing Files

**Unit 5: OTHER WAYS TO COLLABORATE ONLINE:** Collaborating via Web-Based Communication Tools –Evaluating Web Mail Services –Evaluating Web Conference Tools –Collaborating via Social Networks and Groupware –Collaborating via Blogs and Wikis

**Recommended Text**

- 1) Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
- 2) Kumar Saurabh, “Cloud Computing –Insights into New Era Infrastructure”, Wiley Indian Edition, 2011.



**THE FOLLOWING DOCUMENTS ARE REQUIRED IN CRETRIA 1.3.2  
OF VARIOUS DEPARTMENT AS FOLLOWS:**

- SYLLABUS COPY OR BROCHURE

[FOR 2016-17, 2017 -18, 2018-19, 2019-20, 2020-21]

**DEPARTMENT OF BBA**

**THE FOLLOWING DOCUMENTS ARE REQUIRED IN CRETRIA 1.3.2  
OF VARIOUS DEPARTMENT AS FOLLOWS:**

- SYLLABUS COPY OR BROCHURE

[FOR 2016-17, 2017 -18, 2018-19, 2019-20, 2020-21]



# **University of Madras**

**Chepauk, Chennai 600 005**

*[Est. 1857, State University, NAAC 'A' Grade, CGPA 3.32, NIRF 2019 Rank: 20]*

Website: [www.unom.ac.in](http://www.unom.ac.in), Tel. 044-2539 9561

**Undergraduate Programme in  
Management.**

**Curriculum and Syllabus for  
B.B.A.-Bachelor of Business Administration**  
*(With effect from the Academic Year 2020-21)*

**February 2020**

**Note: The Board of Studies in Business Administration designed learning Outcome Based Curriculum Framework of B.B.A. programme prescribed by UGC.**

## **UNIVERSITY OF MADRAS**

### **B.B.A. DEGREE COURSE IN BUSINESS ADMINISTRATION**

#### **SYLLABUS WITH EFFECT FROM 2020-2021**

#### **ALLIED-I: MANAGERIAL ECONOMICS**

##### **UNIT I**

Nature and scope of managerial economics – definition of economics – important concepts of economics – relationship between micro, macro and managerial economics – nature and scope – objectives of firm

##### **UNIT II**

Demand analysis – Theory of consumer behavior – Marginal utility analysis – indifference curve analysis Meaning of demand – Law of demand – Types of demand – Determinants of demand – Elasticity of demand – Demand forecasting

##### **UNIT III**

Production and cost analysis – Production – Factors of production – production function – Concept – Law of variable proportion – Law of return to scale and economics of scale – cost analysis – Different cost concepts – Cost output relationship – Short run and long run – Revenue curves of firms – Supply analysis

##### **UNIT IV**

Pricing methods and strategies – Objectives – Factors – General consideration of pricing – methods of pricing – Dual pricing – Price discrimination

##### **UNIT V**

Market classification – Perfect competition – Monopoly – Monopolistic competition – Duopoly – Oligopoly

##### **Recommended Texts**

1. Dr. S.Shankaran, Managerial Economics - Margram Publication - Chennai
2. P.L Metha, Managerial Economics - Sultan Chand Publications - New Delhi
3. RL Varsheny and K L Maheshwari, Managerial Economics - Sultan Chand Publications -New Delhi.
4. Joel Dean, Managerial Economics - Prentice Hall of India Pvt. Ltd.,- New Delhi.
5. Spencer M H, Contemporary Economics - Worth publishers - New York.
6. VI Mote Samuel Paul G.S Gupta, Managerial Economics – concepts and cases – Tata McGraw Hill - New Delhi.

## **UNIT I**

Introduction – Meaning and Definition of Statistics – Collection and Tabulation of Statistical Data – Presentation of Statistical Data – Graphs and Diagrams- Measures of Central Tendency – Arithmetic Mean, Median and Mode – Harmonic Mean and Geometric Mean.

## **UNIT II**

Measures of Variation – Standard Deviation –Mean deviation – Quartile deviation- Skewness and kurtosis – Lorenz Curve –Simple Correlation – Scatter Diagram – Karl Pearson's Correlation – Rand Correlation – Regression.

## **UNIT III**

Analysis of Time Series – Methods of Measuring Trend and Seasonal Variations

## **UNIT IV**

Index Numbers – Consumer Price Index – And Cost Of Living Indices- Statistical quality control

## **UNIT V**

Sampling procedures - simple, stratified and systematic.

## **Reference Books:**

1. P.R. Vittal, **Business Mathematics and Statistics**, Margham Publications , Chennai, 2004.
2. S.P.Gupta, **Statistical Methods**, Sultan Chand & Sons, New Delhi, 2007.
3. S.P. Gupta, **Elements of Business Statistics**, Sultan Chand & Sons, New Delhi, 2007.
4. J.K.Sharma, **Business Statistics**, Pearson Education, New Delhi, 2007.
5. **Business Statistics & OR** - Dr.S.P.Rajagopalan, Tata McGraw Hill

### **UNIT – I**

Introduction to OR – Meaning and scope – Characteristics – models in OR.LPP- Formulation graphical method – Simplex method- Big M Method application in Business – merits and Demerits.

### **UNIT – II**

Transportation model – basic feasible solution – formulation, solving a TP. Assignment models – formulation – solution.

### **UNIT – III**

Network analysis – work break down analysis – construction – numbering of event. Time Calculation – critical path, slack, float – application.

### **UNIT – IV**

Queuing models- elements of queuing system – characteristics of queuing model.

### **UNIT – V**

Decision theory – statement of Baye's theorem application. Probability – decision trees. Game theory meaning and characteristics – saddle point – Dominance property.

### **RECOMMENDED TEXTS / REFERANCE BOOKS**

1. P.R. Vittal & V.Malini, Operative Research – Margham Publications – Chennai – 17.
2. P.K.Gupta & Man mohan, Problems in Operations Research – Sultan Chand & sons – New Delhi
3. V.K.Kapoor, Introduction to operational Research – Sultan chand & sons – New Delhi
4. Hamdy A Taha, Operation Research – An Introduction prentice Hall of India- New Delhi

## **CORE-I: PRINCIPLES OF MANAGEMENT**

### **UNIT I**

Management: Importance – Definition – Nature and Scope of Management Process – Role and Functions of a Manager – Levels of Management – Development of Scientific Management and other Schools of thought and approaches.

### **UNIT II**

Planning: Nature – Importance – Forms – Types – Steps in Planning – Objectives – Policies – Procedures and Methods – Natures and Types of Policies – Decision –making – Process of Decision – making – Types of Decision.

### **UNIT III**

Organizing: Types of Organisations – Organisation Structure – Span of Control and Committees – Departmentalisation – Informal Organisation- Authority – Delegation – Decentralisation – Difference between Authority and Power – Responsibility.

### **UNIT IV**

Recruitment – Sources, Selection, Training – Direction – Nature and Purpose. Co-ordination – Need, Type and Techniques and requisites for excellent Co-ordination – Controlling – Meaning and Importance – Control Process.

### **UNIT V**

Definition of Business ethics - Types of Ethical issues -Role and importance of Business Ethics and Values in Business - - Ethics internal - Ethics External - Environment Protection - Responsibilities of Business

### **Recommended Texts**

1. C.B.Gupta, Management Theory & Practice - Sultan Chand & Sons - New Delhi.
2. L.M.Prasad, Principles & Practice of Management - Sultan Chand & Sons – New Delhi.
3. P.C. Tripathi & P.N Reddy, Principles of Managements - Tata Mc.Graw Hill – New Delhi.
4. Wehrich and Koontz, Management – A Global Perspective
5. N.Premavathy, Principles of Management - Sri Vishnu Publication - Chennai.
6. J.Jayasankar, Business Management - Margham Publication - Chennai.

## **CORE-II: FINANCIAL ACCOUNTING**

### **UNIT I**

Meaning and scope of Accounting, Basic Accounting Concepts and Conventions – Objectives of Accounting – Accounting Transactions – Double Entry Book Keeping – Journal, Ledger, Preparation of Trial Balance – Preparation of Cash Book.

### **UNIT II**

Preparation of Final Accounts of a Sole Trading Concern – Adjustments Receipts and Payments Account, Income & Expenditure Account and Balance Sheet of Non Trading Organizations

### **UNIT III**

Partnership Accounts-Final accounts of partnership firms – Basic concepts of admission, retirement and death of a partner including treatment of goodwill - rearrangement of capitals. (Simple problems on Partnership Accounts).

### **UNIT IV**

Depreciation – Meaning, Causes, Types – Straight Line Method – Written Down Value Method, Insurance Policy Method, Sinking Fund Method & Annuity Method. Insurance claims – Average Clause (Loss of stock & Loss of Profit)

### **UNIT V**

Single Entry – Meaning, Features, Defects, Differences between Single Entry and Double Entry System – Statement of Affairs Method – Conversion Method

### **Recommended Texts**

1. R.L.Gupta & V.K.Gupta, Advanced Accounting – Sultan Chand & Sons - New Delhi.
2. Jain & Narang, Financial Accounting – Kalyani Publishers - New Delhi.
3. T.S. Reddy & A.Murthy, Financial Accounting -Margham Publications –Chennai-17.
4. Shukla & Grewal, Advanced Accounting – S Chand -New Delhi.
5. Nirmal Gupta, Financial Accounting-Ane Books India– New Delhi.
6. S.Parthasarathy and A.Jaffarulla, Financial Accounting- Kalyani Publishers – New Delhi.

## **CORE-III: BUSINESS COMMUNICATION**

### **UNIT I**

Definition – Methods – Types – Principles of effective Communication – Barriers to Communication – Business Letter – Layout.

### **UNIT II**

Kinds of Business Letters: Interview – Appointment – Acknowledgement – Promotion – Enquiries – Replies – Orders – Sales – Circular – Complaints.

### **UNIT III**

Bank Correspondence – Insurance Correspondence – Agency Correspondence – Correspondence with Shareholders, Directors.

### **UNIT IV**

Reports Writing – Agenda, Minutes of Meeting – Memorandum – Office Order – Circular – Notes.

### **UNIT V**

Modern Forms of Communication: Fax – Email – Video Conferencing – Internet – Websites and their use in Business.

### **Recommended Texts**

1. Rajendra Pal & J.S. Korlahalli, Essentials of Business Communication - Sultan Chand & Sons - New Delhi.
2. Shirley Taylor, Communication for Business - Pearson Publications - New Delhi.
3. Bovee, Thill, Schatzman, Business Communication Today - Pearson Education Private Ltd. - New Delhi.
4. Penrose, Rasbery, Myers, Advanced Business Communication - Bangalore.
5. Simon Collin, Doing Business on the Internet - Kogan Page Ltd.- London.
6. Mary Ellen Guffey, Business Communication – Process and Product – International Thomson Publishing - Ohio.



## **CORE-IV: MANAGEMENT ACCOUNTING**

### **UNIT I**

Management accounting – Meaning, nature, scope and functions, need, importance and limitations – Management Accounting vs. Cost Accounting. Management Accounting vs. Financial Accounting.

### **UNIT II**

Analysis and Interpretation of financial statements – Nature, objectives, essentials and tools, methods – Comparative Statements, Common Size statement and Trend analysis.

### **UNIT III**

Ratio Analysis – Interpretation, benefits and limitations. Classification of ratios - Liquidity, Profitability, turnover, capital structure and Leverage.

### **UNIT IV**

Funds flow and Cash flow analysis. Budgets and budgetary control – Meaning, objectives, merits and demerits.

### **UNIT V**

Investment decisions; brief introduction of cost of capital; methods of capital budgeting; Average Rate of Returns (ARR), Pay Back Period (PBP), Net present Value (NPV) and Internal Rate of returns (IRR), capital rationing (simple problems on capital budgeting methods).

### **Recommended Texts**

1. SN Maheswari, Management Accounting - Sultan Chand & Sons.
2. Jhamb, Fundamentals of Management Accounting – AneBooks India - NewDelhi.
3. Horngren Sunderu Stratton, Introduction to Management Accounting - PearsonEducation.
4. T. S. Reddy and Hari Prasad Reddy-Management Accounting, Maegham Publication.

## **CORE-V: FINANCIAL MANAGEMENT**

### **UNIT I**

Meaning, objectives and Importance of Finance – Sources of finance – Functions of financial management – Role of financial manager in Financial Management.

### **UNIT II**

Capital structures planning - Factors affecting capital structures – Determining Debt and equity proportion – Theories of capital structures – Leverage concept.

### **UNIT III**

Cost of capital – Cost of equity – cost of preference capital – Cost of debt – Cost of retained earnings – weighted Average (or) composite cost of capital (WACC)

### **UNIT IV**

Dividend policies – Factors affecting dividend payment - Company Law provision on dividend payment –Various Dividend Models (Walter's Gordon's – M.M. Hypothesis)

### **UNIT V**

Working capital – components of working capital – working capital operating cycle – Factors influencing working capital – Determining (or) Forecasting of working capital requirements.

### **Reference Books :**

1. Financial Management - I.M. Pandey
2. Financial Management – Prasanna Chandra
3. Financial Management – S.N. Maheswari
4. Financial Management – Y. Khan and Jain

## **CORE-VI: ORGANISATIONAL BEHAVIOUR**

### **UNIT I**

Need and scope of organizational behaviour - Theories of organization - Individual difference Vs Group intelligence tests -Measurement of intelligence - Personality Tests - Nature – Types and uses of perception.

### **UNIT II**

Motivation - Financial and non -Financial motivational techniques - Job satisfaction - meaning - Factors - Theories -Measurement -Morale - Importance - Employee attitudes and behavior and their significance to employee productivity.

### **UNIT III**

Work environment -Good house keeping practices - Design of work place - Fatigue – Causes and prevention and their importance - Leadership -Types and theories of leadership

### **UNIT IV**

Group dynamics -Cohesiveness - Co-operation - Competition - Resolution - Sociometry - Group norms - Role position status

### **UNIT V**

Organizational culture and climate - Organizational Development

### **Recommended Books**

1. Uma Sekaran, Organisational Behaviour Text & cases, 2nd edition, Tata McGraw Hill Publishing CO.Ltd
2. Gangadhar Rao, Narayana ,V.S.P Rao, Organisational Behaviour 1987, Reprint 2000, Konark Publishers Pvt.Ltd , 1 st edition
3. S.S. Khanka , Organisational Behaviour , S.Chand & Co , New Delhi .
4. J.Jayasankar , Organisational Behaviour , Margham Publications , Chennai . 3.

## **CORE-VII: COMPUTER APPLICATION IN BUSINESS**

### **UNIT – I**

Word Processing: Meaning and role of word processing in creating of documents, Editing, formatting and printing documents using tools such as spell check, thesaurus, etc., in word processors (MS Word), Electronic Spreadsheet, Structure of Spread sheet and its applications to accounting , finance, and marketing functions of business; Creating a dynamic/ sensitive worksheet; Concept of absolute and relative cell – reference; Using built – in functions; Goal seeking and solver tools; Using graphics and formatting to worksheet; Sharing data with other desktop applications ; Strategies of creating error – free worksheet (MS Excel)

### **UNIT – II**

Programming under a DBMS environment: The concept of data base management system; Data field, records, and files, Sorting and Indexing data; Searching records. Designing queries, and reports; Linking of data files; Understanding programming environment in DBMS; Developing menu driven applications in query language (MS – Access).

### **UNIT – III**

Electronic Data Interchange (EDI) : Introduction of EDI - Basics of EDI; edi standards; Financial EDI (FEDI) FEDI for international trade transaction; Applications of EDI, Advantages of EDI; Future of EDI.

### **UNIT – IV**

The internet and its basic concepts: Internet concept, History, Development in India: Technological foundation of internet; Distributed computing; Client – server computing ;internet protocol suite; Application of distributed computing ; Client server computing; Internet protocol suite in the internet environment ; Domain Name System (DNS); Generic Top – Level Domain (gTLD); Country code Top Level Domain (ccTLD) – India; Allocation of second level domains; IP addresses, Internet protocol; Applications of Internet in business, Education, Governance , etc.

### **UNIT – V**

Information System Audit : Basic idea of information audit; - Difference with the traditional concepts of audit; Conduct and applications of IS audit in internet environment.

### **Reference Books:**

1. Agarwala Kamlesh N and Agarwala Deeksha – Business on the Net – Introduction to E-Commerce
2. Goyal – Management Information System.
3. Minoli Daniel, Minoli Emma – e Commerce Technology Handbook.
4. Kanter – Managing with informations.

## **CORE-VIII: MARKETING MANAGEMENT**

### **UNIT I**

Fundamentals of marketing - Role of Marketing - Relationship of Marketing with other functional areas - concept of marketing mix-Marketing approaches - Various Environmental factors affecting the marketing functions.

### **UNIT II**

Buyer Behavior - Consumer goods and Industrial goods - Buying motives - Factors influencing buyer Behaviour Market segmentation - Need and basis of Segmentation - Targeting - positioning.

### **UNIT III**

The Product - Characteristics - benefits - classifications - consumer goods - industrial goods - New Product Development process - Product Life Cycle - Branding - Packaging.

### **UNIT IV**

Physical Distribution: Importance - Various kinds of marketing channels - distribution problems. Sales management: Motivation, Compensation and Control of salesmen.

### **UNIT V**

A brief overview of: Advertising - Publicity - Public Relations - personal Selling – Direct selling and Sales promotion.

### **Recommended Texts**

1. Philip Kotler, 2003, Marketing Management, 11th edition, Pearson Education(Singapore) Pte Ltd, New Delhi.
2. V.S. Ramaswamy & S.Namakumari, 1994, Principles of Marketing, first edition, S.G.Wasani / Macmillan India Ltd, New Delhi.
3. Crrainfield, Marketing Management, Palgrave Macmillan
4. Sontakki . C.N , Marketing Management, Kalyanni Publishers, Ludhiana
5. Gary Armstrong & Philip Kotler, 2003, Marketing -An Introduction, sixth edition, Pearson Education (Singapore) Pvt Ltd, New Delhi
6. R.S.N. Pillai and Bagavathi ,Modern Marketing , S.Chand & Co , New Delhi.
7. Jayasankar, Marketing, Margham publications, Chennai.

## **CORE-IX HUMAN RESOURCE MANAGEMENT**

### **UNIT I**

Nature and scope of Human Resources Management – Differences between personnel management and HRM – Environment of HRM – Human resource planning – Recruitment – Selection – Methods of Selection – Uses of various tests – interview techniques in selection and placement.

### **UNIT II**

Induction – Training – Methods – Techniques – Identification of the training needs – Training and Development – Performance appraisal – Transfer – Promotion and termination of services – Career development.

### **UNIT III**

Remuneration – Components of remuneration – Incentives – Benefits – Motivation – Welfare and social security measures.

### **UNIT IV**

Labour Relation – Functions of Trade Unions – Forms of collective bargaining- Workers' participation in management – Types and effectiveness – Industrial Disputes and Settlements (laws excluded)

### **UNIT V**

Human Resource Audit – Nature – Benefits – Scope – Approaches.

### **REFERENCE BOOKS :**

1. Human Resource Management – V S P Rao
2. Human Resource Management – Ashwathappa
3. Human Resource Management – Garry Deseler
4. Human Resource Management – L M Prasad
5. Human Resource Management – Tripathi.

## **CORE-X: BUSINESS REGULATORY FRAME WORK**

### **UNIT I**

Brief outline of Indian Contracts Act - Special contracts Act - Sale of goods Act - Contract of Agency

### **UNIT II**

Brief outline of Indian Companies Act 1956.

### **UNIT III**

Brief outline of FEMA - Consumer Protection Act

### **UNIT IV**

The laws of Trade Marks - Copyright - Patents - Designs - Trade related Intellectual Property Rights. (TRIPS) RTP -IDRA -an overview

### **UNIT V**

Brief outline of Cyber Laws

### **Recommended Text books**

1. N.D.Kapoor, 1993, Business Laws, Sultan Chand, New Delhi
2. K.S.Anantharaman, 2003 Business and Corporate Laws ,Sitaraman&co. Pvt.Ltd.
3. Chandrasekaran ,2004 Sitaraman&co Pvt Ld , Intellectual Property Law
4. Bare Acts- FEMA , Consumer Protection Act
5. Acharya -2004, Intellectual Property Rights Asia Law House Publication,

## **CORE-XI: FINANCIAL SERVICES**

### **UNIT I**

Meaning and importance of financial services – Types of financial services – Financial services and economic environment – Players in Financial Services Sector.

### **UNIT II**

Merchant Banking – Functions – Issue management – Managing of new issues – Underwriting – Capital market – Stock Exchange – Role of SEBI

### **UNIT III**

Leasing and Hire purchase – Concepts and features – Types of lease Accounts. Factoring – Functions of Factor

### **UNIT IV**

Venture Capital – Credit Rating – Consumer Finance

### **UNIT V**

Mutual Funds : Meaning – Types – Functions – Advantages – Institutions Involved – UTI

### **REFERENCE BOOKS**

1. Financial Services – M.Y.Khan
2. Financial Services – B.Santhanam
3. Law of Insurance – Dr.M.N. Mishra
4. Indian Financial System – H.r. Machiraju
5. A Review of current Banking Theory and Practice – S.K. Basu.



## **CORE-XII: MANAGEMENT INFORMATION SYSTEM**

### **UNIT I**

Definition of Management Information System - MIS support for planning, Organizing and controlling - Structure of MIS - Information for decision - making.

### **UNIT II**

Concept of System - Characteristics of System - Systems classification - Categories of Information Systems - Strategic information system and competitive advantage

### **UNIT III**

Computers and Information Processing - Classification of computer - Input Devices – Output devices - Storage devices, - Batch and online processing. Hardware - Software. Database management Systems.

### **UNIT IV**

System Analysis and design - SDLC - Role of System Analyst - Functional Information system - Personnel, production, material, marketing.

### **UNIT V**

Decision Support Systems - Definition. Group Decision Support Systems - Business Process Outsourcing - Definition and function

### **Recommended Books:**

1. Mudrick & Ross , "Management Information Systems", Prentice - Hall of India .
2. Sadagopan , "Management Information Systems" - Prentice- Hall of India
3. CSV Murthy -"Management Information Systems" Himalaya publishing House .
4. Dr. S.P. Rajagopalan , "Management Information Systems and EDP " , Margham Publications , chennai .

## **CORE–XIII: ADVERTISING MANAGEMENT AND SALES PROMOTION**

### **UNIT I**

Advertising: Advertising, objectives, task and process, market segmentation and target audience – Message and copy development.

### **UNIT II**

Media: Mass Media - Selection, Planning and Scheduling – Web Advertising – Integrated programme and budget planning.

### **UNIT III**

Implementation: Implementing the programme coordination and control – Advertising agencies – Organization and operation.

### **UNIT IV**

Sales Promotion: Why and When Sales promotion activities, Consumer and sales channel oriented – planning, budgeting and implementing and controlling campaigns.

### **UNIT V**

Control: Measurement of effectiveness – Ethics, Economics and Social Relevance.

### **Reference Books**

1. Bhatia, T.K., Advertising and Marketing in Rural India, 2nd Edition, Macmillan India Ltd., 2007.
2. Hackley, C., Advertising and Promotion: An integrated communications approach, 2<sup>nd</sup> Edition, Sage Publications, 2010.
3. Jefkins, F., Advertising, 4th Edition, Pearson, 2002.
4. Wells, W.D., Burnett, J. and Moriarty, S., Advertising: Principles and Practice, 7th Edition, Pearson, 2007.

## **CORE-XIV: RESEARCH METHODOLOGY**

### **UNIT-I**

Introduction to Business Research - Research in Business – Research Process- Research need, formulating the problem, designing, sampling, pilot testing .

### **UNIT –II**

Research Design- Exploratory, Descriptive, Casual, Formulation of hypothesis - types. Measurement- characteristics of sound measurement tool, Scaling methods and sampling techniques.

### **UNIT –III**

Sources and Collection of Data- : Primary and secondary sources, survey observation, experimentation- details and evaluation. - Questionnaires – schedules, data entry, tabulation & cross tabulation-and Graphic presentation . Data.

### **UNIT –IV**

Analysis and Preparation: Hypothesis testing – statistical significance, statistical testing procedure. Tests of significance- -Simple Correlation -Regression .

### **UNIT –V**

Presenting results and writing the report: - The written research Report.

### **REFERENCE**

1. Donald R Cooper, Business Research Methods 7th Ed, McGraw Hill, 2001
2. Krishnaswami OR, M.Ranganatham, Methodology of Research for Social Science, Himalaya, Mumbai, 2001.
3. Anderson J. et.al, Thesis and Assignment writing, Wiley Eastern
4. Research Methodology by C.R. Kothari

## **CORE-XV: OPERATIONS MANAGEMENT**

### **UNIT – I**

Introduction: Nature and Scope of Operations Management. Production design & Process planning: Plant location: Factors to be considered in Plant Location – Plant Location Trends.

### **UNIT – II**

Layout of manufacturing facilities: Principles of a Good Layout – Layout Factors – Basic Types of Layout – Service Facilities.

### **UNIT – III**

Production and Inventory Control: Basic types of production – Basic Inventory Models – Economic Order Quantity, Economic Batch Quantity – Reorder point – Safety stock – Classification and Codification of stock – ABC classification – Procedure for Stock Control, Materials Requirement Planning (MRP). JIT.

### **UNIT – IV**

Methods Analysis and Work Measurement: Methods Study Procedures – The Purpose of Time Study – Stop Watch Time Study – Performance Rating – Allowance Factors – Standard Time – Work Sampling Technique. Quality Control: Purposes of Inspection and Quality Control – Acceptance Sampling by Variables and Attributes – Control Charts.

### **UNIT – V**

Service Operations Management: Introduction – Types of Service – Service Encounter –Service Facility Location – Service Processes and Service Delivery.

### **Reference Books**

1. Buffa, E.S. and Sarin, R., Modern Productions / Operations Management, 8thEdition,Wiley, 2007.
2. Chary, S.N., Production and Operations Management, 5th Edition, Tata McGraw-Hill, 2012.
3. B.Mahadevan, Operations Management,2nd Edition,Pearson,2010.
4. Lee Krajewski,Larry P Ritzman.,Manoj K Malhotra & Samir K Srivastava, Operations Management, 9th Edition,Pearson,2011.
5. Heizer, J., Render, B. and Rajashekhar, J., Operations Management, 9th Edition, Pearson, 2009.
6. Panneerselvam, R., Production and Operations Management, 3rd Edition, PHI Learning,2012.
7. Srinivasan,G., Quantitative Models in Operations and Supply Chain Management, PHI Learning Pvt. Ltd

## **CORE-XVI: MATERIALS MANAGEMENT**

### **UNIT – I**

Materials Management- Definition-Function-Importance of Materials Management.

### **UNIT – II**

Integrated materials management- the concept- service function advantages- Inventory Control- Function Of Inventory - Importance-Replenishment Stock-Material demand forecasting- MRP- Basis tools - ABC-VED- FSN Analysis - Inventory Control Of Spares And Slow Moving Items -EOQ-EBQ-Stores Planning.

### **UNIT – III**

Purchase Management- Purchasing - Procedure - Dynamic Purchasing - Principles – import substitution- International purchase- Import purchase procedure

### **UNIT – IV**

Store Keeping And Materials Handling- Objectives - Functions - Store Keeping - Stores Responsibilities - Location Of Store House - Centralized Store Room - Equipment – Security Measures - Protection And Prevention Of Stores.

### **UNIT – V**

Vendor Rating - Vendor Management - Purchase Department - Responsibility - Buyer Seller Relationship - Value Analysis - Iso Types.

### **REFERENCE BOOKS:**

1. P.Saravanavel and S.sumathi, **Production and Materials Management**, Margham publications, 2015
2. M.M Verma, **Materials Management**, Sultan Chand Publications, 2012.
3. Hill, Operations managent,Palgrave Macmillan.

## **CORE-XVII: BUSINESS ENVIRONMENT**

### **UNIT I**

The concept of Business Environment – Its nature and significance – Brief overview of political – Cultural – Legal – Economic and social environments and their impact on business and strategic decisions

### **UNIT II**

Political Environment – Government and Business relationships in India

### **UNIT III**

Social environment – Cultural heritage- Social attitudes – Castes and communities – Joint family systems – linguistic and religious groups – Types of social organization

### **UNIT IV**

Economic Environment – Economic systems and their impact of business – Fiscal deficit -- Plan investment – Five year planning.

### **UNIT V**

Financial Environment – Financial system – Commercial bank – Financial Institutions – RBI Stock Exchange – IDBI – Non Banking Financial Companies NBFCs

### **RECOMMENDED TEXTS**

1. Francis Cherunilam, 2002, Business environment, Himalaya Publishing House, 11<sup>th</sup> Revised Edition, India.
2. Dr.S.Sankaran, Business Environment, Margham Publications
3. K.Ashwathappa, 1997, Essentials of Business Environment, Himalaya Publishing House, 6<sup>th</sup> Edition, India
4. Joshi Rosy Kapoor Sangam, Business Environment, Kalyani Publishers, Ludhiana

## **CORE–XVIII: SERVICES MARKETING**

### **UNIT I**

Marketing Services: Introduction growth of the service sector. The concept of service. Characteristics of service - classification of service designing of the service, blueprinting using technology, developing human resources, building service aspirations.

### **UNIT II**

Marketing Mix in Service Marketing: The seven Ps: product decision, pricing strategies and tactics, promotion of service and distribution methods for services. Additional dimension in services marketing- people, physical evidence and process.

### **UNIT III**

Effective Management of Service Marketing: Marketing demand and supply through capacity planning and segmentation - internal marketing of services - external versus internal Orientation of service strategy.

### **UNIT IV**

Delivering Quality Service: Causes of service - quality gaps. The customer expectations versus perceived service gap. Factors and techniques to resolve this gap. Customer relationship management. Gaps in services - quality standards, factors and solutions – the service performance gap - key factors and strategies for closing the gap. External communication to the customers- the promise versus delivery gap - developing appropriate and effective communication about service quality.

### **UNIT V**

Marketing of Service With Special Reference To:1.Financial services, 2.Health services, 3.Hospitality services including travel, hotels and tourism, 4.Professional service, 5.Public utility service, 6.Educational services.

### **Recommended Texts**

1. S.M. Jha, Services marketing, Himalaya Publishers, India
2. Baron, Services Marketing , Second Edition. Palgrave Macmillan
3. Dr. L. Natarajan Services Marketing, Margham Publications, Chennai.
4. Thakur .G.S. Sandhu supreet & Dogra Babzan , Services marketing , kalyanni Publishers, Ludhianna .
5. Dr. B. Balaji , Services Marketing and Management ,S. Chand & Co , New Delhi .

**CORE-XIX: BUSINESS TAXATION**

**UNIT I:**

Objectives Of Taxation – Canons Of Taxation – Tax System In India – Direct And Indirect Taxes – Meaning And Types.

**UNIT II:**

Central Excise Duty – Classification – Levy and Collection of Excise duty – Clearance of excisable goods- Exemption from excise duty – Excise and Small Scale Industries – Excise and Exports – Demand, Refund, Rebate of Central Excise duty – Offences and Penalties – Settlement – Appellate Provisions.

**UNIT III:**

The Customs duty – Levy and Collection of customs duty – Organisation of the customs department – Officers of the customs – Powers – Appellate machinery – Infringement of the law – offences and penalties – Exemption from duty – customs duty drawback – duties free zones.

**UNIT IV:**

Central Sales Tax Act – Levy and Collection of CST - Liability of Tax – Registration of dealers – Goods of Special Importance – Offences and penalties - Value added tax – objectives – Levy of VAT – Arguments in favour of VAT – Difficulties in administering VAT

**UNIT V:**

Definition of GST – Administrative structure of GST – Officers as per CGST Act - Officers as per SGST Act – Jurisdiction – Appointment- Powers- Procedure for Registration – Amendment of registration – Cancellation of registration.

**REFERENCE BOOKS:**

1. V.S.Datey, **Central Excise**, JBA Publishers, Edition 2013. Reddy .T.S and Y. hari Prasad reddy, **Business Taxation ( Goods & Services TAX - GST)**, Margam Publication, Edition 2019.
2. Srinivasan N.P and Priya Swami. M , **Business Taxation**, Kalyani publishers Edition 2013
3. Pagaredinkar, **Business Taxation**, Sultan Chand and Sons, 2012.
4. Senthil and Senthil, **Business Taxation**, Himalaya Publication, 4<sup>th</sup> Edition.
5. Vinodk.Singania, **Indirect Tax**, Sultan Chand and Sons, Edition 2013.
6. Dr. Vinodk.Singania and Dr. Monica Singhanian, **Students Guide to Income Tax (including service tax, vat)** , JBA Publishers, Edition 2013.



**ELECTIVE-II(A): CUSTOMER RELATIONSHIP  
MANAGEMENT**

**UNIT-I**

Communication - need/ Mode of communication – barriers, channels of communication - oral - written -listening skill – Verbal skill- interpersonal communication and intra personal communication , Essentials of business letter.

**UNIT -II**

CRM - concept and approach - CR in competitive environment public relation and image building

**UNIT -III**

Banker - customer relationship -retaining and enlarging customer base - customer services - quality circle.

**UNIT -IV**

Nature and types of customer - complaint redressal methods Talwar and Goiporia committee report, customer service committee, customer day - Copra Forum - ombudsman.

**UNIT - V**

Market Segment - Customer Data Base - Market Research. Review and Evaluation of Customer Satisfaction.

**Recommended Books**

1. H.Peeru Mohamed & A. Sangadevan , Customers Relationship Management - A Step –by – step approach , Vikas Publishing House Private Limited , Noida .
2. Mukesh Chaturvedi Abhinav , Chaturvedi , Customers Relationship Management –An Indian Perspective , Excel Books , New Delhi .

**ELECTIVE-II(B): E- BUSINESS**

**UNIT I**

Introduction to electronic business - meaning - value chains - the Internet and the web  
- infrastructure for e-business

**UNIT II**

Web based tools for e - business - e - business software - overview of packages

**UNIT III**

Security threats to e - business - implementing security for e - commerce and  
electronic payment systems.

**UNIT IV**

Strategies for marketing, sales and promotion - B2C and strategies for purchasing and  
support activities - B2B - web auction virtual - web portals

**UNIT V**

The environment of e-business - international - legal ethical - tax issues - business  
plan for implementing e-business

**REFERENCE BOOKS:**

1. Garry P Schneider and James T Perry - Electronic Commerce, Course technology,  
Thomson Learning, 2000
2. Diwan, Prag and Sunil Sharma - E-Commerce - Managers guide to E-Business
3. Kosivr, David - Understanding E-Commerce

**B.B.A. DEGREE COURSE IN BUSINESS ADMINISTRATION**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BBA-DSE03**

**ELECTIVE-III: PROJECT WORK (GROUP)**

A group of 3 students will be assigned a project in the beginning of the final year. The project work shall be submitted to the college 20 days before the end of the final year and the college has to certify the same and submit to the university 15 days prior to the commencement of the University examination.

The project shall be evaluated externally. The external examiner shall be from the panel of examiners suggested by the board of studies from time to time.

Those who fail in the project work will have to redo the project work and submit to the college for external examination by the University.

**BGE-CSC15**

**CORE-XV: LOGISTICS AND SUPPLY CHAIN MANAGEMENT**

**Inst.Hrs : 6** Common to BCom(MM) & BCom(ISM)

**YEAR: III**

**Credits : Core 4 / Elective 5**

**SEMESTER: V**

**Learning Objectives:**

1. The students to gain deeper insights into logistics and supply chain management.
2. To highlight the integrated nature of working in logistics and supply chain industry.
3. To prepare students to work in logistics and allied industries.

**OUTCOME**

- On completion of syllabus student will understand the basic concepts of logistics and supply chain management and student prepare them self to work in logistics and allied industries

**UNIT I:** Concepts of Logistics – Evolution – Nature and Importance – Components of Logistics Management- Competitive advantages of Logistics – Functions of Logistics management – Principles – Logistics Network- Integrated Logistics system, Supply chain management – Nature and Concepts – Value chain- Functions – Supply chain effectiveness – Outsourcing – 3PLs and 4PLs – Supply chain relationships – Customer services.

**UNIT II:** Elements of Logistics and Supply chain management – Inventory carrying – Warehousing, Technology in the ware house: Computerisation, Barcoding, RFID and WMS – Material handling , Concepts and Equipments: Automated Storage and Retrieval Systems – Order Processing – Transportation – Demand Forecasting – Impact of Forecasts on Logistics and Supply chain Management- Performance measurements.

**UNIT III:** Transportation – Position of Transportation in Logistics and Supply chain management- Road, Rail, Ocean Transport - Ships- Types- Measurement capacity of ships – shipping information, Air, Transport Multi modal transport – containerization – CFS – ICDS- Cross Docking- Selection of transportation mode – Transportation Network and Decision – Insurance aspects of logistics.

**UNIT IV:** Logistical Information System (LIS) - Operations – Integrated IT solution for Logistics and supply chain management- Emerging technologies in Logistics and Supply chain management. Components of a logistic system-transportation-Inventory carrying-warehousing-order processing –Distribution channels- Difference between warehouse and distribution centre.

**UNIT V:** Performance- Bench marking for supply chain improvement- Dimensions and achieving excellence- Supply Chain Measures – SCOR model- Logistics score board- Activity Based Costing - Economic Value Added Analysis- Balance Score card approach-Lean thinking and six sigma approach in Supply Chain.

#### **Recommended Text**

1. John J.Coyle , C. John Langley .JR., Robert A. Novack , Brian J.Gibson – Supply Chain Management A Logisticss Perspective – CENGAGE , New Delhi
2. Joel D.Wisner , Keah – Choon Tan , G.Keong Leong – Principles of Supply Chain Management ABalanced Approach– CENGAGE, New Delhi

#### **REFERENCE BOOKS:**

1. Agarwal, D.K., ‘Textbook of Logistics and Supply Chain Management’, Mac MillanIndia Ltd, 2003.
2. Chase, R.B., Shankar, R and Jacobs, F.R. ‘Operations Management and Supply Chain Management’, McGraw Hill Publications, 13<sup>th</sup> edition, 2018.
3. Chopra, S., Meindl, P. and Kalra, D.V. ‘Supply Chain Management’, Pearson EducationIndia, 6<sup>th</sup> edition, 2016.
4. Krishnaveni Muthiah, ‘Logistics Management and Seaborne Trade’, Himalaya PublishingHouse, 2010.
5. Martin Christopher, ‘Logistics and Supply Chain Management’ Pearson Education, 2003.
6. Ronald H. Ballou, ‘Business Logistics and Supply Chain Management’ PearsonEducation 2004.

#### **E-RESOURCES:**

1. [www.managementstudyguide.com](http://www.managementstudyguide.com)
2. [https://www.tutorialspoint.com/supply\\_chain\\_management/supply\\_chain\\_management\\_tutorial.pdf](https://www.tutorialspoint.com/supply_chain_management/supply_chain_management_tutorial.pdf)
3. <https://www.camcode.com/asset-tags/supply-chain-management-guide/>
4. <https://library.ku.ac.ke/wp-content/downloads/2011/08/Bookboon/Magement%20andOrganisation/fundamentals-of-supply-chain-management.pdf>
5. [https://www.youtube.com/watch?v=PmR2SKeY9Ms&list=PLGit8yny\\_3ANzZMsJJjeux\\_Mg-S0f0hGcn](https://www.youtube.com/watch?v=PmR2SKeY9Ms&list=PLGit8yny_3ANzZMsJJjeux_Mg-S0f0hGcn)
6. <https://www.youtube.com/watch?v=IqmrNUoivy7g&list=PLF9071540F59BA1FO>

### **DEPARTMENT OF ISM :**

**UNIVERSITY OF MADRAS**  
**B.Com. Information System Management**  
**(With effect from the academic year 2016-2017)**  
**SYLLABUS**

**I SEMESTER**  
**Core Paper I - FINANCIAL ACCOUNTING**

## **Objectives**

**No of Credits : 4**

1. To enable the students to know the Principles of Accounting in General.
2. To Understand the System of Keeping Financial Accounting Records.

### **Unit I : Introduction**

Meaning and Scope of Accounting - Objectives of Accounting - Basic Accounting Concepts - Accounting Transactions - Double Entry Book Keeping - Journal - Ledger - Preparation of Trial Balance - Preparation of Cash Book.

### **Unit II : Final Accounts**

Preparation of Final Accounts of a Sole Trading Concern - Adjustments - Preparation of Receipts and Payments Account, Income and Expenditure Account and Balance Sheet of Non-Trading Organizations.

### **Unit III : Rectification of Errors and Bank Reconciliation Statement**

Classification of Errors - Rectification of Errors - Preparation of Suspense A/c. Bank Reconciliation Statement - Need and preparation.

### **Unit IV : Depreciation and Insurance Claims**

Depreciation - Meaning - Causes - Types - Straight Line method - Written down value method - Concept of useful life under Companies Act, 2013.

Insurance Claims - Calculation of Claim Amount - Average Clause.

### **Unit V : Single Entry System**

Meaning and Features of Single Entry System - Defects - Difference between Single Entry and Double Entry System - Methods of Calculation of Profit - Statement of Affairs Method-Conversion Method.

**Note : Questions in Sec. A, B & C shall be in the proportion of 20:80 between Theory and Problems.**

### **Suggested Readings**

1. Gupta, R.L & Gupta, V.K, Advanced Accounting, Sulthan Chand & Sons, New Delhi.
2. Jain & Narang, Financial Accounting, Kalyani Publishers, New Delhi.
3. Reddy, T.S & Murthy, A. Financial Accounting, Margham Publications, Chennai.
4. Shukla & Grewal, Advanced Accounting, S. Chand & Co. New Delhi.
5. Parthasarathy, S. & Jaffarulla, A. Financial Accounting, Kalyani Publishers, New Delhi

### **E-Resources**

[www.accountingcoach.com](http://www.accountingcoach.com)  
[www.accountingstudyguide.com](http://www.accountingstudyguide.com)  
[www.futureaccountant.com](http://www.futureaccountant.com)  
[www.onlinelibrary.wiley.com](http://www.onlinelibrary.wiley.com)

# **Core Paper II - PRINCIPLES OF MANAGEMENT**

## **Objectives**

**No of Credits : 4**

1. To make the students to understand the basic concepts of management.
2. To prepare the students to know about the significance of the management in Business.

## **Unit I : Introduction**

Definition - Importance - Nature and Scope of Management - Process of Management - Role and functions of Managers - Levels of Management - Scientific Management - Contributions to Management by different Schools of thought.

## **Unit II : Planning**

Nature - Importance - Types of Planning - Steps in planning - Objectives of Planning - Policies - Decision making Process - Types of Decisions.

## **Unit III : Organisation**

Meaning and Types of organisations - Principles - Formal and Informal organisation - Organisation Structure - Span of Control - Departmentalisation - Basis - Meaning and Importance of Departmentalisation. Policies - Meaning and Types - Procedures - Forecasting.

## **Unit IV : Authority and Responsibility**

Authority - Definition - Sources - Limitations - Difference between Authority and Responsibility - Delegation of Authority - Meaning - Principles and importance - Centralisation Vs Decentralisation.

## **Unit V : Direction Co-ordination & Control**

Direction - Nature - Purpose. Co-ordination - Need - Types and Techniques - equisites for Excellent Co-ordination. Controlling - Meaning - Importance - Control Process.

## **Suggested Readings**

1. Gupta, C.B. Management Theory & Practice, Sulthan Chand & Sons, New Delhi.
2. Prasad, L.M. Principles & Practice of Management, Sultan Chand & Sons, New Delhi.
3. Tripathi, P.C. & Reddy, P.N. Principles of Managements, Tata Mc Graw Hill, New Delhi.
4. Wehrich and Koontz, Management - A Global Perspective.
5. PremavathyN, Principles of Management, Sri Vishnu Publications, Chennai.
6. Jayasankar, J. Business Management, Margham Publication, Chennai.
7. Sundar, K. Principles of Management, Vijay Nicole Imprints Pvt. Ltd., Chennai

## **E-Resources**

[www.wisdomjobs.com](http://www.wisdomjobs.com)

[www.aima.in](http://www.aima.in)

[www.clep.collegeboard.org](http://www.clep.collegeboard.org)



## **Allied Paper – I : COMPUTER APPLICATIONS IN BUSINESS**

### **UNIT I**

Word Processing: - Meaning and role of word processing in creating documents, editing, formatting and printing documents, Using tools such as spelling check, thesaurus, etc., in word processors (MS Word) - Electronic Spreadsheet: Structure of spreadsheet and its applications to accounting, finance, and marketing functions of business; Creating a dynamic / sensitive worksheet; Concept of absolute and relative cell reference; Using built-in functions; Goal seeking and solver tools; Using graphics and formatting of worksheet; Sharing data with other desktop applications; Strategies of creating error-free worksheet (MS Excel)

### **UNIT II**

Programming under a DBMS environment: - The concept of data base management system; Data field, records, and files, Sorting and indexing data; Searching records. Designing queries, and reports; Linking of data files; Understanding Programming environment in DBMS; Developing menu drive applications in query language (MS — Access).

### **UNIT III**

Electronic Data Interchange (EDI): - Introduction to EDI — Basics of EDI; EDI standards; Financial EDI (FEDI) (FEDI for international trade transaction; Application of EDI, Advantages of EDI; Future of EDI.

### **UNIT IV**

The Internet and its basic concepts: - Internet concept, History, Development in India: Technological foundation of internet; Distributed computing; Client — server computing; internet protocol suite; Application of distributed computing; Client server computing; Internet protocol suite in the internet environment; Domain Name System (DNS); Generic Top-Level Domain (g TLD); Country code Top Level Domain (cc TLD) — Indian;- Allocation of second level domains;- IP addresses, Internet Protocol;- Applications of internet in business, Education, Governance, etc.

### **UNIT V**

Information System Audit:- Basic idea of information audit; - Difference with the traditional concepts of audit:-Conduct and applications of IS audit in internet environment.

### **RECOMMENDED BOOKS:**

1. R.K.Taxali, PC Software for Windows Made Simple - Tata McGraw Hill publications — India, 2010.
2. Herbert Schildt, Windows 2000 Programming from the Ground Up - Tata McGraw Edition 2000.
3. Comdex Computer Course Kit, Training Kit for Windows 98/me, Word, Excel, Access 2000 and Internet dream tech press
4. Kalakota & Whinston, Frontier of Electronic Commerce - Addison Wesley Longman Inc.

5. Napier, Judd, River Wagner, Creating a Winning E-Business - Vikar PublishingHouse

**NON MAJOR ELECTIVE – Any one of the  
following (Semester wise)**

**SEMESTER**

**1. BASICS OF COMPUTER**

**INTRODUCTION -  
UNIT – I**

1. Introduction to computers
2. Input Devices
3. Output Devices
4. Operating System

**MS WORD – UNIT - II**

5. Text Manipulations
6. Usage of Numbering, Bullets, Footer and Headers
7. Usage of Spell check, Find & Replace
8. Text Formatting
9. Picture insertion and alignment
10. Creation of documents, using templates
11. Creation templates
12. Mail Merge Concepts
13. Copying Text & Pictures from Excel

**MS-EXCEL - UNIT – III**

14. Cell Editing
15. Usage of Formulae and Built-in Functions
16. File Manipulations
17. Data Sorting (both number and alphabets)
18. worksheet Preparation
19. Drawing Graphs
20. Usage of Auto Formatting

**MS-POWER POINT – UNIT – IV**

21. Inserting Clip arts and Pictures
22. Frame movements of the above
23. Insertion of new slides
24. Preparation of Organization Charts
25. Presentation using Wizards
26. Usage of design templates

**INTERNET – UNIT – V**

27. Introduction to Internet
28. WWW
29. E-Mail

**REFERENCE BOOKS :**

1. A first Course in Computers, Sanjay Saxena, Vikas Publishing House Pvt. Ltd.,

2. Microsoft Office in Easy steps, Stephen Copestake, Comdex Computer Publishing
3. Teach yourself, MS Office for Windows, Corey Sandler, Tom Bedgelt, Jan Weingarten, BPB Publication.

## **2. BASICS OF RETAIL MARKETING**

### **UNIT – I**

Retailing – Definition – Retail Marketing – Growth of organized retailing in India – Importance of retailing

### **UNIT – II**

Functions of Retailing – characteristics of Retailing – Types of Retailing – store retailing – Non-store retailing

### **UNIT – III**

Retail location factors – Branding in retailing – private labeling – Franchising concept.

### **UNIT – IV**

Communication tools used in Retailing – Sales promotion, e-tailing- window display

### **UNIT - V**

Supply chain management – definition – importance – Role of information Technology in retailing.

### **Reference Books:**

1. Modern Retail Management – J.N.Jain & P.P.Singh Regal Publications , Newdelhi
2. Retail Management – Suja Nair, Himalaya Publishing house.

3.

## **AN OVERVIEW OF ISO**

### UNIT-I

An Introduction to ISO 9000, 9001,9002,9003. The Quality systems to be certified- Meaning of ISO- Benefits of ISO 9001- Certification- General Scheme of ISO9001.

### UNIT-II

QMS (Quality Management Systems). Meaning- Principles of ISO 9001-2000- Preparing a specimen QMS – future of ISO? – QMS Documentation- QMS Process & Measurement.

### UNIT-III

ISO 9001-2000 Requirements- Explanation of main clauses – Time Line and cost Implication of Implementing.

### UNIT-IV

ISO 9001-2000 and QIS- Comparison of ISO 901 and the capability Maturity Model for software. Certification bodies operating Multinationals.

### UNIT-V

ISO and how to hire an ISO 9000 Consultant- What is Internal Quality Auditing.

### REFERENCE BOOKS

1. guide to ISO 9001-2000.

A.K.Chakraborty

P.K.Basu

S.C.Chakravarthy

PUBLICATIONS: Asian Books Pvt. Ltd.

## **4. BASICS OF HEALTH CARE MANAGEMENT**

### **UNIT – I PERSONAL (SELF) HEALTH CARE**

Personal Hygiene – Personal Diet pattern – Self health maintenance by yoga and other spiritual practice — Drills

### **UNIT – II FAMILY HEALTH CARE**

Family hygiene – group health care by vaccination – propitiation and prevention – Sanitation and diet patterns

### **UNIT - III COMMUNAL HEALTH CARE**

Mass – Hygiene (Social Hygiene) – Environmental Hygiene - Communal health care centres — Hospitals — Statistical bodies - Government and Non government organizations (NGO) for propagation of nutritious diet patterns - maintained by voluntary health organizations and government schemes.

### **UNIT – IV HEALTH AWARENESS**

Health awareness programme organized by governmental and non governmental agencies. Communal amenity programme.

### **UNIT – V HEALTH DISASTER MANAGEMENT**

First Aid — Disaster management techniques like epidemic eruption control, management and eradication.

### **Books for reference :**

Text books on

1. Social and preventive Medicine, K. Park, Brimnot publishers

**Core Paper III - BUSINESS COMMUNICATION****Objectives****No of Credits : 4**

1. To facilitate the students to understand the concept of Communication.
2. To know the Basic Techniques of the Modern forms of Communication.

**Unit I : Communication**

Definition - Methods - Types - Principles of Effective Communication - Barriers to Communication - Business letters - lay out.

**Unit II : Business Letters**

Meaning - Kinds of Business Letters - Application for a situation - Interview - Appointment letter - Acknowledgement - Promotion - Enquiries - Reply Letter to Enquiries - Orders - Sales Letter - Circular Letter - Complaints Letter.

**Unit III : Correspondence**

Bank Correspondence - Insurance Correspondence - Agency Correspondence - Correspondence with Share Holders & Directors.

**Unit IV : Reports and Meetings**

Reports - Meaning - Writing of Reports - Meetings - Agenda - Minutes - Memorandum - Office order - Circular Notes.

**Unit V : Forms of Communication**

Modern forms - Fax - email - video conference - internet - websites - uses of the various forms of communication.

**Suggested Readings**

1. Rajendra Paul & Korlahalli, J.S. Essentials of Business Communication, Sultan Chand & Sons, New Delhi.
2. Shirley Taylor, Communication for Business, Pearson Publications, New Delhi.
3. Bovee, Thill, Schatzman, Business Communication Today - Pearson Education Private Ltd - New Delhi.
4. Penrose, Rasbery, Myers, Advanced Business Communication, Bangalore.
5. Simon Collin, Doing Business on the Internet, Kogan Page Ltd, London.
6. Mary Ellen Guffey, Business Communication - Process and Product, International Thomson Publishing, Ohio.
7. Sundar, K. A, Business Communication, Vijay Nicole Imprints Pvt. Ltd., Chennai

**E-Resources**

[www.newagepublishers.com](http://www.newagepublishers.com)



[www.managementstudyguide.com](http://www.managementstudyguide.com)

[www.businesscommunication.org](http://www.businesscommunication.org)

[www.smallbusiness.chron.com](http://www.smallbusiness.chron.com)

# **Core Paper IV - HUMAN RESOURCE MANAGEMENT**

## **Objectives**

**No of Credits : 4**

1. To facilitate the students to know about the importance of Human Resources.
2. To make the students to understand the various aspects of the Human Resources Management.

## **UNIT I : Introduction**

Nature and Scope of Human Resources Management - Differences between Personnel Management and HRM - Environment of HRM - Human Resource Planning - Recruitment - Selection - Methods of Selection - Uses of various Tests - Interview techniques in Selection and Placement.

## **UNIT II : Training**

Meaning - Induction - Methods - Techniques - Identification of the Training needs - Training and Development - Performance appraisal - Transfer - Promotion and Termination of services - Career Development.

## **UNIT III : Compensation**

Cost to Company - CTC Fixed and Flexible Pay - Components - Incentives - Benefits - Motivation - Welfare and Social Security Measures.

## **UNIT IV : Labour Relation**

Need - Functions of Trade Unions - Forms of Collective bargaining - Workers Participation in management - Types and effectiveness. Industrial Disputes and Settlements (laws excluded)

## **UNIT V : Human Resource Audit**

Human Resource Audit - Nature - Benefits - Scope - Approaches.

## **Suggested Readings**

1. Rao, V S P, Human Resource Management, Excel Books
2. Ashwathappa, Human Resource Management, Himalaya Publishing House
3. Garry Deseler, Human Resource Management, Prentice Hall
4. Prasad, L M, Human Resource Management, Sultan Chand & Sons
5. Tripathi, Human Resource Management, Prentice Hall
6. Sundar & Srinivasan, Essentials of Human Resource Management, Vijay Nicole Imprints Pvt. Ltd. Chennai

## **E-Resources**

[www.whatishumanresource.com](http://www.whatishumanresource.com)

[www.managementstudyguide.com](http://www.managementstudyguide.com)

[www.humanresources.about.com](http://www.humanresources.about.com)  
[www.managementhelp.org](http://www.managementhelp.org)

## Allied Paper -II : DATA STRUCTURES

### UNIT I

Definition – Data Structure, Primitive and Composites Data Structure (List, array, stack, Queue, tree, files), array - Operation on array – 1 D array – 2D array.

### UNIT II

Stack – Stack operations – Stack Applications – Infix to Postfix. Conversations, Recursion.

Queue – Queue Operations – Queue applications- Circular Queues.

### UNIT III

Linked Lists – Singly, Doubly Linked Lists -operations and applications – Representation of Polynomials using linked list.

### UNIT IV

Trees – Definition, Binary tree, Tree traversals – in order, pre-order, post order – conversion of forest to primary tree.

### UNIT V

Graph – Definition, Types of Graphs, Graph Traversal – Depth first search, breadth first search, Hashing - Hashing table, Hashing function.

## RECOMMENDED TEXTS:

1. Seymour Lipschutz Schaum S<sup>o</sup> Outline Series, Data Structures - Tata Mcgraw –Hill - New Delhi.
2. Ellis Horowitz & Sartaj Sahani, Fundamentals of Data Structures - Galgotia Book Source - New Delhi.

# **NON MAJOR ELECTIVES – Any one of the following (Semester wise)II SEMESTER**

## **1. CONSUMER PROTECTION AND CONSUMER RIGHTS**

### **UNIT - I**

Introduction of consumer protection act 1986-other amendments-salient features

### **UNIT – II**

Definitions of the terms- : consumer - appropriate laboratory - complainant - consumer dispute -complaint-restrictive trade practice.

### **UNIT - III**

The various consumer rights:-right to safety, Right to information, Right to choose, -right to be heard -Right against exploitation -Right to consumer education

### **UNIT - IV**

Consumer protection councils:-Central - State.

### **UNIT - V**

Consumer disputes redressal agencies:-Direct forum-state commission-national commission

### **REFERENCE BOOKS:**

1. LECTURES ON TORTS AND CONSUMER PROTECTION LAWS BY DR. REGA SURYA RAO--ASIA LAW HOUSE. HYDRABAD.
2. CONSUMER PROTECTION LAWS --BY PROF. RAKESH KHANNA--CENTRAL LAW AGENCY.

## **BASICS OF BUSINESS INSURANCE**

### **Unit – I**

Introduction to Insurance – Type of Insurance – Principles of Insurance.

### **Unit – II**

Salient features of IRDA Act – Administration of IRDA Act – Regulatory measures of IRDA

### **Unit – III**

Life insurance products – Term, Whole life, Endowment.

### **Unit – IV**

Introduction to general Insurance – fire, marine and motor insurance.

### **Unit – V**

Government and insurance companies – LIC India- private players in Insurance in India.

### **Recommended Texts:**

Dr.N.Premavathy – Elements of Insurance, Sri Vishnu Publications, Chennai.  
Dr.A.Murthy – Elements of Insurance, Margham Publications, Chennai  
M.N.Mishra – Insurance, Principles and practice, S.Chand & Co. Ltd., New Delhi

### **Reference Books:**

Nalini Prava Tripathy, Prabir Paal – Insurance Theory & Practice, Prentice Hall of India  
Anand Ganguly – Insurance Management, New Age International Publishers.

**Objectives**

1. To develop an understanding of the process of Disaster Management.
2. To understand the mitigation programmes of Disaster Management.
3. To develop an understanding of the Disaster Management poling and legislation.

**UNIT I**

Meaning, definition, basic aspects and types of disasters.

**UNIT II**

Stages IN Disaster - Pre, during and post disaster.

**UNIT III**

Disaster Mitigation – guiding principles of Mitigation. Formulation and implementation of Mitigation programmes.

**UNIT IV**

Disaster training – Utilisation of resources, training and public awareness.

**UNIT V**

Disaster Management policy and legislation; Disaster Management – Strategy in India.

**Books for Reference**

1. “Disaster Management”, I sundar, T. Sezhiyan 1<sup>st</sup> Edition, Sarup and Sons, NewDelhi, 2007.
2. “Disaster Management”, A Disaster Manager“s Hand boob; Carter.W, ASTAN Development Bank, Manila.
3. Natural Disaster Management, Destruction, Safety and Precautions, S. Prasad, Mangalam publishers and Distributors, New Delhi – 2007.
4. Challenge and Response; K.D.Gangrade, S.Dhadde, Delhi, Rachna publications,1973.

## **4.CONCEPT OF SELF HELP GROUPS**

### **Objectives of the course**

1. To develop an understanding of the basic concepts of SHGS.
2. To enable the students Understand the operative mechanisms of SHGS
3. To Help the students to know about the various activities undertaken by SHGS
4. To help the students to understand the concept of women empowerment through SHGS
5. To develop an understanding of the role of govt. & NGO's for the development of SHGS.

<b>UNIT - I</b>	Meaning, Concept and Functions of SHGS
<b>UNIT - II</b>	Women empowerment through SHGS
<b>UNIT - III</b>	Micro finance through SHGS
<b>UNIT - IV</b>	Social Development through SHGS
<b>UNIT - V</b>	Role of Govt. and NGO's in fostering SHGS

### **Bibliography**

1. "Clinical approach to promotion of entrepreneurship" ED.Setty, Anmol publications Pvt., Ltd, New Delhi 2004.
2. "India economic Empowerment of Women", V.S. Ganesamurthy, New Century publications, New Delhi, 1<sup>st</sup> published – May 2007.
3. "Readings in Microfinance", N. Lalitha Dominant publishers and Distributors, New Delhi, 1<sup>st</sup> Edition 2008.
4. "Rural Credit and Self Help Groups, Micro finance needs & concepts in India", K.G.Karmakar, Sage publications, New Delhi, 1999.
5. "Rural empowerment through, SHGS, NGO's & PRI's S.B.Verma, Y.T. Pavar, Deep & Deep publications, New Delhi 2005.
6. "Women's Own; the Self help movement of Tamil Nadu". C.K. Gariyali, S.K. Vettivel, Vetri publishers, New Delhi, 2003.

### **Journals**

1. Yoja na, A Development Monthly, Chief Editor Anurag Misra, Published by Ministry of information and Broad casting.
2. Kurukshetra, A Journal on Rural Development, Monthly Journal, Editors; Kapilkumar, Lalitha Khurane published by Ministry of Rural Development.



**Core Paper V - LOGISTICS AND SUPPLY CHAIN MANAGEMENT****Objectives****No of Credits : 4**

1. To expose the students to learn the area of Logistics
2. To enable the students to understand the significance of the Logistics and Supply Chain Management.

**UNIT I : Introduction**

Supply Chain Management - Meaning, Definition, Functions, Need - Marketing forces affecting Supply chain activities - Supply chain activities in India.

**UNIT II : Supply Chain Intermediaries**

Meaning, Importance, objectives, functions - Types of intermediaries - Selection of Channel members - Motivation, training and evaluation of Channel members.

**UNIT III : Logistics**

Introduction to Logistics, Transportation - Meaning, Importance, Functions - Types of Transportation - Advantages and Disadvantages, Methods of Selection of Transportation - Factors considering fixation of freight charges - Role of containers in Modern Transportation.

**UNIT IV : Warehousing**

Meaning, Characteristics, Importance, Functions - Types of Warehousing - Selection of transportation - Warehouse locations - Packaging and Material handling - Documents relating to Warehousing - Warehousing in India, Private Warehouses.

**UNIT V : Supply Chain Management**

Recent trends in Supply chain management - Use of IT in Supply chain management, Vendor managed inventory, RFID technology in Supply chain management, Third party and Fourth party logistics services providers, Event Supply chain management.

**Suggested Readings**

1. Satish K, Kappor and Purva Kamal, Basis of Distribution Management, Printice Hall of India, New Delhi, 2003.
2. Sunil Chopra, Supply Chain Management - Strategic Planning and operations - 2004.
3. Taylor, Supply Chain - A Manager's guide - Pearson Education - New Delhi - 2004.
4. David J, Bloomberg, Stephen Lemay, Joe E, Hanna, Logistics, Printice Hall of India, New Delhi, 2002.
5. Dr. C.B. Gupta and Dr. N. Rajan Nair, Marketing Management, Sultan Chand, New Delhi, 2007
6. Bowersox, Logistical Management - The Integrated supply chain Management Prentice Hall of India, New Delhi - 2004.

**E-Resources**

[www.supplychainopz.com](http://www.supplychainopz.com)

[www.logistics.about.com](http://www.logistics.about.com)

[www.marketmotive.com](http://www.marketmotive.com)

[www.learnmarketing.net](http://www.learnmarketing.net)

## **Core Subject : VI - PROGRAMMING IN C**

### **UNIT I**

C fundamentals - Character set - Identifier and keywords - Data types - Constants - variables - Declaration - Expressions - Statements - Operators - Arithmetic, Unary, relations, Logical, Assignment and conditional Library functions.

### **UNIT II**

Input/Output functions - Simple C programs - Flow of control - Control structures - Switch, break, continue, go to statements - Comma operator

### **UNIT III**

Functions - Defining, accessing functions - Function prototypes - Passing arguments - recursion - Storage classes

### **UNIT IV**

Arrays - Definition and processing - Passing arrays to function - Multidimensional arrays - Arrays and string Structures - Pointers - Declaration, Operations on pointers, passing pointers to functions, Pointers and arrays

### **UNIT V**

Introduction to files - Basic concepts' of Object Oriented Programming - Classes and Objects.

### **REFERENCE BOOKS:**

1. Gottfried B.S - Programming with C - second edition TMH Pub. Co. Ltd., - New Delhi - 1996
2. Kanctkar Y - : Let us C - BPB Pub. - New Delhi – 1999
3. E. Balagurusamy - Programming in ANSI C

## Core Subject : VII - C PRACTICALS

1. To find max and min of numbers
2. To generate Fibonacci series
3.  $nPr$  and  $nCr$
4. Matrix addition and subtraction
5. Transpose of a Matrix Sorting - Bubble Sort
6. Sorting – Bubble sort
7. Reverse a string and check for palindrome
8. Counting the number of vowels, consonants, words and white spaces in a line of text
9. Linear Search
10. Binary Search
11. Illustration of file creation, and operations.
12. Illustration of Classes and Object Concept.

## **Core Subject : VIII - MARKETING MANAGEMENT**

### **Objectives**

**No of Credits : 4**

1. To enable the students understand the significance of Marketing operations
2. To impart knowledge of the various strategies followed in Marketing Practices.

### **UNIT I : Introduction**

Fundamentals of Marketing - Role of Marketing - Relationship of Marketing with the other functional areas - Concept of Marketing mix - Marketing approaches - Various Environmental factors affecting the Marketing functions.

### **UNIT II : Buyer Behaviour & Market Segmentation**

Buyer Behavior - Consumer goods and Industrial goods - Buying motives - Factors influencing Buyer Behaviour Market Segmentation - Need and Basis of Segmentation Targeting - Positioning.

### **UNIT III : Product Policy**

Meaning of Product - Characteristics - Benefits - Classifications - Consumer goods - Industrial goods - New Product Development Process - Product Life Cycle - Branding - Packaging.

### **UNIT IV : Distribution & Sales Management**

Physical Distribution - Importance - Various kinds of Marketing Channels - Distribution Problems.

Sales Management - Motivation - Compensation and Control of Salesmen.

### **UNIT V : Advertising & Sales Promotion**

A Brief overview of Advertising - Publicity - Public Relations - Personal Selling - Direct Selling and Sales Promotion.

### **Suggested Readings**

1. Philip Kotler, 2003, Marketing Management, 11th edition, Pearson Education (Singapore) Pte Ltd, New Delhi.
2. Ramaswamy, V.S. & Namakumari, S. - 1994, Principles of Marketing, first edition, S.G. Wasani / Macmillan India Ltd, New Delhi.
3. Crainfield, Marketing Management, Palgrave Macmillan
- A. Sontakki. C.N , - Marketing Management, Kalyanni Publishers, Ludhiana.
5. Gary Armstrong & Philip Kotler, 2003, Marketing - An Introduction, Sixth edition, Pearson Education (Singapore) Pvt Ltd, New Delhi.
6. Pillai, R.S.N. and Bagavathi, Modern Marketing, S.Chand & Co, New Delhi.
7. Jayasankar, Marketing, Margham publications, Chennai
8. Sundar, Essentials of Marketing, Vijay Nicole Imprints Pvt. Ltd. Chennai

### **E-Resources**

[www.marketing-schools.org](http://www.marketing-schools.org)

[www.consumerpsychologist.com](http://www.consumerpsychologist.com)

[www.marketingteacher.com](http://www.marketingteacher.com)

[www.emeraldinsight.com](http://www.emeraldinsight.com)

# **Allied Paper III - BUSINESS STATISTICS**

## **Objectives**

**No of Credits : 5**

1. To facilitate the understanding of the relevance and need of the Statistics in the Current Scenario.
2. To Customize the importance of Business Statistics for the Commerce Students.

## **UNIT - I Introduction**

Meaning and Definition of Statistics - Collection and Tabulation of Statistical Data - Presentation of Statistical Data - Graphs and Diagrams

## **UNIT- II Measures of Central Tendency and Measures of Variation**

Measures of Central Tendency - Arithmetic Mean, Median, Mode, Harmonic Mean and Geometric Mean. Measures of Variation - Standard deviation - Mean Deviation - Quartile Deviation - Skewness and Kurtosis - Lorenz Curve

## **UNIT- III Correlation and Regression Analysis**

Simple Correlation - Scatter Diagram - Karl Pearson's Correlation - Spearman's Rank Correlation - Regression - Meaning - Linear Regression.

## **UNIT - IV Time Series**

Analysis of Time Series - Causes of variation in Time Series Data - Components of Time series; Additive and multiplicative models - Determination of Trend by Semi average, Moving average and Least squares (Linear, Second degree and Exponential) Methods - Computation of Seasonal indices by Simple average, Ratio-to-moving average, Ratio-to Trend and Link relative methods

## **UNIT - V Index Numbers**

Meaning and Types of Index numbers - Problems in Construction of Index numbers - Methods of Construction of Price and Quantity indices - Tests of adequacy - Errors in Index numbers - Chain Base Index numbers - Base shifting - splicing - deflating - Consumer Price index and its uses - Statistical Quality Control

**Note : Questions in Sec. A, B & C shall be in the proportion of 20:80 between Theory and Problems.**

## **Suggested Readings**

1. Dhingra I C & M.P. Gupta, Lectures in Business Statistics, Sultan Chand and Sons, New Delhi, 2009
2. Gupta S P and Archana Agarwal, Business Statistics (Statistical Methods), Sultan Chand and Sons, New Delhi, 9<sup>th</sup> revised edition 2013
3. Gupta S. C, Fundamentals of Statistics, Himalaya Publishing House
4. Sharma J K, Fundamentals of Business Statistics, 2nd edition, Vikas Publishing House Pvt Ltd, 2013
5. Rajagopalan.S.P, and Sattanathan, R., Business Statistics and Operations Research, Vijaya Nicole Imprint Pvt. Ltd., Chennai
6. J o s e p h A n b a r a s u , Business Statistics, Vijay Nicole Imprint Pvt. Ltd, Chennai

## **E-Resources**

[www.spss.co.in](http://www.spss.co.in)

<https://statlearning.class.stanford.edu>

<http://www.mit.edu>



## **IV SEMESTER**

### **Core Subject IX - MANAGEMENT INFORMATION SYSTEM**

#### **Objectives**

**No of Credits : 4**

1. To enable the students to learn the Role of Management Information System in the Business area.
2. To expose the students to the World of Computers

#### **UNIT I : Introduction**

Definition of Management Information System - MIS support for Planning, Organizing and Controlling - Structure of MIS - Information for Decision making.

#### **UNIT II : Management System**

Concept of System - Characteristics of System - Systems Classification - Categories of Information Systems - Strategic information System and Competitive advantage

#### **UNIT III : Computers & M.I.S.**

Computers and Information Processing - Classification of Computer - Input Devices - Output Devices - Storage Devices - Batch and Online Processing. Hardware - Software - Database Management Systems.

#### **UNIT IV : System Analysis**

System Analysis and Design - SDLC - Role of System - „Analyst - Functional Information System - Personnel, Production, Material, Marketing.

#### **UNIT V : Decision Support System**

Decision Support Systems - Definition - Group Decision Support System - Business Process Outsourcing - Definition Functions.

#### **Suggested Readings**

1. Mudrick & Ross, "Management Information Systems", Prentice - Hall of India.
2. Sadagopan, - "Management Information Systems", Prentice, Hall of India.
3. Murthy, CSV"- Management Information Systems" Himalaya Publishing House.
4. Azam, Management Information System, Vijay Nicole Imprints Pvt. Ltd. Chennai
5. Dr. S.P. Rajagopalan, "Management Information Systems and EDP", Margham Publications

#### **E-resources**

[www.dbatra.com](http://www.dbatra.com)

[www.itworld.com](http://www.itworld.com)

[www.icisa.cag.gov.in](http://www.icisa.cag.gov.in)



## **Core Subject : X - OBJECT ORIENTED PROGRAMMING WITH C++**

### **Unit I:**

Principles of object oriented programming(OOPs), object-oriented paradigm. Advantages - OOPs concepts – OOPs Languages. Models:-Class Model-State Model and Interaction Model.

### **Unit II:**

Introduction to C++-Tokens, Keywords-Identifiers-Variables-Operators-Manipulators-Expressions-Control Structures.

### **Unit III:**

Functions - Main Function - Function Prototyping - Inline Functions - Friend and Virtual Functions-Parameters Passing in Functions-Values Return by Functions.

### **Unit IV:**

Classes and Objects; Constructors and Destructors; and Operator Overloading and Type Conversions - Type of Constructors - Function overloading.

### **Unit V:**

Inheritance: Single Inheritance - Multilevel Inheritance - Multiple Inheritance - Hierarchical Inheritance - Hybrid Inheritance. Virtual Functions and Polymorphism; Managing Console I/O operations.

### **RECOMMENDED TEXTS:**

1. E. Balagurusamy, 2013, 6<sup>th</sup> Edition, Object Oriented Programming with C++, Tata McGraw-Hill Publishing Company Ltd.
2. H. Schildt, *C++ the Complete reference*. T M H.1998.

## **Core Subject : XI - C++ PRACTICALS**

1. Practical on simple C++ programs such Factorial, Fibonacci series, sum and average
2. C++ Program for largest and smallest in an array.
3. C++ program for Sorting an array of numbers/alphabets using arrays.
4. Illustration of Function overloading.
5. Program for the implementation of operator overloading.
6. Friend function operations.
7. Practical on use of classes.
8. Illustration of objects in C++
10. Practical based on the concept of inheritance.
11. Implementation of Constructor and destructor
12. Implementation of Function overloading.
14. Illustration of Virtual functions.

## **Core Paper XII - BUSINESS ENVIRONMENT**

### **Objectives**

**No of Credits : 4**

1. To impart the knowledge of Business environment.
2. To enable the students to know the factors influencing the changes in the Business Climate.

### **UNIT I : Introduction**

The Concept of Business Environment - Its Nature and Significance - Brief overview of Political, Cultural, Legal, Economic, Social and Global Environments and their impact on Business and Strategic Decisions.

### **UNIT II : Political Environment**

Meaning - Government and Business Relationship in India - Provisions of Indian Constitution pertaining to Business.

### **UNIT III : Social Environment**

Meaning - Cultural heritage - Social attitudes - impact of foreign culture - Castes and Communities - Joint family systems - Linguistic and Religious groups - Types of Social Organization - Social Responsibilities of Business.

### **UNIT IV : Economic Environment**

Economic Systems and their impact on Business - Macro Economic parameters like GDP, Growth Rate Population - Urbanisation. Fiscal Deficit - Plan investment - Per Capita income and their impact on Business decisions - Five Year Planning.

### **UNIT V : Global Environment**

Factors Determining Global Environment - Forex Environment - Financial Environment. Financial System - Commercial Banks - Financial Institutions - RBI - Monetary Policy - Stock Exchange - IDBI - Non-Banking Financial Companies (NBFCs).

### **Suggested Readings**

1. Sankaran.S., Business Environment
2. Francis Cherunilam, Business Environment, Himalaya Publishing House
3. Aswathappa, Business Environment, Himalaya Publishing House
4. Dasgupta & Sengupta, Government and Business in India.
5. Srinivasan.K., Productivity and social Environment, ASIA
6. Dhanabakiam & Kavitha.M, Business Environment, Vijay Nicole Imprints Pvt. Ltd.Chennai

### **E-Resources**

- [www.businesscasestudies.co.uk](http://www.businesscasestudies.co.uk)
- [www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)
- [www.mbaofficial.com](http://www.mbaofficial.com)
- [www.mbaknol.com](http://www.mbaknol.com)

# **Allied Paper IV - Elements of Operations Research**

## **Objectives**

**No of Credits : 5**

1. To facilitate the understanding of the Concept of Operation Research.
2. To help the student to understand the various techniques of solving problems.

## **UNIT I : Introduction**

Operations Research - Meaning - Definition - Origin and History - Characteristic features - Need - Scope - Steps - Techniques - Application - Limitations.

## **UNIT II : Linear Programming Problem (LPP)**

Meaning - Requirements - Assumptions - Applications - Formulating LPP - Advantages - Limitations - formulating LP Model (simple problems only)

## **UNIT - III : Methods of LPP**

Obtaining Optimal solution for Linear Programming Problem (LPP) - Graphical Method - Problems - Simplex Method for type of LPP & for Slack Variable Case - Maximization Function - Minimization Function (simple problems only)

## **UNIT - IV : Transportation Problems**

Meaning - (Initial Basic Feasible Solution) - Assumptions - Degenerate Solution - North - West Corner Method - Least Cost Method - Vogel's Approximation Method - Assignment Problems - Features - Transportation Problem Vs Assignment Problem - Hungarian Method (Simple problems only).

## **UNIT - V : Game Theory**

Meaning - Types of Games - Basic Assumptions - Finding value of game for Pure Strategy - Mixed Strategy - Indeterminate Matrix and Average Method - Graphical Method - Pure Strategy - Saddle Point - Pay off Matrix Value of game (simple problems only)

**Note : Questions in Sec. A, B & C shall be in the proportion of 20:80 between Theory and Problems.**

## **Suggested Readings**

1. Agarwal, N.P. and Sonia Agarwal, Operations Research and Quantitative techniques, RB SA Publishers, New Delhi, 2009
2. Anand Sharma, Operations Research, Himalayan Publishing House, 2014, Mumbai
3. Gurusamy S, Elements of Operations Research, Vijay Nicole Imprints, 2015, Chennai
4. Gupta P K & Gupta S P, Quantitative Techniques & Operations Research, Sulthan Chand and Sons, 2014, New Delhi
5. Kanti Swarup, P.K.Gupta & Man Mohan, Operations Research, Jain Book Agency, 2014, New Delhi
6. Sarangi, S.K. Applied Operations Research and Quantitative Methods, Himalayan Publishing House, 2014, Mumbai
7. Shridhara, K. Bhat, Operations Research, Himalayan Publishing House, 2011, Mumbai

## **E-resources**

<http://www.learnaboutor.co.uk>

<http://www.theorsociety.com/>

[www.orcomplete.com/](http://www.orcomplete.com/)

<http://www.orsi.in/>

## **V SEMESTER**

### **Core Subject : XIII - VISUAL BASIC PROGRAMMING**

#### **UNIT I**

Data Types - String - Numbers - Variables - Text boxes - Labels - Creating controls  
- Tool box Name property\

Command button - Access Keys - Image Controls \message Boxes Grid Editing tools.

#### **UNIT II**

Displaying Information - Determinate Loops - Indeterminate Loops - Conditional  
Built in Functions - Customizing a Form - Writing Simple programs.

#### **UNIT III**

Functions and procedures - Lists - Arrays - Control Arrays Combo Boxes - Grid  
Control - Do Events and Sub Main

#### **UNIT IV**

Error Trapping - Event Handling - Module - Monitoring Mouse Activity -  
DialogBoxes - Common Controls - Menus

#### **UNIT V**

Error Trapping - MDI Forms - Database Connectivity using Data Control and DAO.

#### **REFERENCE BOOKS:**

1. Visual Basic 6 - The Complete Reference - Noel Jerke - Tata McGraw Hill 1999.
2. Visual Basic from the Ground up - Gary Cornell - Tata Mc Graw Hill 1999

## **Core Subject : XIV - VISUAL BASIC PRACTICALS**

- 1) Develop a simple calculator
- 2) Event handling using window timer control
- 3) Performing cascading windows operations (horizontal, vertical & tiles)
- 4) Changing the color, font and size of text.
- 5) Implementation of Drag and Drop events using images.
- 6) Payroll Processing
- 7) Inventory Management
- 8) E-Banking
- 9) Work Flow Applications
- 10) Electricity Bill

## **Core Paper XV - ELEMENTS OF COST ACCOUNTING**

### **Objectives**

**No of Credits : 4**

1. To make the students to know the Process of Accounting for Cost Elements.
2. To understand the advantages of Costing to the Stakeholders, Workers, Creditors and the Public.

### **Unit I : Cost Accounting**

Definition - Nature and Scope - Principles of Cost Accounting - Cost Accounting and Financial Accounting - Cost Accounting Vs Management Accounting - Installation of Costing System - Classification of Costs - Cost Centre - Profit Centre.

### **Unit II : Cost Sheet**

Meaning - Preparation of Cost Sheet - Reconciliation of Cost and Financial Accounts.

### **Unit III : Material Costing**

Material Control - Meaning and Objectives - Purchase of Materials - Stock Levels of Materials - EOQ - Stores Records - ABC Analysis - Issue of Materials - Methods of Issue - FIFO - LIFO - HIFO - Base Stock Method - Specific Price Method - Simple and Weighted Average Method - Standard and Inflated Price Method.

### **Unit IV : Labour Costing**

Direct Labour and Indirect Labour- Time Keeping - Methods and Calculation of Wage Payments - Time Wages - Piece Wages - Incentives - Different Methods of Incentive Payments - Idle time - Overtime - Labour Turnover - Meaning, Causes and Measurement.

### **Unit V : Overheads Costing**

Overheads - Definition - Classification - Allocation and Apportionment of Overheads - Basis of Allocation - Absorption of Overheads - Preparation of Overheads Distribution Statement- Machine Hour Rate - Computation of Machine Hour Rate.

**Note : Questions in Sec. A, B & C shall be in the proportion of 20:80 between**

**Theory and Problems.**

### **Suggested Readings**

1. Jain, S.P & Narang, K.L., Cost Accounting, Kalyani Publishers
2. Khanna, B.S. Pandey, I.M - Ahuja, G.K and Arora M.N., Practical Costing, S Chand & Sons
3. Murthy A & Gurusamy S, Cost Accounting, Vijay Nicole Imprints Pvt. Ltd. Chennai
4. Reddy, T.S. and Hariprasad Reddy, Y, Cost Accounting, Margam Publications
5. Prasad, N.K and Prasad, V.K, Cost Accounting, Book Syndicate
6. Saxena and Vashist, Cost Accounting Sulthan Chand and Sons, 2014, New Delhi

### **E-Resources**

[www.accountinglectures.com](http://www.accountinglectures.com)

[www.accountingcoach.com](http://www.accountingcoach.com)

<http://simplestudies.com/accounting-lectures.html>



[www.accountingstudyguide.com](http://www.accountingstudyguide.com)

# **Core Paper XVI - FINANCIAL MANAGEMENT**

## **Objectives**

**No of Credits : 4**

1. To impart the basics of Financial Management for the benefit of Commerce students.
2. To enable the students to know the concepts of the Investment, Financing and Working Capital.

## **Unit I : Introduction**

Meaning and Objectives of Financial Management - Functions of Financial Management. Finance - Importance of Finance - Sources of Finance - Role of Financial Manager in Financial Management.

## **Unit II : Capital Structure**

Meaning - Factors affecting Capital Structure - Planning - Theories of Capital Structure - Determining Debt Equity Proportion - Leverage Concept.

## **Unit III : Cost of Capital**

Definition - Cost of Equity Capital - Cost of Preference Capital - Cost of Debt - Cost of Retained Earnings - Weighted Average (or) Composite cost of capital (WACC)

## **Unit IV : Dividend**

Meaning - Dividend Policies - Factors affecting Dividend Payment - Provisions on Dividend Payment in Company Law - Dividend Models - Walter's Model - Gordon's Model  
- M.M. Model - Hypothesis Model.

## **Unit V : Working Capital**

Working Capital - Meaning and importance - Factors Influencing Working Capital - Determining (or) Forecasting of Working Capital requirements - Working Capital Operating cycle.

**Note : Questions in Sec. A, B & C shall be in the proportion of 20:80 between Theory and Problems.**

## **Suggested Readings**

1. I.M. Pandey, Financial Management, Vikas Publishing House
2. Prasanna Chandra, Financial Management, Tata McGraw Hill Publications
3. S.N. Maheswari, Financial Management, Sultan Chand & Sons
4. Y. Khan and Jain, Financial Management, Sultan Chand & Sons
5. P. Periyasamy.P, Financial Management, Vijay Nicole Imprints Pvt. Ltd. Chennai
6. Murthy A, Financial Management, Margam Publications, Chennai

## **E-Resources**

[www.cpdwise.com](http://www.cpdwise.com)

[www.simplilearn.com](http://www.simplilearn.com)

[www.findtutorials.com](http://www.findtutorials.com)  
[www.studyfinance.com](http://www.studyfinance.com)

## **ELECTIVE PAPER – I -1. WEB TECHNOLOGY.**

### **Unit – I**

Internet basics: Basic concepts – Communication on the internet – Internet Domains – Establishing connectivity on the internet. Introduction to HTML – HTML Tags – Paired Tags – Singular Tags- The Structure of the HTML program.

### **Unit – II**

Lists: Types of Lists – Adding Graphics to HTML Documents -Tables – Linking Documents — Frames – Introduction to Frames.

### **Unit – III**

Introduction to Java Script – Advantages of Java Script – Writing Java Script into HTML – Data types and Literals – Operators and Expression in Java Script – Conditional statements in Java Script.

### **Unit – IV**

Looping in Java Script – Basic programming Techniques -Functions and Loops in Java Script : Built – in Functions – User defined functions – Dialog boxes.

### **Unit – V**

Java Scripts Document Object Model – Cookies -Dynamic HTML – Cascading Style Sheets- Class – External Style Sheets – Tags in Style Sheets.

## **REFERENCE BOOKS :**

1. Ivan Bayross, Web Enabled Commercial Application Development Using HTML, JavaScript and PHP, 4<sup>th</sup> Revised Edition, BPB Publications, 2010.
2. J. Jaworski, Mastering Javascript, BPB Publications, 1999.
3. T. A. Powell, Complete Reference HTML (Third Edition), TMH, 2002.
4. Jeffrey C. Jackson, "Web Technologies--A Computer Science Perspective", Pearson Education, 2006.

# **ELECTIVE PAPER – I -2. ENTREPRENEURIAL DEVELOPMENT**

## **Objectives**

**No of Credits : 4**

1. To make the students to understand the concept of Entrepreneurship and their work in life.
2. To enable the students to know the effectiveness of the Manpower in Entrepreneurship.

## **UNIT I : Concept of Entrepreneurship**

Entrepreneurship - Meaning - Types - Qualities of an Entrepreneur - Classification of Entrepreneurs - Factors influencing Entrepreneurship - Functions of Entrepreneurs.

## **UNIT II : Entrepreneurial Development Agencies.**

Commercial Banks - District Industries Centre - National Small Industries Corporation - Small Industries Development Organisation - Small Industries Service Institute. All India Financial Institutions. SIPCOT and its objectives. MSME Sector and its coverage- Objectives of Ministry of MSME. Role and Functions of MICRO Small and Medium Enterprises - Development Organisation (MSME - DO) - Objectives of SIDCO - Functions of Tamil Nadu SIDCO - IRBI and its Role. NABARD and its role in the Rural Development of India - Introduction to Micro Units Development Refinance Agency (MUDRA).

## **UNIT III : Project Management**

Business idea generation techniques - Identification of Business opportunities - Feasibility study - Marketing, Finance, Technology & Legal Formalities - Preparation of Project Report - Tools of Appraisal.

## **UNIT IV - Entrepreneurial Development Programmes**

Entrepreneurial Development Programmes (EDP) - Role, relevance and achievements - Role of Government in organizing EDPs- Critical evaluation.

## **UNIT V - Economic development and Entrepreneurial growth**

Role of Entrepreneur in Economic growth - Strategic approaches in the changing Economic scenario for small scale Entrepreneurs - Networking, Niche play, Geographic Concentration, Franchising / Dealership - Development of Women Entrepreneurship. Self-help groups and empowerment of Women in India - Financing SHG and their role in Micro-financing. Financial inclusion and its penetration in India, Challenges and Government role in Financial inclusion - Pradhan Mantri Jan-Dhan Yojana - Six Pillars of Its Mission objectives.

## **Suggested Readings**

1. Saravanavel, P. Entrepreneurial Development, Principles, Policies and Programmes, Ess Pee Kay Publishing House - 1997, Chennai.
2. Tulsian, P.C & Vishal Pandey, Business Organization and Management, Pearson Education India, 2002, Delhi.
3. Janakiram, B, and Rizwana, M, Entrepreneurship Development, Text and Cases, Excel Books India, 2011, Delhi.
4. Arun Mittal & Gupta, S.L - Entrepreneurship Development, International Book House Pvt. Ltd, 2011, Mumbai.
5. Anil Kumar, S, Poornima, S, Abraham, K, Jayashree, K - Entrepreneurship Development, New age International (P) Ltd, 2012, Delhi
6. Gupta C B and Srinivasan NP, Entrepreneurial Development, Sultan Chand & Sons
7. Raj Shankar, Entrepreneurship, Vijay Nicole Imprints Pvt. Ltd. Chennai

## **E-resources**

<http://inventors.about.com/od/entrepreneur/>

<http://learnthat.com/tag/entrepreneurship/>  
[www.managementstudyguide.com](http://www.managementstudyguide.com)  
[www.quintcareers.com](http://www.quintcareers.com)  
[www.entrepreneur.com](http://www.entrepreneur.com)

## **VI SEMESTER**

### **Core Paper XVII - MANAGEMENT ACCOUNTING**

#### **Objectives**

**No of Credits : 4**

1. To enable the students to get knowledge about the various techniques of Management Principles.
2. To make the students to get practical skill in solving management problems.

#### **Unit I : Introduction**

Management Accounting - Meaning - Scope - Importance - Limitations - Management Accounting Vs Cost Accounting - Management Accounting Vs Financial Accounting.

#### **Unit II : Financial Statement Analysis**

Analysis and Interpretation of Financial Statements - Nature and Significance - Types of Financial Analysis - Tools of Analysis - Comparative Statements - Common size Statement - Trend Analysis.

#### **Unit III : Ratio Analysis**

Meaning - Advantages - Limitations - Types of Ratios - Liquidity Ratios - Profitability Ratios - Turnover Ratios - Capital Structure Ratios - Leverage Ratios - Calculation of Ratios.

#### **Unit IV : Cash Flow Analysis & Marginal Costing**

Meaning of Cash Flow Statements - Advantages - Limitations - Preparation of Cash Flow Statement - Types of Cash flows - Operating, Financing and Investing Cash flows. Application of Marginal Costing in Decision Making - Make or Buy - Shutdown or Continue - Exploring New Markets.

#### **Unit V : Budgetary Control & Capital Budgeting Control.**

Budgetary Control - Meaning - Preparation of various Budgets - Cash Budget - Flexible Budget - Production Budget - Sales Budget. Capital Expenditure Control - Meaning of Capital Budgeting — Assessment of Capital Expenditure through Pay Back Method, Net Present Value Method and Accounting Rate of Return Method.

**Note : Questions in Sec. A, B & C shall be in the proportion of 20:80 between Theory and Problems.**

#### **Suggested Readings**

1. Maheswari, S.N., Management Accounting, Sultan Chand & Sons
2. Charles T. Horngren and Gary Sundem, N, Introduction to Management Accounting, Prentice Hall
3. Murthy A and Gurusamy S, Management Accounting- Theory & Practice, Vijay Nicole Imprints Pvt. Ltd. Chennai
4. Sharma and Shashi K. Gupta, Management Accounting, Kalyani Publishers
5. Reddy, T.S. & Dr. Hariprasad Reddy, Y, Management Accounting, Margham Publications, Chennai.
6. Hansen - Mowen, Cost Management Accounting and Control, South Western College

#### **E-Resources**

[www.accountingcoach.com](http://www.accountingcoach.com)

[www.accountingstudyguide.com](http://www.accountingstudyguide.com)

[www.futureaccountant.com](http://www.futureaccountant.com)

[www.thestudentcpa.com](http://www.thestudentcpa.com)



# **Core Subject : XVIII - E- BUSINESS**

## **UNIT I**

Introduction to electronic business - meaning - value chains - the Internet and the web - infrastructure for e-business

## **UNIT II**

Web based tools for e - business - e - business software - overview of packages

## **UNIT III**

Security threats to e - business - implementing security for e - commerce and electronic payment systems.

## **UNIT IV**

Strategies for marketing, sales and promotion - B2C and strategies for purchasing and support activities - B2B - web auction virtual - web portals

## **UNIT V**

The environment of e-business - international - legal ethical - tax issues - business plan for implementing e-business.

## **REFERENCE BOOKS:**

1. Garry P Schneider and James T Perry - Electronic Commerce, Course technology, Thomson Learning, 2000
2. Diwan, Prag and Sunil Sharma - E-Commerce - Managers guide to E-Business
3. Kosiv, David - Understanding E-Commerce

# **Core Subject : XIX - SOFTWARE PROJECT MANAGEMENT**

## **UNIT I**

Introduction - Defining a software development process - Identify the software model - Activities - Relationship among activities - document information on each activity Tailoring - improving the process - Discipline - Need for Implementing discipline - Personality Traits - Management Tools.

## **UNIT II**

Project Planning - Top down and bottom up planning Types of activity - Duration - Critical path

## **UNIT III**

Project Tracking: Overview of project process - tracking meetings - Recovery plans

## **UNIT IV**

Product requirements and specifications - Product requirements - Objectives - Customer problem solving Specification - Final product – Testing

## **UNIT V**

Software Quality Assurance (SQA): Software quality and software quality assurance - Software reviews - Formal technical reviews - Software quality - Formal approaches to SQA - Software reliability - A software quality assurance approach

## **REFERENCE BOOKS:**

1. Neil Whitten - Managing Software Development Projects for Success, John Wiley and Sons
2. Roger S Pressman - Software Engineering - McGraw Hill
3. Watts Humphrey - Managing Software Process, Addison Wesley

## ELECTIVE – II - 1. WEB TECHNOLOGY PRACTICALS

1. Create a simple page introducing you, how old you are, what you do, what you like and dislike. Modify the introduction to include a bullet list of what you do and put list the 5 things you like most and dislike as numbered list. Create another page about your favourite hobby, and link to (and from) your main page. Center something and put a quote on one of your pages.

2. Put an existing image on a web page. Create a table, use a heading and at least one use of row span/col span, colour a page and some text with a page. link to another site.

3. Create a new file called index, html.

- Put the normal HTML document structure tags in the file. Give it a title.
- At the bottom of page (i.e the last thing between the tags) put the following
- A horizontal rule.
- A link to your email address (with your name between the tags); remember to put the link to your email address within address tags..
- A line break.
- The date (I have this same structure of the bottom of this page).

Above this block (which is called the footer), put a title in heading tags.

Add some text describing yourself (you can split this into multiple headings and paragraphs as you wish).

4. Write a script to create an array of 10 elements and display its contents.

5. Write a function in JavaScript that takes a string and looks at it character *by* character.

6. Create a simple calculator using fields. Have two fields for number entry & one field for the result. Allow the user to be able to use to use plus, minus, multiply & divide.

7. Create a document and add a link to it. When the user moves the mouse over the link, it should load the linked document on its own. (User is not required to click the link).

8. Create a document, which opens a window without a toolbar, address bar or a status bar that unloads itself after one minute.

9. Design a web page with validation using Javascript.

10. Add a Cascading Style sheet for designing the web page.

# **Elective II- 2.SPSS & TALLY ACCOUNTING PACKAGE**

## **(i) STATISTICAL & ACCOUNTING APPLICATION PACKAGE**

### **(Lab Based Practical Paper)**

Computerized Accounting - Tally Accounting Software

#### **UNIT I**

Tally-origin- General Features- Accounting features-Inventory feature-Starting TALLY Start up screen component-Processing icons –Multilingual feature of TALLY- Quit TALLY

#### **UNIT II**

Company creation –creating, selecting, deleting, shutting a company –altering company details- changing data directory –auto selection of company

#### **UNIT III**

Pre defined groups in TALLY- Primary groups-sub groups- creation of user defined primary groups — display- alteration of groups-Ledger Accounts-creations, display, alteration, deletion

#### **UNIT IV**

Tally vouchers-Meaning-Payment vouchers-Receipt vouchers-entering, deleting, Canceling, printing a voucher- Post dated vouchers

#### **UNIT V**

Security Control- Meaning, need- creation, Display, alteration of security –TALLY Audit- features-conduct

### **Recommended Text Books:**

1. Tally Bible by V. Sundaramoorthy
2. Tally – V. Palanivel , Margham Publications, Chennai

## (ii) **SPSS - STATISTICAL PACKAGE FOR SOCIAL SCIENCES**

1. Construction of Frequency tables
  - (a) Univariate Frequency tables
  - (b) Cross- Tabulation
2. Graphical representation of Data
  - (a) Bar diagram – Simple Bar diagram, Multiple Bar Diagram, Sub divided Bar Diagram,
  - (b) Histogram
  - (c) Pie Diagram
3. Calculation of Measures of Central Tendencies
  - (a) Mean, Median and Mode
  - (b) Geometric mean
4. Calculation of Methods of Dispersion
  - (a) Standard Deviation
  - (b) Quartiles
  - (c) skewness
  - (d) Kurtosis
5. Calculation of Correlation Coefficient
  - (a) Karl Pearson"s Correlation Coefficient
  - (b) Spearman"s Rank Correlation Coefficient
6. Calculation of Regression Trend
  - (a) Trend Line
7. Test of Significance for Single and two Samples – Large Sample Test (Z-Test)
  - (a) Test for Mean
  - (b) Test for Proportion
  - (c) Test for Standard Deviation
8. Test of Significance for Single and two Samples – Small Sample Test (t-Test, F-test)
  - (a) Test of Mean
  - (b) Test of Variances
9. Non-Parametric Test

(a) One –Way Chi-square test (test for Homogeneity)

(b) Two–Way Chi-square test (test for Attributes)

10. Test of Homogeneity of Means for more than 2 samples

(a) One –Way ANOVA

(b) Two–Way ANOVA

**Recommended Text Books:**

1. SPSS for Beginners, 1999 Vijay Gupta ,Published by **VJBooks** Inc.
2. Levine"s Guide to SPSS for Analysis of Variance.2nd Edition, Melanie C. Page,  
Sanford L. Braver and David P. MacKinnon, **LAWRENCE ERLBAUM ASSOCIATES, PUBLISHERS2003** Mahwah, New Jersey, London.

**Elective Paper - III : PROJECT  
WORK (GROUP)**

**No of Credits : 5**

A Group of 3 students will be assigned a Project in the beginning of the Final year. The Project Work shall be submitted to the College 20 days before the end of the Final year and the College has to certify the same and submit to the University 15 days prior to the commencement of the University Examinations.

The Project shall be evaluated externally. The External Examiner shall be from the Panel of Examiners suggested by the board of Studies from time to time.

Those who fail in the Project Work will have to redo the Project Work and submit to the College for External examination by the University.

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DEPARTMENT OF BCA:-



**University of Madras**

**Chepauk, Chennai 600 020**

**[Est. 1857, State University, NAAC 'A' Grade, CGPA  
3.32, NIRF 2019 Rank: 20]**

Website: [www.unom.ac.in](http://www.unom.ac.in), Tel. 044-2539 9000

**Undergraduate Programme  
In  
Computer Applications**

**Syllabus for  
BCA**

**(With effect from the Academic Year 2020-21)**

**February 2020**

# **Learning Outcome Based Curriculum Framework**

**Note: The Committee is designed Learning Outcome Based Curriculum Framework of Under Graduate Bachelor of Computer Application Program prescribed by UGC**



# Syllabus for Bachelor of Computer Applications (BCA)

(With effect from the Academic Year 2020-21)

## I Preamble

Bachelor of Computer Applications (BCA) is a 3 – Year Under Graduate Programme Spread over six semesters. The Course is designed to bridge the gap between IT industries and Academic institutes by incorporating the latest development, into the Curriculum and to give students a complete understanding within a structured framework. The Course helps the students to build-up a successful Career in Computer Science and for pursuing higher studies in Computer Science.

## II Course Objectives

- Provide strong foundations in fundamentals of Computer Science and applications, inter disciplinary courses and electives for widening the domain expertise.
- Design and develop software based solutions for real world problems, serving effectively to the requirements of computer field and Society
- Attain sufficient knowledge related to computer domains, possesses technical, soft and hard skills and apply them effectively in team work
- Empower the students with competencies in creative thinking and problem solving, inter-personal communication and managerial skills.

## III Graduate Attributes

- Computational Knowledge
- Problem analysis & Solving
- Design & Development of Solutions
- Modern tool usage
- Communication skills
- Innovation & Entrepreneurship
- Societal & environmental concern

## IV Course Outcomes

After Completion of the course, the students are expected to

- Understand the basic principles and concepts of Computer applications and integrate the knowledge gained in Computer application domain with practical needs of the society and be an ethically and socially responsible Computer Application Professional
- Explore emerging technologies in diverse areas of Computer Application and inculcate skills for successful career, entrepreneurship and higher studies
- Ability to apply the concepts of Computer and practices via emerging technologies and Software development tools.

# UNIVERSITY OF MADRAS

## BCA

### SYLLAB

### US 2020-

S.NO.	PART	SUBJECT NAME	CREDITS	MAX. MARKS		
				EXTERNAL MARKS	INTERNAL MARKS	TOTAL
<b>SEMESTER I</b>			<b>21</b>			
1	I	Tamil/ Other languages – I	3	75	25	100
2	II	English – I	3	75	25	100
3	III	Core I : Problem Solving using Python	4	75	25	100
4	III	Practical I: Problem Solving using Python Lab	2	60	40	100
5	III	Allied I: Mathematics I	5	75	25	100
6	IV	Basic Tamil/Advanced Tamil/Non Major Elective I	2	75	25	100
7	IV	Soft Skill I	3	50	50	100
<b>Total Credits</b>			<b>22</b>			
<b>SEMESTER II</b>			<b>CREDITS</b>	<b>EXTERNAL MARKS</b>	<b>INTERNAL MARKS</b>	<b>TOTAL</b>
8	I	Tamil/ Other languages – II	3	75	25	100
9	II	English – II	3	75	25	100
10	III	Core II :Object Oriented Programming Concepts using C ++	4	75	25	100
11	III	Practical II : C++ programming Lab	3	60	40	100
12	III	Allied II: Mathematics II	5	75	25	100
13	IV	Basic Tamil/Advanced Tamil/Non Major Elective II	2	75	25	100
14	IV	Soft Skill II	3	50	50	100
<b>Total Credits</b>			<b>23</b>			
<b>SEMESTER III</b>			<b>CREDITS</b>	<b>EXTERNAL MARKS</b>	<b>INTERNAL MARKS</b>	<b>TOTAL</b>
15	III	Core III: Data Structures	4	75	25	100
16	III	Core IV: Java programming	4	75	25	100
17	III	Core V: Computer Organization	4	75	25	100
18	III	Practical III : Data Structures using Java Lab	3	60	40	100
19	III	Allied III: Financial Accounting	5	75	25	100
20	IV	Soft Skill III	3	50	50	100
21	IV	Environmental Studies	Examination will be held in Semester IV			
<b>Total Credits</b>			<b>23</b>			
<b>SEMESTER IV</b>			<b>CREDITS</b>	<b>EXTERNAL MARKS</b>	<b>INTERNAL MARKS</b>	<b>TOTAL</b>
22	III	Core VI: Open Source Technologies	4	75	25	100
23	III	Core VII: Computer Network	4	75	25	100
24	III	Core VIII : E-Commerce technologies	4	75	25	100
25	III	Practical IV : Open Source Technologies Lab	3	60	40	100
26	III	Allied IV: Cost and Management Accounting	5	75	25	100
27	IV	Soft Skill IV	3	50	50	100
28	IV	Environmental Studies	2	75	25	100
<b>Total Credits</b>			<b>25</b>			

SEMESTER V			CREDITS	EXTERNAL MARKS	INTERNAL MARKS	TOTAL
29	III	Core IX: Software Engineering	4	75	25	100
30	III	Core X : Operating System	4	75	25	100
31	III	Core XI: Relational Database Management System	4	75	25	100
32	III	Practical V: Operating System Lab	3	60	40	100
33	III	Practical VI : PL/SQL Lab	2	60	40	100
34	III	Elective I	5	75	25	100
35	IV	Value Education	2			
<b>Total Credits</b>			<b>24</b>			
SEMESTER VI			CREDITS	EXTERNAL MARKS	INTERNAL MARKS	TOTAL
36	III	Core XII: Web Design and Development	4	75	25	100
37	III	Core XIII: Data Mining	4	75	25	100
38	III	Core XIV: Mobile Application Development	4	75	25	100
39	III	Practical VII: Mobile Application Development Lab	3	60	40	100
40	III	Elective II	5	75	25	100
41	III	Mini Project	5	60	40	100
42	V	Extension Activities	1			
<b>Total Credits</b>			<b>26</b>			
<b>Total credits ( Core, Elective, SBS)</b>			<b>143</b>			
<b>Non Major Elective I - I Semester</b>						
Web Application Office Automation HTML						
<b>Non Major Elective II – II Semester</b>						
Web Application Lab Office Automation Lab HTML Lab						
<b>Elective I</b>						
Principles of Information Security Resource Management Techniques Multimedia and its Applications						
<b>Elective II</b>						
Software Project Management IOT and its Applications Data Analytics using R						

- Describe the core syntax and semantics of Python programming language.
- Discover the need for working with the strings and functions.
- Illustrate the process of structuring the data using lists, dictionaries, tuples and sets.
- Understand the usage of packages and Dictionaries.

#### **OUTCOMES:**

- To Understand the principles of Python and acquire skills in programming in python
- To develop the emerging applications of relevant field using Python
- Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.
- Able to develop simple turtle graphics programs in Python

#### **UNIT – I**

Introduction: The essence of computational problem solving – Limits of computational problem solving- Computer algorithms-Computer Hardware-Computer Software-The process of computational problem solving- Python programming language - Literals - Variables and Identifiers - Operators - Expressions and Data types.

#### **UNIT - II**

Control Structures: Boolean Expressions - Selection Control - If Statement- Indentation in Python- Multi-Way Selection -- Iterative Control- While Statement- Infinite loops- Definite vs. Indefinite Loops- Boolean Flags and Indefinite Loops. Lists: List Structures - Lists in Python - Iterating over lists in Python.

#### **UNIT - III**

Functions: Program Routines- Defining Functions- More on Functions: Calling Value-Returning Functions- Calling Non-Value-Returning Functions- Parameter Passing - Keyword Arguments in Python - Default Arguments in Python-Variable Scope.

#### **UNIT - V**

Objects and their use: Software Objects - Turtle Graphics – Turtle attributes-Modular Design: Modules - Top-Down Design - Python Modules - Text Files: Opening, reading and writing text files - String Processing - Exception Handling.

#### **UNIT - V**

Dictionaries and Sets: Dictionary type in Python - Set Data type. Object Oriented Programming using Python: Encapsulation - Inheritance – Polymorphism. Recursion: Recursive Functions.

#### **TEXT BOOK:**

1. Charles Dierbach, “Introduction to Computer Science using Python - A computational Problem solving Focus”, Wiley India Edition, 2015.

#### **REFERENCE BOOKS:**

1. Mark Lutz, “*Learning Python Powerful Object Oriented Programming*”, O’reilly Media 2018, 5<sup>th</sup> Edition.
2. Timothy A. Budd, “*Exploring Python*”, Tata McGraw Hill Education Private Limited 2011, 1<sup>st</sup> Edition.
3. Allen Downey, Jeffrey Elkner, Chris Meyers, “*How to think like a computer scientist: learning with Python*”, 2012.
4. Sheetal Taneja & Naveen kumar, “*Python Programming a Modular approach – A Modular approach with Graphics, Database, Mobile and Web applications*”, Pearson, 2017.
5. Ch Satyanarayana M Radhika Mani, B N Jagadesh, “*Python programming*”, Universities Press 2018.

## WEB REFERENCES

- <http://interactivepython.org/courselib/static/pythonds>
- <http://www.ibiblio.org/g2swap/byteofpython/read/>
- <http://www.diveintopython3.net/>
- <http://greenteapress.com/wp/think-python-2e/>
- NPTEL & MOOC courses titled Python programming
- [http://spoken-tutorial.org/tutorial-search/?search\\_foss=Python&search\\_language=English](http://spoken-tutorial.org/tutorial-search/?search_foss=Python&search_language=English)
- <http://docs.python.org/3/tutorial/index.html>



- To implement the python programming features in practical applications.
- To write, test, and debug simple Python programs.
- To implement Python programs with conditionals and loops.
- Use functions for structuring Python programs.
- Represent compound data using Python lists, tuples, dictionaries , turtles, Files and modules.

#### OUTCOMES:

- Understand the numeric or real life application problems and solve them.
- Apply a solution clearly and accurately in a program using Python.
- Apply the best features available in Python to solve the situational problems.

#### LIST OF EXERCISES:

1. Program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. Program to calculate total marks, percentage and grade of a student. Marks obtained in each of the five subjects are to be input by user. Assign grades according to the following criteria:  
 Grade A: Percentage  $\geq 80$                       Grade B: Percentage  $\geq 70$  and  $< 80$   
 Grade C: Percentage  $\geq 60$  and  $< 70$       Grade D: Percentage  $\geq 40$  and  $< 60$   
 Grade E: Percentage  $< 40$
3. Program, to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
4. Program to display the first n terms of Fibonacci series.
5. Program to find factorial of the given number using recursive function.
6. Write a Python program to count the number of even and odd numbers from array of N numbers.
7. Python function that accepts a string and calculate the number of upper case letters and lower case letters.
8. Python program to reverse a given string and check whether the give string is palindrome or not.
9. Write a program to find sum of all items in a dictionary.
10. Write a Python program to construct the following pattern, using a nested loop 1  
 22  
  
 333  
  
 4444  
  
 55555  
  
 666666  
  
 7777777  
  
 88888888  
  
 999999999
11. Read a file content and copy only the contents at odd lines into a new file.
12. Create a Turtle graphics window with specific size.
13. Write a Python program for Towers of Hanoi using recursion
14. Create a menu driven Python program with a dictionary for words and their meanings.
15. Devise a Python program to implement the Hangman Game.

**OBJECTIVES:**

- To inculcate knowledge on Object-oriented programming concepts using C++.
- To gain Knowledge on programming with C++.

**OUTCOMES:**

- To write programs using OOP concepts like Abstraction, Encapsulation, Inheritance and Polymorphism

**UNIT - I**

Introduction to C++ - key concepts of Object-Oriented Programming –Advantages – Object Oriented Languages – I/O in C++ - C++ Declarations. Control Structures : - Decision Making and Statements : If ..else, jump, goto, break, continue, Switch case statements - Loops in C++ : for, while, do - functions in C++ - inline functions – Function Overloading.

**UNIT - II**

Classes and Objects: Declaring Objects – Defining Member Functions – Static Member variables and functions – array of objects –friend functions – Overloading member functions – Bit fields and classes – Constructor and destructor with static members.

**UNIT- III**

Operator Overloading: Overloading unary, binary operators – Overloading Friend functions – type conversion – Inheritance: Types of Inheritance – Single, Multilevel, Multiple, Hierarchal, Hybrid, Multi path inheritance – Virtual base Classes – Abstract Classes.

**UNIT - IV**

Pointers – Declaration – Pointer to Class , Object – this pointer – Pointers to derived classes and Base classes – Arrays – Characteristics – array of classes – Memory models – new and delete operators – dynamic object – Binding, Polymorphism and Virtual Functions.

**UNIT - V**

Files – File stream classes – file modes – Sequential Read / Write operations – Binary and ASCII Files – Random Access Operation – Templates – Exception Handling - String – Declaring and Initializing string objects – String Attributes – Miscellaneous functions .

**TEXT BOOK:**

1. E. Balagurusamy, “*Object-Oriented Programming with C++*”, TMH 2013, 7<sup>th</sup> Edition.

**REFERENCE BOOKS:**

1. Ashok N Kamthane, “*Object-Oriented Programming with ANSI and Turbo C++*”, Pearson Education 2003.
2. Maria Litvin & Gray Litvin, “*C++ for you*”, Vikas publication 2002.

**WEB REFERENCES:**

- NPTEL & MOOC courses titled Object oriented programming concepts using C++
- <https://alison.com/course/introduction-to-c-plus-plus-programming>

## OBJECTIVES:

- To implement the various object oriented programming concepts using C++

## OUTCOMES:

- To understand the structure and model of the C++ programming language.
- To solve problems in C++ demonstrating Object Oriented Concepts.

## LIST OF EXERCISES:

1. Write a C++ program to demonstrate function overloading, Default Arguments and Inline function.
2. Write a C++ program to demonstrate Class and Objects
3. Write a C++ program to demonstrate the concept of Passing Objects to Functions
4. Write a C++ program to demonstrate the Friend Functions.
5. Write a C++ program to demonstrate the concept of Passing Objects to Functions
6. Write a C++ program to demonstrate Constructor and Destructor
7. Write a C++ program to demonstrate Unary Operator Overloading
8. Write a C++ program to demonstrate Binary Operator Overloading
9. Write a C++ program to demonstrate:
  - Single Inheritance
  - Multilevel Inheritance
  - Multiple Inheritance
  - Hierarchical Inheritance
  - Hybrid Inheritance
- 10 Write a C++ program to demonstrate Virtual Functions.
11. Write a C++ program to manipulate a Text File.
12. Write a C++ program to perform Sequential I/O Operations on a file.
13. Write a C++ program to find the Biggest Number using Command Line Arguments
14. Write a C++ program to demonstrate Class Template
15. Write a C++ program to demonstrate Function Template.
16. Write a C++ program to demonstrate Exception Handling.

## OBJECTIVES:

- To understand the concepts of ADTs
- To learn linear data structures-lists, stacks, queues
- To apply Tree and Graph structures
- To understand sorting, searching and hashing

## OUTCOMES:

- Implement abstract data types for linear data structures.
- Apply the different linear and non linear data structures to problem solutions.
- Critically analyze the various sorting algorithms.

## UNIT - I

Abstract Data Types (ADTs)- List ADT-array-based implementation-linked list implementation-singly linked lists-circular linked lists-doubly-linked lists-applications of lists-Polynomial Manipulation- All operations- Insertion-Deletion-Merge-Traversal.

## UNIT - II

Stack ADT-Operations- Applications- Evaluating arithmetic expressions – Conversion of infix to postfix expression-Queue ADT-Operations-Circular Queue- Priority Queue- deQueue-applications of queues.

## UNIT - III

Tree ADT-tree traversals-Binary Tree ADT-expression trees-applications of trees-binary search tree ADT-Threaded Binary Trees-AVL Trees- B-Tree- B+ Tree – Heap-Applications of heap.

## UNIT - IV

Definition- Representation of Graph- Types of graph-Breadth first traversal – Depth first traversal-Topological sort- Bi-connectivity – Cut vertex- Euler circuits-Applications of graphs.

## UNIT - V

Searching- Linear search-Binary search-Sorting-Bubble sort-Selection sort-Insertion sort-Shell sort-Radix sort-Hashing-Hash functions-Separate chaining- Open Addressing-Rehashing-Extendible Hashing.

## TEXT BOOKS:

1. Mark Allen Weiss, *"Data Structures and Algorithm Analysis in C++"*, Pearson Education 2014, 4<sup>th</sup> Edition.
2. Reema Thareja, *"Data Structures Using C"*, Oxford Universities Press 2014, 2<sup>nd</sup> Edition.

## REFERENCES:

1. Thomas H.Cormen,Chales E.Leiserson,Ronald L.Rivest, Clifford Stein, *"Introduction to Algorithms"*, McGraw Hill 2009, 3<sup>rd</sup> Edition.
2. Aho, Hopcroft and Ullman, *"Data Structures and Algorithms"*, Pearson Education 2003.

## WEB REFERENCES:

- NPTEL & MOOC courses titled Data Structures
- <https://nptel.ac.in/courses/106106127/>

**OBJECTIVES:**

- To understand the concepts of Object Oriented Programming.
- To learn about the control structures, class with attributes and methods used in Java.

**OUTCOMES:**

- Knowledge of the structure and model of the Java programming language.
- Understand the basic principles of creating Java applications with GUI.
- Demonstrate use of string and String Buffers, Develop multithreaded programs in Java.

## UNIT - I

Introduction to OOPS: Paradigms of Programming Languages – Basic concepts of Object Oriented Programming

– Differences between Procedure Oriented Programming and Object Oriented programming - Benefits of OOPs – Application of OOPs. Java: History – Java features – Java Environment – JDK – API. Introduction to Java: Types of java program – Creating and Executing a Java program – Java Tokens- Java Virtual Machine (JVM) – Command Line Arguments –Comments in Java program.

## UNIT - II

Elements: Constants – Variables – Data types - Scope of variables – Type casting – Operators: Special operators – Expressions – Evaluation of Expressions. Decision making and branching statements- Decision making and Looping– break – labeled loop – continue Statement. Arrays: One Dimensional Array – Creating an array – Array processing – Multidimensional Array – Vectors – ArrayList – Advantages of Array List over Array Wrapper classes.

## UNIT - III

Class and objects: Defining a class – Methods – Creating objects – Accessing class members – Constructors – Method overloading – Static members –Nesting of Methods – this keyword – Command line input. Inheritance: Defining inheritance –types of inheritance– Overriding methods – Final variables and methods – Final classes – Final methods - Abstract methods and classes – Visibility Control- Interfaces: Defining interface – Extending interface - Implementing Interface - Accessing interface variables. Strings: String Array – String Methods – String Buffer Class.

## UNIT - IV

Packages: Java API Packages – System Packages – Naming Conventions –Creating & Accessing a Package – Adding Class to a Package – Hiding Classes. Exception Handling: Limitations of Error handling – Advantages of Exception Handling - Types of Errors – Basics of Exception Handling – try blocks – throwing an exception – catching an exception – finally statement. Multithreading: Creating Threads – Life of a Thread – Defining & Running Thread – Thread Methods – Thread Priority – Synchronization –Implementing Runnable interface – Thread Scheduling.

## UNIT - V

I/O Streams: File – Streams – Advantages - The stream classes – Byte streams –Character streams. Applets: Introduction – Applet Life cycle – Creating & Executing an Applet –Applet tags in HTML – Parameter tag – Aligning the display - Graphics Class: Drawing and filling lines – Rectangles – Polygon – Circles – Arcs – Line Graphs – Drawing Bar charts AWT Components and Even Handlers: Abstract window tool kit – Event Handlers – Event Listeners – AWT Controls and Event Handling: Labels – Text Component – Action Event – Buttons – Check Boxes – Item Event – Choice– Scrollbars – Layout Managers- Input Events – Menus.

**TEXT BOOKS:**

1. E. Balagurusamy, *“Programming with Java”*, TataMc-Graw Hill, 5<sup>th</sup> Edition.
2. Sagayaraj, Denis, Karthick and Gajalakshmi, *“Java Programming for Core and advanced learners”*, Universities

Press (INDIA) Private Limited 2018.

## **REFERENCES:**

1. Herbert Schildt, "*The complete reference Java*", TataMc-Graw Hill, 7<sup>th</sup> Edition.

## **WEB REFERENCES:**

- NPTEL & MOOC courses titled Java
- <https://nptel.ac.in/courses/106105191/>

## **OBJECTIVES:**

- To understand the basic organization of computers and the working of each component and CPU
- To bring the programming features of 8085 Microprocessor and know the features of latest microprocessors.
- To understand the principles of Interfacing I/O devices and Direct Memory accesses

## **OUTCOMES:**

- Describe the major components of a computer system and state their function and purpose
- Describe the microstructure of a processor
- Demonstrate the ability to program a microprocessor in assembly language.
- Classify and describe the operation DMA and peripheral Interfaces.

## **UNIT - I**

Data representation: Data types – Complements- fixed point and floating point representation other binary codes. Register Transfer and Microoperations: Register transfer language- Register transfer- Bus and Memory transfers – Arithmetic, logic and shift micro operations.

## **UNIT - II**

Central processing unit: General register and stack organizations- instruction formats - Addressing modes- Data transfer and manipulation - program control- RISC - Pipelining - Arithmetic and instruction- RISC pipeline - Vector processing and Array processors.

## **UNIT - III**

Microprocessor Architecture and its Operations - 8085 MPU - 8085 Instruction Set and Classifications. Programming in 8085: Code conversion - BCD to Binary and Binary to BCD conversions - ASCII to BCD and BCD to ASCII conversions - Binary to ASCII and ASCII to Binary conversions.

## **UNIT - IV**

Programming in 8085:BCD Arithmetic - BCD addition and Subtraction - Multibyte Addition and Subtraction - Multiplication and Division. Interrupts: The 8085 Interrupt – 8085 Vectored Interrupts –

## **UNIT - V**

Direct Memory Access(DMA)and 8257 DMA controller - 8255A Programmable Peripheral Interface. Basic features of Advanced Microprocessors - Pentium - I3 , I5 and I7.

## **TEXT BOOKS:**

1. M.M. Mano, "Computer System architecture". Pearson, Third Edition, 2007
2. R. S. Gaonkar- "Microprocessor Architecture- Programming and Applications with 8085"- 5<sup>th</sup> Edition- Penram- 2009.
3. Tripti Dodiya & Zakiya Malek, "Computer Organization and Advanced Microprocessors", Cengage Learning, 2012.

## **REFERENCE BOOKS:**

1. Mathur- "Introduction to Microprocessor"- 3<sup>rd</sup> Edition- Tata McGraw-Hill-1993.
2. P. K. Ghosh and P. R. Sridhar- "0000 to 8085: Introduction to Microprocessors for Engineers and Scientists"- 2<sup>nd</sup> Edition- PHI- 1995.

3. NagoorKani- "Microprocessor (8085) and its Applications"- 2<sup>nd</sup> Edition- RBA Publications- 2006.
4. V. Vijayendran- "Fundamentals of Microprocessors – 8085"- S. Viswanathan Pvt. Ltd.- 2008.

### **WEB REFERENCES:**

- NPTEL & MOOC courses titled Computer organization
- <https://nptel.ac.in/courses/106105163/>
- <https://nptel.ac.in/courses/106103068/>



- To implement linear and non-linear data structures
- To understand the different operations of search trees
- To implement graph traversal algorithms
- To get familiarized to sorting and searching algorithms

#### **OUTCOMES:**

- Write functions to implement linear and non-linear data structure operations.
- Suggest appropriate linear and non-linear data structure operations for solving a given problem.
- Analyze various sorting methods.

#### **LIST OF EXERCISES:**

1. Write a Java programs to implement the List ADT using arrays and linked lists.
2. Write a Java programs to implement the following using a singly linked list. Stack ADT (b) Queue ADT
3. Write a java program that reads an infix expression, converts the expression to postfix form and then evaluates the postfix expression (use stack ADT).
4. Write a Java program to implement priority queue ADT.
5. Write a Java program to perform the following operations:
  - (a) Insert an element into a binary search tree.
  - (b) Delete an element from a binary search tree.
  - (c) Search for a key element in a binary search tree.
6. Write a Java program to perform the following operations
  - (a) Insertion into an AVL-tree
  - (b) Deletion from an AVL-tree
7. Write a Java programs for the implementation of BFS for a given graph.
8. Write a Java programs for the implementation of DFS for a given graph.
9. Write a Java programs for implementing the following searching methods:
  - (a) Linear search
  - (b) Binary search.
10. Write a Java programs for implementing the following sorting methods:
  - (a) Bubble sort
  - (b) Selection sort
  - (c) Insertion sort
  - (d) Radix sort.

- To provide a basic idea of Open source technology, their software development process to understand the role and future of open source software in the industry along with the impact of legal, economic and social issues for such software.

## **OUTCOMES:**

- To recognize the benefits and features of Open Source Technology and to interpret, contrast and compare open source products among themselves

## **UNIT- I**

Introduction – Why Open Source – Open Source –Principles, Standards Requirements, Successes – Free Software – FOSS – Internet Application Projects

## **UNIT- II**

Open source – Initiatives, Principles, Methodologies, Philosophy, Platform, Freedom, OSSD, Licenses – Copy right, Copy left, Patent, Zero Marginal Technologies, Income generation opportunities, Internalization

## **UNIT- III**

Case Studies – Apache, BSD, Linux, Mozilla (Firefox), Wikipedia, Joomla, GCC, Open Office.

## **UNIT- IV**

Open Source Project –Starting, Maintaining –Open Source – Hardware, Design, Teaching & Media

## **UNIT- V**

Open Source Ethics – Open Vs Closed Source – Government – Ethics – Impact of Open source Technology – Shared Software – Shared Source

## **TEXT BOOK:**

1. Kailash Vadera, Bhavyesh Gandhi, “*Open Source Technology*”, Laxmi Publications Pvt Ltd 2012, 1st Edition.

## **REFERENCE BOOK:**

1. Fadi P. Deek and James A. M. McHugh, “*Open Source: Technology and Policy*”, Cambridge Universities Press 2007.

## **WEB REFERENCES:**

- Coursera online course – Open Source Software Development Methods - <https://www.coursera.org/learn/open-source-software-development-methods>

- To understand the concept of Computer network
- To impart knowledge about networking and inter networking devices

## OUTCOMES:

- Analyse different network models
- Analyse and compare a number of data link, network and transport layer
- Analysing key networking protocols and their hierarchical relationship in the conceptual model like TCP/IP and OSI

## UNIT - I

Introduction – Network Hardware - Software - Reference Models - OSI and TCP/IP Models - Example Networks: Internet, ATM, Ethernet and Wireless LANs - Physical Layer - Theoretical Basis for Data Communication - Guided Transmission Media.

## UNIT - II

Wireless Transmission - Communication Satellites - Telephone System: Structure, Local Loop, Trunks and Multiplexing and Switching. Data Link Layer: Design Issues - Error Detection and Correction.

## UNIT - III

Elementary Data Link Protocols - Sliding Window Protocols - Data Link Layer in the Internet - Medium Access Layer - Channel Allocation Problem - Multiple Access Protocols - Bluetooth.

## UNIT - IV

Network Layer - Design Issues - Routing Algorithms - Congestion Control Algorithms - IP Protocol - IP Addresses - Internet Control Protocols.

## UNIT - V

Transport Layer - Services - Connection Management - Addressing, Establishing and Releasing a Connection - Simple Transport Protocol - Internet Transport Protocols (ITP) - Network Security: Cryptography.

## TEXT BOOK :

1. A. S. Tanenbaum, “*Computer Networks*”, Prentice-Hall of India 2008, 4<sup>th</sup> Edition.

## REFERENCE BOOKS:

1. Stallings, “*Data and Computer Communications*”, Pearson Education 2012, 7<sup>th</sup> Edition.
2. B. A. Forouzan, “*Data Communications and Networking*”, Tata McGraw Hill 2007, 4<sup>th</sup> Edition.
3. F. Halsall, “*Data Communications, Computer Networks and Open Systems*”, Pearson Education 2008.
4. D. Bertsekas and R. Gallager, “*Data Networks*”, PHI 2008, 2<sup>nd</sup> Edition.
5. Lamarca, “*Communication Networks*”, Tata McGraw Hill 2002.

## WEB REFERENCES:

- NPTEL & MOOC courses titled Computer Networks
- <https://nptel.ac.in/courses/106106091/>

## **OBJECTIVES:**

- To provide students with an overview and understanding of e-commerce with a specific emphasis on Internet Marketing.
- To explore the major issues associated with e-commerce-security, privacy, intellectual property rights, authentication, encryption, acceptable use policies, and legal liabilities.

## **OUTCOMES:**

- Obtain a general understanding of basic business management concepts.
- Have complete knowledge about basic technical concepts relating to E-Commerce.
- Obtain thorough understanding about the security issues, threats and challenges of E-Commerce.

## **UNIT - I**

History of E-commerce and Indian Business Context: E-Commerce –Emergence of the Internet –Emergence of the WWW – Advantages of E-Commerce – Transition to E-Commerce in India – The Internet and India – E-transition Challenges for Indian Corporate. Business Models for E-commerce: Business Model – E-business Models Based on the Relationship of Transaction Parties - E-business Models Based on the Relationship of Transaction Types.

## **UNIT - II**

Enabling Technologies of the World Wide Web: World Wide Web – Internet Client-Server Applications – Networks and Internets – Software Agents – Internet Standards and Specifications – ISP. e-Marketing :Traditional Marketing – Identifying Web Presence Goals – Online Marketing – E-advertising – E-branding.

## **UNIT - III**

E-Security: Information system Security – Security on the Internet – E-business Risk Management Issues – Information Security Environment in India. Legal and Ethical Issues : Cybers talking – Privacy is at Risk in the Internet Age – Phishing – Application Fraud – Skimming – Copyright – Internet Gambling – Threats to Children.

## **UNIT - IV**

e-Payment Systems: Main Concerns in Internet Banking – Digital Payment Requirements – Digital Token-based e-payment Systems – Classification of New Payment Systems – Properties of Electronic Cash – Cheque Payment Systems on the Internet – Risk and e-Payment Systems – Designing e-payment Systems – Digital Signature – Online Financial Services in India - Online Stock Trading.

## **UNIT - V**

Information systems for Mobile Commerce: What is Mobile Commerce? – Wireless Applications –Cellular Network – Wireless Spectrum – Technologies for Mobile Commerce – Wireless Technologies –Different Generations in Wireless Communication – Security Issues Pertaining to Cellular Technology. Portals for E-Business: Portals – Human Resource Management – Various HRIS Modules.

## **TEXT BOOK:**

1. P.T.Joseph, S.J., *"E-Commerce - An Indian Perspective"*, PHI 2012, 4<sup>th</sup> Edition.

## **REFERENCE BOOKS:**

1. David Whiteley , *"E-Commerce Strategy, Technologies and Applications"*, Tata McGraw Hill, 2001.

2. Ravi Kalakota, Andrew B Whinston, "*Frontiers of Electronic Commerce*", Pearson 2006, 12<sup>th</sup> Impression.

### **WEB REFERENCES:**

- <https://www.docsity.com/en/e-commerce-notes-pdf-lecture-notes-university-level/2484734/>
- <https://magnetoitsolutions.com/blog/advantages-and-disadvantages-of-ecommerce>
- [https://www.researchgate.net/publication/320547139ECommerce Merits and Demerits A Review Paper](https://www.researchgate.net/publication/320547139ECommerce_Merits_and_Demerits_A_Review_Paper)

**OBJECTIVES:**

- To be aware of the various open source software available for different problem needs
- To be familiar with the usage of the software like installation and configuration

**OUTCOMES:**

- Students must be able to use appropriate open source tools based on the nature of the problem
- Students should be able to code and compile different open source software

**LIST OF EXERCISES:**

1. Study and usage of Libre Office Suite – Writer, Calc& Impress
2. Text Processing with PERL
3. Simple Applications using PHP
4. Simple Applications using Python
5. Image editing using GIMP
6. Study and usage of Business Intelligence tools – BIRT, JMagallanes
7. Creation of network diagrams using GraphViz
8. Linux Installation
9. Software Configuration in Linux environment.
10. Version Control System using Git.

## **OBJECTIVES:**

- To introduce the software development life cycles
- To introduce concepts related to structured and object oriented analysis & design co
- To provide an insight into UML and software testing techniques

## **OUTCOMES:**

- The students should be able to specify software requirements, design the software using tools
- To write test cases using different testing techniques.

## **UNIT- I**

Introduction – Evolution – Software Development projects – Emergence of Software Engineering.  
Software Life cycle models – Waterfall model – Rapid Application Development – Agile Model – Spiral Model

## **UNIT- II**

Requirement Analysis and Specification – Gathering and Analysis – SRS – Formal System Specification

## **UNIT- III**

Software Design – Overview – Characteristics – Cohesion & Coupling – Layered design – Approaches Function Oriented Design – Structured Analysis – DFD – Structured Design – Detailed design

## **UNIT- IV**

Object Modeling using UML – OO concepts – UML – Diagrams – Use case, Class, Interaction, Activity, State Chart – Postscript

## **UNIT- V**

Coding & Testing – coding – Review – Documentation – Testing – Black-box, White-box, Integration, OO Testing, Smoke testing.

## **TEXT BOOK:**

1. Rajib Mall, "*Fundamentals of Software Engineering*", PHI 2018, 5<sup>th</sup> Edition.

## **REFERENCE BOOKS:**

1. Roger S. Pressman, "*Software Engineering - A Practitioner's Approach*", McGraw Hill 2010, 7<sup>th</sup> Edition.
2. Pankaj Jalote, "*An Integrated Approach to Software Engineering*", Narosa Publishing House 2011, 3<sup>rd</sup> Edition.

## **WEB REFERENCES:**

- NPTEL & MOOC courses titled Software Engineering
- <https://nptel.ac.in/courses/106105182/>

**OBJECTIVES:**

- To understand the fundamental concepts and role of Operating System.
- To learn the Process Management and Scheduling Algorithms
- To understand the Memory Management policies
- To gain insight on I/O and File management techniques

**OUTCOMES:**

- Understand the structure and functions of Operating System
- Compare the performance of Scheduling Algorithms
- Analyze resource management techniques
- Identify the features of I/O and File handling methods

**UNIT - I**

Introduction: Views - Types of System - OS Structure – Operations - Services – Interface- System Calls- System Structure - System Design and Implementation. Process Management: Process - Process Scheduling - Inter-process Communication. CPU Scheduling: CPU Schedulers - Scheduling Criteria - Scheduling Algorithms.

**UNIT - II**

Process Synchronization: Critical- Section Problem - Synchronization Hardware Semaphores - Classical Problems of Synchronization - Monitors. Deadlocks: Characterization - Methods for Handling Deadlocks - Deadlock Prevention - Avoidance - Detection - Recovery.

**UNIT - III**

Memory Management: Hardware - Address Binding – Address Space - Dynamic Loading and Linking – Swapping – Contiguous Allocation - Segmentation - Paging – Structure of the Page Table.

**UNIT - IV**

Virtual Memory Management: Demand Paging - Page Replacement Algorithms - Thrashing. File System: File Concept -. Access Methods - Directory and Disk Structure - Protection - File System Structures - Allocation Methods - Free Space Management.

**UNIT - V**

I/O Systems: Overview - I/O Hardware - Application I/O Interface - Kernel I/O Subsystem - Transforming I/O Requests to Hardware Operations - Performance. System Protection: Goals - Domain - Access matrix. System Security: The Security Problem - Threats – Encryption- User Authentication.

**TEXTBOOK:**

1. Abraham Silberschatz, Peter B Galvin, Gerg Gagne, “*Operating System Concepts*”, Wiley India Pvt.Ltd. 2018, 9<sup>th</sup> Edition.



## REFERENCES:

1. William Stallings, "*Operating Systems Internals and Design Principles*", Pearson, 2018, 9<sup>th</sup> Edition.
2. Andrew S. Tanenbaum, Herbert Bos, "*Modern Operating Systems*", Pearson 2014, 4<sup>th</sup> Edition.

## WEB REFERENCES:

- NPTEL & MOOC courses titled Operating Systems
- <https://nptel.ac.in/courses/106106144/>

- Gain a good understanding of the architecture and functioning of Database Management Systems
- Understand the use of Structured Query Language (SQL) and its syntax.
- Apply Normalization techniques to normalize a database.
- Understand the need of transaction processing and learn techniques for controlling the consequences of concurrent data access.

## **OUTCOMES:**

- Describe basic concepts of database system
- Design a Data model and Schemas in RDBMS
- Competent in use of SQL
- Analyze functional dependencies for designing robust Database

## **UNIT - I**

Introduction to DBMS– Data and Information - Database – Database Management System – Objectives - Advantages – Components - Architecture. ER Model: Building blocks of ER Diagram – Relationship Degree – Classification – ER diagram to Tables – ISA relationship – Constraints – Aggregation and Composition – Advantages

## **UNIT - II**

Relational Model: CODD’s Rule- Relational Data Model - Key - Integrity – Relational Algebra Operations – Advantages and limitations – Relational Calculus – Domain Relational Calculus - QBE.

## **UNIT - III**

Structure of Relational Database. Introduction to Relational Database Design - Objectives – Tools – Redundancy and Data Anomaly – Functional Dependency - Normalization – 1NF – 2NF – 3NF – BCNF. Transaction Processing – Database Security.

## **UNIT - IV**

SQL: Commands – Data types – DDL - Selection, Projection, Join and Set Operations – Aggregate Functions – DML – Modification - Truncation - Constraints – Subquery.

## **UNIT - V**

PL/SQL: Structure - Elements – Operators Precedence – Control Structure – Iterative Control - Cursors - Procedure - Function - Packages – Exceptional Handling - Triggers.

## **TEXT BOOK:**

1. S. Sumathi, S. Esakkirajan, “*Fundamentals of Relational Database Management System*”, Springer International Edition 2007.

## **REFERENCE BOOKS:**

1. Abraham Silberchatz, Henry F. Korth, S. Sudarshan, “*Database System Concepts*”, McGrawHill 2019, 7<sup>th</sup> Edition.
2. Alexis Leon & Mathews Leon, “*Fundamentals of DBMS*”, Vijay Nicole Publications 2014, 2<sup>nd</sup> Edition.

## **WEB REFERENCES:**

- NPTEL & MOOC courses titled Relational Database Management Systems
- <https://nptel.ac.in/courses/106106093/>
- <https://nptel.ac.in/courses/106106095/>

- To learn Process management and scheduling.
- To understand the concepts and implementation of memory management policies.
- To understand the various issues in Inter Process Communication.

#### **OUTCOMES:**

- Understand the process management policies and scheduling process by CPU.
- Analyze the memory management and its allocation policies.
- To evaluate the requirement for process synchronization.

#### **PROGRAM LIST:**

1. Basic I/O programming.  
To implement CPU Scheduling Algorithms:
2. Shortest Job First Algorithm.
3. First Come First Served Algorithm.
4. Round Robin and Priority Scheduling Algorithms.
5. To implement reader/writer problem using semaphore.
6. To implement Banker's algorithm for Deadlock avoidance.  
Program for page replacement algorithms:
7. First In First Out Algorithm.
8. Least Recently Used Algorithm.
9. To implement first fit, best fit and worst fit algorithm for memory management.
10. Program for Inter-process Communication.

- Learn the various DDL and DML commands
- Understand queries in SQL to retrieve information from data base
- Understand PL/SQL statements: Exception Handling, Cursors, and Triggers.
- Develop database applications using front-end and back-end tools.

#### **OUTCOMES:**

- Implement the DDL , DML Commands and Constraints
- Create, Update and query on the database.
- Design and Implement simple project with Front End and Back End.

#### **LIST OF EXERCISES**

- 1) DDL commands with constraints.
- 2) DML Commands with constraints.
- 3) SQL Queries: Queries, sub queries, Aggregate function
- 4) PL/SQL : Exceptional Handling
- 5) PL/SQL : Cursor
- 6) PL/SQL : Trigger
- 7) PL/SQL : Packages
- 8) Design and Develop Application for Library Management
- 9) Design and Develop Application for Student Mark Sheet Processing
- 10) Design and Develop Application for Pay Roll Processing

- To understand Web based programming and scripting languages.
- To learn the basic web concepts and to create rich internet applications that use most recent client-side programming technologies.
- To learn the basics of HTML, DHTML, XML, CSS, Java Script and AJAX.

## OUTCOMES:

- Ability to Develop and publish Web pages using Hypertext Markup Language (HTML).
- Ability to optimize page styles and layout with Cascading Style Sheets (CSS).
- Ability to Understand, analyze and apply the role of languages to create a capstone
- Website using client-side web programming languages like HTML, DHTML, CSS, XML, JavaScript, and AJAX.

## UNIT I:

HTML: HTML-Introduction-tag basics- page structure-adding comments working with texts, paragraphs and line break. Emphasizing test- heading and horizontal rules-list-font size, face and color-alignment-links-tables-frames

## UNIT II:

Forms & Images Using Html: Graphics: Introduction-How to work efficiently with images in web pages, image maps, GIF animation, adding multimedia, data collection with html forms textbox, password, list box, combo box, text area, tools for building web page front page

## UNIT III:

XML & DHTML: Cascading style sheet (CSS)-what is CSS-Why we use CSS-adding CSS to your web pages-Grouping styles-extensible markup language (XML). Dynamic HTML: Document object model (DCOM)-Accessing HTML & CSS through DCOM Dynamic content styles & positioning-Event bubbling-data binding.

## UNIT IV:

JavaScript : Client side scripting, What is JavaScript, How to develop JavaScript, simple JavaScript, variables, functions, conditions, loops and repetition, Advance script, JavaScript and objects, JavaScript own objects, the DOM and web browser environments, forms and validations

## UNIT V:

Ajax: Introduction, advantages &disadvantages, Purpose of it, ajax based web application, alternatives of ajax

Java Script & AJAX: Introduction to array-operators, making statements-date & time-mathematics-strings-Event handling- form properties. AJAX. Introduction to jQuery and AngularJS.

## TEXT BOOKS:

1. Pankaj Sharma, “*Web Technology*”, Sk Kataria & Sons Bangalore 2011.(UNIT I, II, III & IV).
2. Mike Mcgrath, “*Java Script*”, Dream Tech Press 2006, 1<sup>st</sup> Edition. (UNIT V:JAVASCRIPT)
3. Achyut S Godbole & Atul Kahate, “*Web Technologies*”, 2002, 2<sup>nd</sup> Edition. (UNIT V: AJAX)

## REFERENCE BOOKS:

- Laura Lemay, Rafe Colburn , Jennifer Kyrnin, “*Mastering HTML, CSS & Javascript Web Publishing*”, 2016.
- [DT Editorial Services](#) (Author), “*HTML 5 Black Book (Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP, jQuery)*”, Paperback 2016, 2<sup>nd</sup> Edition.
- C. Xavier, “*World Wide Web Design with HTML*”, TMH Publishers 2001.
- Wendy Willard, “*A Beginners Guide HTML*”, Tata McGraw Hill 2009, 4<sup>th</sup> Edition.

## **WEB REFERENCES:**

- NPTEL & MOOC courses titled Web Design and Development.
- <https://www.udemy.com/topic/web-design/>

- To learn about data mining Concepts
- To study the different data mining techniques

#### **OUTCOMES:**

- To have knowledge in Data mining concepts
- To apply Data mining concepts in different fields

#### **UNIT - I**

Basic Data Mining Tasks – Data Mining Versus Knowledge Discovery in Data Bases – Data Mining Issues – Data Mining Matrices – Social Implications of Data Mining – Data Mining from Data Base Perspective.

#### **UNIT - II**

Data Mining Techniques – a Statistical Perspective on data mining – Similarity Measures – Decision Trees – Neural Networks – Genetic Algorithms.

#### **UNIT - III**

Classification: Introduction – Statistical – Based Algorithms – Distance Based Algorithms – Decision.

#### **UNIT - IV**

Clustering Tree – Based Algorithms – Neural Network Based Algorithms – Rule Based Algorithms – Combining Techniques: Introduction – Similarity and Distance Measures – Outliers – Hierarchical Algorithms. Partitioned Algorithms.

#### **UNIT - V**

Association Rules: Introduction - Large Item Sets – Basic Algorithms – Parallel & Distributed Algorithms – Comparing Approaches – Incremental Rules – Advanced Association Rules Techniques – Measuring the Quality of Rules.

#### **TEXT BOOK:**

1. Jiawei Han & Micheline Kamber, "*Data Mining Concepts & Techniques*", 2011, 3<sup>rd</sup> Edition.

#### **REFERENCE BOOK:**

1. Margaret H. Dunham, "*Data Mining Introductory and Advanced Topics*", Pearson Education 2003.

## **WEB REFERENCES:**

- NPTEL & MOOC courses titled Data Mining
- <https://nptel.ac.in/courses/106105174/>



- To make the student understand the basic concepts of mobile application development, be aware of Characteristics of mobile applications, User-interface design, basics of graphics and multimedia.
- To gain knowledge about testing and publishing of Android application

## **OUTCOMES:**

- To explain the basics of mobile application development
- Develop Android application with User interface, networking and animation.
- Use simulator tools to test and publish the application.

## **UNIT - I**

Mobile Application Development - Mobile Applications and Device Platforms - Alternatives for Building Mobile Apps -Comparing Native vs. Hybrid Applications -The Mobile Application Development Lifecycle-The Mobile Application Front-End-The Mobile Application Back-End-Key Mobile Application Services-What is Android-Android version history-Obtaining the Required Tools- Launching Your First Android Application-Exploring the IDE-Debugging Your Application-Publishing Your Application

## **UNIT - II**

Understanding Activities-Linking Activities Using Intents-Fragments-Displaying Notifications- Understanding the Components of a Screen-Adapting to Display Orientation-Managing Changes to Screen Orientation- Utilizing the Action Bar-Creating the User Interface Programmatically Listening for UI Notifications

## **UNIT - III**

Using Basic Views-Using Picker Views -Using List Views to Display Long Lists-Understanding Specialized Fragments - Using Image Views to Display Pictures -Using Menus with Views-Using WebView- Saving and Loading User Preferences-Persisting Data to Files-Creating and Using Databases.

## **UNIT - IV**

Sharing Data in Android-Creating Your Own Content Providers -Using the Content Provider- SMS Messaging - Sending Email-Displaying Maps- Getting Location Data- Monitoring a Location.

## **UNIT - V**

Consuming Web Services Using HTTP-Consuming JSON Services- Creating Your Own Services - Binding Activities to Services -Understanding Threading .

## **TEXT BOOK:**

1. Jerome DiMarzio, "*Beginning Android Programming with Android Studio*", 4<sup>th</sup> Edition.

## **REFERENCE BOOKS:**

1. Dawn Griffiths, David Griffiths, "*Head First Android Development: A Brain-Friendly Guide*", 2017.
2. Neil Smyth , "*Android Studio 3.0 Development Essentials: Android*", 8<sup>th</sup> Edition.
3. Pradeep Kothari, "*Android Application Development (With Kitkat Support)*", Black Book 2014.

## **WEB REFERENCES:**

- <https://developer.android.com/guide>
- [https://en.wikipedia.org/wiki/Android\\_10](https://en.wikipedia.org/wiki/Android_10)
- Develop App for Free
- <https://flutter.dev/>
- <http://ai2.appinventor.mit.edu>

- [https://en.wikipedia.org/wiki/Android\\_version\\_history](https://en.wikipedia.org/wiki/Android_version_history)
- <https://aws.amazon.com/mobile/mobile-application-development/> (Unit 1)
- [https://en.wikipedia.org/wiki/Mobile\\_app\\_development](https://en.wikipedia.org/wiki/Mobile_app_development)

- To give overall view of Mobile application development
- Develop and Publish Android applications using Graphical user interface
- Develop and Publish Android application which can use Location and network services

## **OUTCOMES:**

At the end of the course, the student should be able to:

- Use Emulator tools to design and develop applications

## **Exercises**

1. Develop an application that finds greatest among three numbers using GUI Components
2. Develop an application to display your personal details using GUI Components
3. Develop an application that uses the radio button
4. Develop an application that uses the image button
5. Develop an application that uses Alert Dialog Box
6. Develop an application that uses Layout Managers.
7. Develop an application that uses audio mode (NORMAL, SILENT, VIBRATE)
8. Develop an application that uses to send messages from one mobile to another mobile.
9. Develop an application that uses to send email
10. Develop an application for mobile calls.
11. Develop an application for Student Mark sheet processing
12. Develop an application for Login Page in Database.
13. Develop an application for Google map locator (optional)

## **WEB REFERENCES:**

**Develop the App online**

- <https://flutter.dev/>
- <http://ai2.appinventor.mit.edu>

The aim of the mini project is that the student has to understand the real time software development environment. The student should gain a thorough knowledge in the problem, he/she has selected and the language / software, he/she is using.

## **Project planning:**

The B.Sc (Computer Science / Software Application)/BCA Major Project is an involved exercise, which has to be planned well in advance. The topic should be chosen in the beginning of final year itself. Related reading training and discussions of first internal project viva voce should be completed in the first term of final year.

### **I Selection of the project work**

Project work could be of three types.

#### **a) Developing solution for real life problem**

In this case a requirement for developing a computer-based solution already exists and the different stages of system development life cycle is to be implemented successfully. Examples are accounting software for particular organization, computerization of administrative function of an organization, web based commerce etc.

#### **b) System Software Project**

Projects based on system level implementation. An example is a Tamil language editor with spell checker, compiler design.

#### **b) Research level project**

These are projects which involve research and development and may not be as a structured and clear cut as in the above case. Examples are Tamil character recognition, neural net based speech recognizer etc. This type of projects provides more challenging opportunities to students.

### **II Selection of team**

To meet the stated objectives, it is imperative that major project is done through a team effort. Though it would be ideal to select the team members at random and this should be strongly recommended, due to practical consideration students may also be given the choice of forming themselves into teams with three members. A team leader shall be selected. Team shall maintain the minutes of meeting of the team members and ensure that tasks have been assigned to every team member in writing. Team meeting minutes shall form a part of the project report. Even if students are doing project as groups, each one must independently take different modules of the work and must submit the report.

### **III Selection of Tools**

No restrictions shall be placed on the students in the choice of platform/tools/languages to be utilized for their project work, though open source is strongly recommended, wherever possible. No value shall be placed on the use of tools in the evaluation of the project.

### **IV Project management**

Head of the Department / Principal of the college should publish the list of student's project topic, internal guide and external organization and teams agreed before the end of July. Changes in this list may be permitted for valid reasons and shall be considered favorably by the Head of the department / Principal of the college any time before commencement of the project. Students should submit a fortnightly report of the progress, which could be indication of percentage of completion of the project work. The students should ideally keep a daily activity book. Team meeting should be documented and same should be submitted at the end of the project work.

### **v Documentation**

Three copies of the project report must be submitted by each student (one for department library, one for the organization where the project is done and one for the student himself/herself). The final outer

dimensions of the project report shall be 21cm X 30 cm. The color of the flap cover shall be light blue. Only hard binding should be done. The text of the report should be set in 12 pt, Times New Roman, 1.5 spaced.

Headings should be set as follows: CHAPTER

HEADINGS 16 pt, Arial, Bold, All caps, Centered.

1. Section Headings 14 pt Bookman old style, Bold, Left adjusted.

1.1 Section Sub-heading 12 pt, Bookman old style.

Title of figures tables etc are done in 12 point, Times New Roman, Italics, centered.

Content of the Project should be relevant and specify particularly with reference to the work. The report should contain the requirement specification of the work, Analysis, Design, Coding, testing and Implementation strategies done.

- Organizational overview (of the client organization, where applicable)
- Description of the present system
- Limitations of the present system

- The Proposed system - Its advantages and features
- Context diagram of the proposed system
- Top level DFD of the proposed system with at least one additional level of expansion
- Program List (Sample code of major functions used)
- Files or tables (for DBMS projects) list. List of fields or attributes (for DBMS projects) in each file or table.
- Program – File table that shows the files/tables used by each program and the files are read, written to, updated, queried or reports were produced from them.
- Screen layouts for each data entry screen.
- Report formats for each report.

### **Some general guidelines on documentation are:**

1. Certificate should be in the format: **"Certified that this report titled.....is a bonafide record of the project work done by Sri/ Kum ..... under our supervision and guidance, towards partial fulfillment of the requirement for award of the Degree of B.Sc Computer Science/BCA of XXX College"** with dated signature of internal guide, external guide and also Head of the Department/ College.

2. If the project is done in an external organization, another certificate on the letterhead of the organization is required: **"Certified that his/her report titled .....is a bonafide record of the project work done by Sri/Kum.....under my supervision and guidance, at the .....department of..... (Organization) towards partial fulfillment of the requirement for the award of the Degree of B.Sc (Computer Science)/BCA of XXX College.**

3. Page numbers shall be set at right hand bottom, paragraph indent shall be set as 3.

4. Only 1.5 space need be left above a section or subsection heading and no space may be left after them.

5. References shall be IEEE format (see any IEEE magazine for detail) While doing the project keep note of all books you refer, in the correct format and include them in alphabetical order in your reference list.

## **VI Project Evaluation:**

### **Internal Assessment**

There shall be six components that will be considered in assessing a project work with weightage as indicated.

1. Timely completion of assigned tasks as evidenced by team meeting minutes 20%
2. Individual involvement, team work and adoption of industry work culture 10%
3. Quality of project documentation (Precision, stylistics etc) 10%
4. Achievement of project deliverables 20%
- 5 Effective technical presentation of project work 10%
6. Viva 30%

Based on the above 6 components internal mark (10) can be awarded.

### **External Assessment**

Dissertation/Project submitted at the end of third year shall be valued by two examiners appointed by the Controller for the conduct of practical exam. The board of examiners shall award 40 marks based on the following components.

1. Achievement of project deliverables - 15 Marks
2. Effective technical presentation of project work - 10 Marks
3. Project Viva - 15 Marks

There shall be a common written examination conducted for all the candidates in each group together for a minimum of 10 minutes.

- (i) Requirement Specification of Project
- (ii) Design of Project
- (iii) Testing and Implementation of Project

- This course introduces the tools and menus to master PHOTOSHOP and Dream Weaver

## **OUTCOMES:**

- To design interactive Web pages
- To design small Web pages using PHOTOSHOP and Dream Weaver

### **UNIT I:**

Basics of Adobe Photoshop – Getting started with Photoshop – title bar – Menu bar - option bar – tool box – screen modes.

### **UNIT II:**

Introduction to digital Image editing , Create your own painted images – Edited scanned images – import rendered visuals – Working with images and colors

### **UNIT III:**

Using tools and palettes – selection tools, Painting and editing tools – menu commands – creating type – change the type settings – styles

### **UNIT IV:**

Methods and Techniques of Adobe Photoshop - Layers – working with layers – merging layers –linking layers – transforming layers and layer effects- filters

### **UNIT V:**

Getting started with Dreamweaver – creating web applications with Dreamweaver.

### **BOOKS FOR REFERENCE :**

1. Greenberg, *“Photoshop – The Complete reference”*, TMH.
2. *“Dream Weaver – Complete reference”*.

### **WEB REFERENCE:**

- NPTEL & MOOC courses titled web application.
- <https://www.coursera.org/courses?query=web%20application>

- The major objective in introducing the Computer Skills course is to impart training for students in Microsoft Office which has different components like MS Word, MS Excel and Power point. The course is highly practice oriented rather than regular class room teaching.

## **OUTCOMES:**

- To perform documentation
- To perform accounting operations
- To perform presentation skills

## **UNIT - I**

Introductory concepts: History - Generation - Classification - Block diagram - Memory unit – CPU.

## **UNIT - II**

Input Devices: Key board, Mouse and Scanner. Output devices: Monitor, Printer. Introduction to Operating systems & its features: DOS – UNIX – Windows. Introduction to Programming Languages: C, C++ and its features.

## **UNIT - III**

Word Processing: Open, Save and close word document; Editing text – tools, formatting, bullets; Spell Checker - Document formatting – Paragraph alignment, indentation, headers and footers, numbering; printing – Preview, options, merge .

## **UNIT - IV**

Spreadsheets: Excel – opening, entering text and data, formatting, navigating; Formulas – entering, handling and copying; Charts – creating, formatting and printing.

## **UNIT - V**

Power point: Introduction to Power point - Features – Understanding slide types – creating & viewing slides – creating slide shows. Applying special object – including objects & pictures – Slide transition – Animation effects.

## **TEXT BOOKS:**

1. Alexis Leon and Mathews Leon, "*Fundamentals of information technology*", Leon Press 1999, 2<sup>nd</sup> Edition.
2. Peter Norton, "*Introduction to Computers*", Tata McGraw Hill.

## **REFERENCE BOOK:**

1. Jennifer Ackerman Kettel, Guy Hat-Davis, Curt Simmons, "*Microsoft 2003*", Tata McGraw Hill.

## **WEB REFERENCE:**

- NPTEL & MOOC courses titled Office Automation.
- [https://www.livewireindia.com/microsoftoffice\\_automation\\_software\\_training.php](https://www.livewireindia.com/microsoftoffice_automation_software_training.php)



- This course introduces to the tags used in HTML

## **OUTCOMES:**

- To use Knowledge of HTML and the basic tools that every Web page coder needs to know
- To implement modern Web pages with HTML

## **UNIT I:**

Introduction : Web Basics: What is Internet – Web browsers – What is Web page – HTML Basics: Understanding tags.

## **UNIT II:**

Tags for Document structure( HTML, Head, Body Tag). Block level text elements: Headings paragraph(<p> tag) – Font style elements: (bold, italic, font, small, strong, strike, big tags)

## **UNIT III:**

Lists: Types of lists: Ordered, Unordered – Nesting Lists – Other tags: Marquee, HR, BR- Using Images – Creating Hyperlinks.

## **UNIT IV:**

Tables: Creating basic Table, Table elements, Caption – Table and cell alignment – Rowspan, Colspan – Cell padding.

## **UNIT V:**

Frames: Frameset – Targeted Links – No frame – Forms : Input, Textarea, Select, Option.

## **RECOMMENDED TEXTS:**

1. Laura Lemay, *“HTML Complete Reference, Teach Yourself Web Publishing with HTML”*.

## **REFERENCE BOOKS:**

1. E Stephen Mack, Janan Platt, *“HTML”*.

## **WEB REFERENCE:**

- NPTEL & MOOC courses titled HTML.
- <https://www.codecademy.com/learn/learn-html>

- This course introduces the techniques used in Photoshop

## **OUTCOMES:**

- To build web applications targeting with single codebase.
- To use various features to build hybrid web application.

## **LIST OF EXERCISES:**

1. Working with the clone stamp tool
2. Drawing Watch using custom shapes
3. Testing lab mode
4. Using multichannel mode
5. Using the sponge Tool
6. Antique framing
7. Creating a supernova
8. Adding an arrowhead.
9. Isolating a Complex Image
10. Removing an element from an image
11. Captain kirk myopia effect
12. Adjusting the focus
13. Creating an edge mask
14. Applying Transformations
15. Correcting brightness and contrast.

- To acquire knowledge on editor, spread sheet and presentation software.

## **OUTCOME:**

- To demonstrate the ability to apply application software in an office environment.

## **LIST OF EXERCISES:**

### **MS-WORD**

1. Text Manipulation: Write a paragraph about your institution and Change the font size and type, Spell check, Aligning and justification of Text
2. Bio data: Prepare a Bio-data.
3. Find and Replace: Write a paragraph about yourself and do the following. Find and Replace - Use Numbering Bullets, Footer and Headers.
4. Tables and manipulation: Creation, Insertion, Deletion (Columns and Rows). Create a mark sheet.
5. Mail Merge: Prepare an invitation to invite your friends to your birthday party. Prepare at least five letters.

### **MS-EXCEL**

1. Data sorting-Ascending and Descending (both numbers and alphabets)
2. Mark list preparation for a student
3. Individual Pay Bill preparation.
4. Invoice Report preparation.
5. Drawing Graphs. Take your own table.

### **MS-POWERPOINT**

1. Create a slide show presentation for a seminar.
2. Preparation of Organization Charts
3. Create a slide show presentation to display percentage of marks in each semester for all students
  1. Use bar chart(X-axis: Semester, Y-axis: % marks).
  2. Use different presentation template different transition effect for each slide.

- This course introduces to the programming in HTML

## **OUTCOME:**

- To implement modern Web pages with HTML

## **LIST OF EXERCISES:**

1. Write a script to create an array of 10 elements and display its contents.
2. Create a simple calculator using form fields. Have two fields for number entry and one field for the result. Allow the user to be able to use plus, minus, multiply and divide.
3. Create a document and add a link to it. When the user moves the mouse over the link, it should load the linked document on its own. (user is not required to click on the link)
4. Create a document which opens a new window without a toolbar, address bar or a status bar that unloads itself after one minute.
5. Design an HTML page that includes document structure tags, title, line break, multiple headings and link to e-mail address.
6. Create an HTML file which is the main page with an image and some text messages along with hyperlinks which is linked to various pages. The navigation should be such that the links take you to the appropriate page and then back to the main page.
7. Create a HTML page to demonstrate the usage of Frames. Choose the content of the page on your own.
8. Design an application for pay slip through HTML forms.

## **OBJECTIVES:**

- To learn how to determine security requirements that mesh effectively with your business objectives, create policies that work for your organization, and use technology to implement your policies.

## **OUTCOMES:**

- Students should be able to understand various security threats.
- Students should be able to understand various encryption algorithms.

### **UNIT - I**

Protection versus security; aspects of security–data integrity, data availability, privacy; security problems, user authentication, Orange Book.

### **UNIT - II**

Program threats, worms, viruses, Trojan horse, trap door, stack and buffer overflow; system threats- intruders; communication threats- tapping and piracy.

### **UNIT - III**

Substitution, transposition ciphers, symmetric-key algorithms-Data Encryption Standard, advanced encryption standards, public key encryption - RSA; Diffie-Hellman key exchange, ECC cryptography, Message Authentication- MAC, hash functions.

### **UNIT - IV**

Symmetric key signatures, public key signatures, message digests, public key infrastructures.

### **UNIT - V**

Intrusion detection, auditing and logging, tripwire, system-call monitoring;

## **TEXT BOOKS:**

1. William Stallings, "*Cryptography and Network Security*", Pearson Education March 2013, 6<sup>th</sup> Edition,
2. C. Pfleeger and SL Pfleeger, "*Security in Computing*", Prentice Hall of India 2007, 3<sup>rd</sup> Edition.

## **REFERENCE BOOK:**

1. D. Gollmann, "*Computer Security*", John Wiley and Sons NY 2002.

## **WEB REFERENCES:**

- NPTEL & MOOC courses titled Information security
- <https://nptel.ac.in/courses/106106129/>

**OBJECTIVE:**

- To learn the basic concepts, models and statements of Operation Research theory which are frequently applied to business decision making.

**OUTCOME:**

- To make use of simplex method to solve optimization problems.
- To utilize PERT and CPM in project management.

**UNIT-I:**

Basics of Operations Research (OR): Characteristics of O.R - Necessity of O.R in Industry -OR and Decision making - Role of computers in O.R. Linear programming: Formulations and Graphical solution (of 2 variables) canonical & standard terms of Linear programming problem. Algebraic solution: Simplex method.

**UNIT-II:**

Algebraic solution: Charnes method of penalties - two phase simplex method - concept of Duality - properties of duality - Dual simplex method.

**UNIT-III:**

Transportation model: Definition - formulation and solution of transportation models - the row - minima, column - minima, matrix minima and vogel's approximation methods. Assignment model: Definition of Assignment model

- comparison with transportation model- formulation and solution of Assignment model - variations of Assignment problem.

**UNIT-IV:**

Sequencing problem: Processing each of n jobs through m machines - processing n jobs through 2 machines - processing n jobs through 3 machines - processing 2 jobs through m machines - processing n jobs through m machines - travelling salesman problem. Game Theory: Characteristics of games -Maximin, Minimax criteria of optimality – Dominance property - algebraic and graphical method of solution of solving 2 x 2 games.

**UNIT-V:**

Pert - CPM: Networks - Fulkerson's Rule - measure of activity - PERT computation - CPM computation - resource scheduling. Simulation: Various methods of obtaining random numbers for use in computer simulation - Additive, multiplicative and mixed types of congruence random number generators - Monte Carlo method of simulation - its advantages and disadvantages.

**RECOMMENDED TEXTS:**

1. Hamdy A. Taha, *“Operation Research - An Introduction”*, Prentice Hall of India, Pvt. Ltd. New Delhi 1996, 5<sup>th</sup> Edition
2. Ackoff R.L. and Sasieni M. W, *“Fundamentals of Operations Research”*, John Wiley and sons New York 1968.
3. Charnes A. Cooper W. and Hendersen A. , *“ Introduction to Linear Programming”*, Wiley and Sons New York 1953.

4. Srinath L.S, "PERT and CPM principles and applications", Affiliated East West Press Pvt. Ltd. New York 1973.

**WEB REFERENCES:**

- <http://ocw.mit.in>
- <http://ebooks.lpude.in.operationsresearch>

## **OBJECTIVES:**

- To understand the basic concepts of Multimedia Systems
- To learn representations, perceptions and applications of Multimedia

## **OUTCOMES:**

- To understand the technologies behind multimedia applications

## **UNIT- I**

Definition - Classification - Multimedia application -Multimedia Hardware - Multimedia software - CDROM - DVD.

## **UNIT-II**

Multimedia Audio: Digital medium - Digital audio technology - sound cards - recording - editing - MP3 - MIDI fundamentals - Working with MIDI - audio file formats - adding sound to Multimedia project.

## **UNIT-III**

Multimedia Text: Text in Multimedia -Multimedia graphics: coloring - digital imaging fundamentals - development and editing - file formats - scanning and digital photography

## **UNIT-IV**

Multimedia Animation: Computer animation fundamentals - Kinematics - morphing - animation s/w tools and techniques. Multimedia Video : How video works - broadcast video standards - digital video fundamentals – digital video production and editing techniques - file formats.

## **UNIT-V**

Multimedia Project : stages of project - Multimedia skills - design concept - authoring - planning and costing –Multimedia Team. Multimedia-looking towards Future: Digital Communication and New Media, Interactive Television, Digital Broadcasting, Digital Radio, Multimedia Conferencing

## **TEXT BOOKS:**

1. S.Gokul, "*Multimedia Magic*", BPB Publications, 2<sup>nd</sup> Edition.
2. Tay Vaughen, "*Multimedia Making it Work*", TMH, 6<sup>th</sup> Edition.

## **REFERENCE BOOKS:**

1. Kiran Thakrar,Prabhat k.andleigh, "*Multimedia System Design*", Prentice Hall India, 1<sup>st</sup> Edition.
2. Malay k Pakhira , "*Computer graphics,Multimedia and Animation*", Prentice Hall India, 2<sup>nd</sup> Edition.

## **WEB REFERENCES:**

- NPTEL & MOOC courses titled Multi media
- <https://nptel.ac.in/courses/106105163/>
- W3schools.com/html/html-media.asp



**OBJECTIVES:**

- To define and highlight importance of software project management.
- To formulate and define the software management metrics & strategy in managing projects

**OUTCOMES :**

- Knowledge gained to train software project managers and other individuals involved in software project planning and tracking and oversight in the implementation of the software project management process

**UNIT - I**

Introduction to Competencies - Product Development Techniques - Management Skills - Product Development Life Cycle - Software Development Process and models - The SEI CMM - International Organization for Standardization.

**UNIT - II**

Managing Domain Processes - Project Selection Models - Project Portfolio Management - Financial Processes - Selecting a Project Team - Goal and Scope of the Software Project - Project Planning - Creating the Work Breakdown Structure - Approaches to Building a WBS - Project Milestones - Work Packages - Building a WBS for Software.

**UNIT - III**

Tasks and Activities - Software Size and Reuse Estimating - The SEI CMM - Problems and Risks - Cost Estimation - Effort Measures - COCOMO: A Regression Model - COCOMO II - SLIM: A Mathematical Model - Organizational Planning - Project Roles and Skills Needed.

**UNIT - IV**

Project Management Resource Activities - Organizational Form and Structure - Software Development Dependencies - Brainstorming - Scheduling Fundamentals - PERT and CPM - Leveling Resource Assignments - Map the Schedule to a Real Calendar - Critical Chain Scheduling.

**UNIT - V**

Quality: Requirements – The SEI CMM - Guidelines - Challenges - Quality Function Deployment - Building the Software Quality Assurance - Plan - Software Configuration Management: Principles - Requirements - Planning and Organizing - Tools - Benefits - Legal Issues in Software - Case Study

**TEXT BOOK:**

1. Robert T. Futrell, Donald F. Shafer, Linda I. Safer, *"Quality Software Project Management"*, Pearson Education Asia 2002.

**REFERENCE BOOKS:**

1. Pankaj Jalote, *"Software Project Management in Practice"*, Addison Wesley 2002.
2. Hughes, *"Software Project Management"*, Tata McGraw Hill 2004, 3<sup>rd</sup> Edition.

**WEB REFERENCES:**

- NPTEL & MOOC courses titled Software Project Management
- [www.smartworld.com/notes/software-project-management](http://www.smartworld.com/notes/software-project-management)

## **OBJECTIVES:**

- To understand the concepts of Internet of Things and the application of IoT.
- To Determine the Market perspective of IoT.
- To Understand the vision of IoT from a global context

## **OUTCOMES:**

After learning the course, the student able to:

- Use of Devices, Gateways and Data Management in IoT.
- Design IoT applications in different domain and be able to analyze their performance
- Implement basic IoT applications on embedded platform

## **UNIT - I**

IoT & Web Technology, The Internet of Things Today, Time for Convergence, Towards the IoT Universe, Internet of Things Vision, IoT Strategic Research and Innovation Directions, IoT Applications, Future Internet Technologies, Infrastructure, Networks and Communication, Processes, Data Management, Security, Privacy & Trust, Device Level Energy Issues, IoT Related Standardization, Recommendations on Research Topics.

## **UNIT - II**

M2M to IoT – A Basic Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. M2M to IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.

## **UNIT - III**

IoT Architecture -State of the Art – Introduction, State of the art, Architecture. Reference Model-Introduction, Reference Model and architecture, IoT reference Model, IoT Reference Architecture-Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views.

## **UNIT - IV**

IoT Applications for Value Creations Introduction, IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, Value Creation from Big Data and Serialization, IoT for Retailing Industry, IoT For Oil and Gas Industry, Opinions on IoT Application and Value for Industry, Home Management, eHealth.

## **UNIT - V**

Internet of Things Privacy, Security and Governance Introduction, Overview of Governance, Privacy and Security Issues, Contribution from FP7 Projects, Security, Privacy and Trust in IoT-Data-Platforms for Smart Cities, First Steps Towards a Secure Platform, Smartie Approach. Data Aggregation for the IoT in Smart Cities, Security

## **TEXT BOOK:**

1. Vijay Madiseti and ArshdeepBahga, "*Internet of Things: (A Hands-on Approach)*", Universities Press (INDIA) Private Limited 2014, 1<sup>st</sup> Edition.

## **REFERENCE BOOKS:**

1. Michael Miller, "*The Internet of Things: How Smart TVs, Smart Cars, Smart Homes, and Smart Cities Are Changing the World*", kindle version.
2. Francis daCosta, "*Rethinking the Internet of Things: A Scalable Approach to Connecting Everything*", Apress Publications 2013, 1<sup>st</sup> Edition,.
3. WaltenequsDargie, ChristianPoellabauer, "*Fundamentals of Wireless Sensor Networks: Theory and Practice*"

4..CunoPfister, *“Getting Started with the Internet of Things”*, O’Reilly Media 2011.

## **WEB REFERENCES:**

- <https://github.com/connectIoT/iottoolkit>
- <https://www.arduino.cc/>
- <http://www.zettajs.org/>

## **OBJECTIVE:**

- To make the student understand the basic concepts of data analytics, be familiar with the data analytics life cycle, learn the basics of R Language, be exposed to data pre-processing, model creations and visualizing the results using R.

## **OUTCOMES:**

- Write R program to pre-process the data for analytics.
- Understand the various methods to analyze the data and create models.
- Present the analytics results to using visualization techniques.

## **UNIT - I**

Introduction to Big Data Analytics - Big Data Overview - State of the Practice in Analytics-Key Roles for the New Big Data Ecosystem -Examples of Big Data Analytics - Data Analytics Lifecycle - Data Analytics Lifecycle Overview - Phase 1: Discovery -Phase 2: Data Preparation -Phase 3: Model Planning -Phase 4: Model Building -Phase 5: Communicate Results - Phase 6: Operationalize- What is R - Why R -Advantages of R Over Other Programming Languages-Handling Packages in R

## **UNIT - II**

Getting Started with R-Working with Directory- Data Types in R-Few Commands for Data Exploration-Challenges of Analytical Data Processing- Expression, Variables and Functions-Missing Values Treatment in R - Using the 'as Operator to Change the Structure of Data - Vectors -Matrices -Factors -List -Few Common Analytical Tasks- Aggregating and Group Processing of a Variable-Simple Analysis Using R- Methods for Reading Data-Comparison of R GUIs for Data Input- Using R with Databases and Business Intelligence

## **UNIT - III**

Exploring Data in R-Data Frames-R Functions for Understanding Data in Data frames-Load Data Frames-Exploring Data- Data Summary-Finding the Missing Values - Invalid Values and Outliers - Descriptive Statistics-Spotting Problems in Data with Visualization -Linear Regression Using R - Model Fitting - Linear Regression-Assumptions of Linear Regression- Validating Linear Assumption- Logistic Regression-What is Regression-Introduction to Generalized Linear Models- Logistic Regression- Binary Logistic Regression-Diagnosing Logistic Regression - Multinomial Logistic Regression Models

## **UNIT - IV**

Decision Tree-What is a Decision Tree-Decision Tree Representation in R- Appropriate Problems for Decision Tree Learning- Basic Decision Tree Learning Algorithm-Measuring Features- Hypothesis Space Search in Decision Tree Learning- Inductive Bias in Decision Tree Learning-Why Prefer Short Hypotheses - Issues in Decision Tree Learning-What is Time Series Data - Reading Time Series Data - Plotting Time Series Data - Decomposing Time Series Data-Forecasts using Exponential Smoothing-ARIMA Models.

## **UNIT - V**

Clustering -What is Clustering-Basic Concepts in Clustering- Hierarchical Clustering -k-means Algorithm-CURE Algorithm  
-Clustering in Non-Euclidean Space-Clustering for Streams and Parallelism - Association Rules - Frequent Itemset- Data Structure Overview - Mining Algorithm

Interfaces - Auxiliary Functions-Sampling from Transactions-Generating Synthetic Transaction Data -Additional Measures of Interestingness - Distance based Clustering Transactions and Associations.

### **TEXT BOOKS:**

1. *"Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data"*, EMC Education Services 2015.
2. Seema Acharya, *"Data Analytics using R"*, McGraw Hill Education 2018, 1st Edition.

### **REFERENCE BOOKS:**

1. Anil Maheshwari, *"Data Analytics Made Accessible"*.
2. Michael Milton, *"Head First Data Analysis"*.
3. V.K.Jain, *"Data Science and Analytics"*.

### **WEB REFERENCES:**

- <https://analytics.google.com/analytics/academy/course/6>
- <https://www.youtube.com/watch?v=D2YcHRilzCk>
- [https://online-learning.harvard.edu/subject/data-anaysis.](https://online-learning.harvard.edu/subject/data-anaysis)
- <https://analytics.google.com/analytics/academy/>

## **DEPARTMENT OF ECS:-**

**APPENDIX – 25(S) UNIVERSITY  
OF MADRAS**

**CHOICE BASED CREDIT SYSTEM**

**B.Sc. DEGREE COURSE IN ELECTRONICS AND  
COMMUNICATION SCIENCE**

**REVISED SYLLABUS  
(w.e.f.2013-14)**

**CORE 1 – BASIC CIRCUIT THEORY**

<b>SUBJECT CODE:</b>	<b>THEORY</b>	<b>MARKS: 100 INTERNAL: 25 EXTERNAL: 75</b>
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**CREDITS: 4**

**SEMESTER: I**

**COURSE OBJECTIVES:**

1. To apply circuit theorems to simplify and find solutions to electrical circuits.
2. To solve simple circuits using ohm's law, Kirchhoff's laws and the properties of the elements.
3. To build up basic problem solving skills through organizing available information and applying circuit laws.
4. To Build up strong problem solving skills by effectively formulate a circuit problem into a mathematical problem using circuit laws and theorems.
5. To Simplify circuits using series and parallel equivalents and using Thevenin and Norton equivalents
6. To understand transient circuit response.

**UNIT I**

**RESISTORS & CAPACITORS** – Introduction to linear and non linear components (active and passive) - Types of resistors – Wire wound, Carbon composition , film type, Cermets', fusible resistors – Resistor color coding – Power rating of resistors – Series and Parallel combinations of resistors

Capacitor – Capacitor connected to a battery – Capacitance – Factors controlling capacitance – Types of capacitors – Fixed capacitors – Non electrolytic & electrolytic capacitors – Variable capacitors – Voltage rating of capacitors – stray circuit capacitors – leakage resistance – Capacitors in series & Parallel – Energy stored in capacitors – Troubles in capacitors – Checking of capacitors with Ohmmeter.

**UNIT II**

**FUNDAMENTALS OF ELECTRICAL ELEMENTS** – Circuits – Identifying the elements & the connected terminology Introduction – Ohms law – Kirchhoff's current law – Kirchhoff's voltage law – Voltage division technique – Concepts of series circuit - Current division technique – Concepts of parallel circuits –Internal

resistance of sources – Method of solving a circuit by Kirchhoff's laws – Loop analysis – Nodal analysis – simple problems.

### **UNIT III**

**NETWORK THEOREMS** – Super position theorem – Thevenin's theorem – Norton's theorem – Thevenin– Norton conversion - theorem statement & simple problems.

### **UNIT IV**

**INDUCTORS & TRANSFORMERS** – Inductors – Air core – Iron core – Ferrite core – Comparison of different cores – Inductance of a Inductor – Mutual Inductance – Coefficient of coupling – variable inductors – Inductors in series & Parallel without M – Reactance & Impedance offered by a coil – Q factor – Testing of inductor using multimeter.

Transformer working – Turns ratio – voltage ratio – current ratio – power in secondary – autotransformers – transformer efficiency – core losses – Types of cores.

### **UNIT V**

**ANALYSIS OF AC CIRCUIT** – Generation of alternative EMF – Terminology – rms or effective value – average value of AC – form factor – Peak factor. Pure resistive circuit – Pure inductive circuit – Pure capacitive circuit – R- L- Series circuit - R-C series circuit – R-L-C series circuit – Resonance – Resonance in series R-L-C circuit –

#### **TEXT BOOKS:**

1. Sedha R.S. A TextBook of Applied Electronics, S. Chand & Company Ltd.
2. Muthusubramanian R. , Salivahanan S. Basic Electrical and Electronics Engineering, Tata McGraw Hill Education private Limited.
3. B.L., Narayanamoorthi M and others, Electricity & Magnetism - National Publishing Co., Chennai.
4. Murugeshan, R. Electricity & Magnetism by R. S. Chand & Company Ltd.

#### **REFERENCE BOOKS:**

1. Theraja V, Basic Electronics Solid state, S. Chand & Company Ltd.
2. Bernard Grob, Basic Electronics, McGraw-Hill Book Company

#### **WEBSITES:**

1. Khan academy.org
2. NPTEL

3. <http://www.electronicsteacher.com>
4. <http://www.science-ebooks.com>
5. <http://www.abcofelectronics.com>
6. [www.ocw.mit.edu](http://www.ocw.mit.edu)
7. [www.academic.earth](http://www.academic.earth)

**Note:** There is no change in the non major elective papers.



## CORE 2 – MAIN PRACTICALS - 1

<b>SUBJECT CODE:</b>	<b>PRACTICAL</b>	<b>MARKS: 100</b> <b>INTERNAL: 40</b> <b>EXTERNAL: 60</b>
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**CREDITS: 4**

**SEMESTER: I**

**(At least Seven experiments should be done for the Examination)**

1. Study of, CRO, Multimeter and other Testing devices (**Study Purpose**)
2. Testing of components
3. To verify Ohm's Law using voltmeter & ammeter.
4. Study of Kirchoff's law
5. Resistance in series & parallel.
6. Capacitance in series & parallel.
7. Study of super position theorem
8. Verification of Thevenin's Theorem.
9. Study of RC circuit – Series Resonance.
10. Study of Series Resonance RLC Circuits.

### REFERENCE BOOKS

1. Zbar, Malvino and Miller, Basic Electronics, A Text Lab Manual, Tata McGraw Hill.
2. Sugaraj Samuel R., Horsley Solomon, B.E.S. Practicals.

## CORE 3 – BASIC ELECTRONICS

<b>SUBJECT CODE:</b>	<b>THEORY</b>	<b>MARKS: 100</b> <b>INTERNAL: 25</b> <b>EXTERNAL: 75</b>
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**CREDITS: 4**

**SEMESTER: II**

### COURSE OBJECTIVES:

1. To understand the use of diodes as power supply rectifiers.
2. To understand the operation of transistors as switching circuits.
3. To learn the tools and techniques of practical electronics and circuit design.
4. To understand the fundamentals of operation of the main semiconductor electronic devices.

5. To understand the fundamentals of special purpose diodes.
6. To familiarize the student with the analysis and design of basic transistor amplifier circuit.

## UNIT I

**BONDING IN SOLIDS** – Cohesive energy – Types of bonds in crystals – Ionic – Covalent – Metallic – Molecular & Hydrogen bonds.

## UNIT II

**SEMICONDUCTOR BASICS** – Conductor – Semiconductor – Introduction to Intrinsic and Extrinsic semiconductor – P type and N type semiconductor – PN junction diode – V-I characteristics – Half wave, Full wave & Bridge rectifier – expression for efficiency and ripple factor - Construction of Basic logic gates using Diodes

## UNIT III

**SPECIAL PURPOSE DIODES** – Zener and Avalanche Break down, Zener diode - V-I characteristics regulated power supply using Zener diode- LED, Photodiode, PIN Diode, Varactor Diode, Tunnel Diode – Principle, Working & Applications.

## UNIT IV

**TRANSISTORS** – Transistor symbols NPN & PNP – Transistor biasing for active, saturation & cutoff - Operation of a BJT - Characteristics of a transistor in CE, CB & CC modes – Early effect – Punch-through – Transistor testing  
– Transistor as a switch – Transistor as an amplifier – UJT - VI characteristics - Construction of Basic logic gates using Transistors (qualitative analysis)

## UNIT V

**FIELD EFFECT TRANSISTORS** – FET – Construction - Working - Static – Transfer characteristics – Parameters of FET – FET as an amplifier – MOSFET – Enhancement MOSFET – Depletion MOSFET – Construction & Working – Drain characteristics of MOSFET – Comparison of JFET & MOSFET.

## TEXT BOOKS

1. Charles Kittel, (2004) , (8<sup>th</sup> edition), Introduction to Solid State Physics
2. S.O. Pillai., (6<sup>th</sup> edition), Solid State Physics, New Age International (P) Limited.
3. Theraja B.L., Basic Electronics Solid state, S. Chand & Company Ltd.
4. Albert Paul Malvino, Donald P. Leach, Digital principles and applications, McGraw-Hill
5. Godse A.P., Bakshi U.A., (2009), (1<sup>st</sup> edition), Electronics Devices, Technical Publications Pune.

## **REFERENCE BOOKS**

1. Roy Choudary D., Shail Jain, Linear Integrated Circuits, New Age International Pvt. Ltd., 2000.
2. Sedha R.S., A TextBook of Applied Electronics, S. Chand & Company Ltd.
3. Jacob Millman and Christos C. Halkias (2008) Integrated Electronics, Tata Mcgraw-Hill

4. Robert L. Boylestad, Louis Nashelsky (10<sup>th</sup> edition), Electron Devices and Circuit Theory, Dorling Kindersley(India Pvt. Ltd.)

## WEBSITES

- Khan academy.org
- NPTEL
- <http://www.electronicsteacher.com>
- <http://www.science-ebooks.com>
- <http://www.abcoelectronics.com>
- [www.ocw.mit.edu](http://www.ocw.mit.edu)
- [www.academic.earth](http://www.academic.earth)

## CORE 4 – MAIN PRACTICALS - II

<b>SUBJECT CODE:</b>	<b>PRACTICAL</b>	<b>MARKS: 100</b> <b>INTERNAL: 40</b> <b>EXTERNAL: 60</b>
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**CREDITS: 4**

**SEMESTER: II**

**(At least seven experiments should be done for the Examination)**

1. V-I Characteristics of Junction Diode.
2. Rectifier circuits – Half Wave, Center-tapped Full wave.
3. Bridge Rectifier.
4. V-I Characteristics of Zener Diode.
5. Regulated Power Supply using Zener Diode.
6. Transistor as a switch.
7. Transistor Characteristics of CE Configuration.
8. Logic gates using Diodes.
9. Logic gates using Transistor.
10. Characteristics of UJT.
11. Characteristics of JFET

## REFERENCE BOOKS

1. Zbar, Malvino and Miller, Basic Electronics, A Text Lab Manual, Tata McGraw Hill.
2. Sugaraj Samuel R., Horsley Solomon, B.E.S. Practicals.
3. Srinivasan M. N., and Others, A text book of practical Physics, Sultan Chand and Sons, New Delhi.

# CORE 5 – AMPLIFIERS AND OSCILLATORS

<b>SUBJECT CODE:</b>	<b>THEORY</b>	<b>MARKS: 100</b> <b>INTERNAL: 25</b> <b>EXTERNAL: 75</b>
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**CREDITS: 4**

**SEMESTER: III**

## **COURSE OBJECTIVES:**

1. To understand the operations and the applications of the various classes of an Amplifier.
2. To study the operation of Push-Pull Amplifier.
3. To familiarize the student with the analysis and design of basic transistor amplifier circuits, feedback amplifiers, wave shaping and multi vibrator circuits.
4. To study the effect on Input Impedance and Frequency on Common Emitter Amplifier.
5. To study the operation of Hartley, Colpitts, RC Phase shift, crystal and wien bridge oscillators.
6. To determine the operating characteristic of Unijunction Transistor Oscillator.

## **UNIT I**

**AMPLIFIERS** – General principles of small signal amplifiers – Load line analysis AC & DC – classifications of amplifiers – RC coupled amplifiers – Working - Frequency response (Qualitative Analysis) – Concept of Multistage amplifiers – Transformer coupled amplifiers – Working - Frequency response (Qualitative Analysis) - Direct Coupled amplifier – working - emitter follower.

**POWER AMPLIFIERS** - Class A – Single ended amplifier - Class B Transformer coupled pushpull amplifier – Crossover distortion – Complementary Symmetry Class-B Push-Pull Amplifier - power dissipation and output power calculations.

## **UNIT II**

**FEEDBACK AMPLIFIERS** – Principles of feedback amplifiers – Transfer gain with feedback – General characteristics of negative feedback amplifier – effect of negative feedback on gain – gain stability – distortion and Bandwidth – Types of feedback.

## **UNIT III**

**OSCILLATORS** – Feedback requirements of oscillators – Barkhausen Criterion for oscillation – Hartley, Colpitts, Phase shift and Wien bridge oscillators - Working – Frequency of oscillations – Crystal oscillator – UJT Relaxation oscillator.

## **UNIT IV**

**OPERATIONAL AMPLIFIERS** – Op-Amp supply voltages – IC identification - Op-Amp parameters - Op-Amp as a voltage amplifier – Inverting amplifier – non-inverting amplifier – Voltage follower.

IC 555 timer - pin functions - internal architecture

## UNIT V

**OP-AMP CIRCUITS** – Summing amplifier – Differential amplifier – Op-amp frequency response – Comparator – Integrator – Differentiator – Triangular Wave generators – Square Wave generators – Active filter(Basics) - Low pass filter - High pass filter – Band pass filter – Sample & Hold Circuits.

**IC 555 APPLICATIONS** - Astable, Monostable and Schmitt trigger.

### TEXT BOOKS:

1. Jacob Millman and Christos C.Halkias, Integrated Electronics, McGraw Hill.
2. D.Roy Choudary, Shail Jain, Linear Integrated Circuits, New Age International Pvt. Ltd., 2000.
3. Sedha, R.S. A TextBook of Applied Electronics, S. Chand & company Ltd.
4. Ramakant A. Gayakwad, OP-AMP and Linear ICs, 4th Edition, Prentice Hall / Pearson Education, 1994.
5. G.K.Mithal, Basic Electronic Devices and circuits, 2nd Edition, G.K.Publishers Pvt. Ltd., 1998.

### REFERENCE BOOKS:

1. Allen Mottershead, Electronic Devices and Circuits-an Introduction - Prentice Hall.
2. Mithal G.K., Electronic Devices and Circuits, Khanna Publishers.
3. Donald L.Schilling, Charles Belove, Discrete and Integrated Electronic Circuits, McGraw Hill.
5. Jacob Millman, Micro Electronics, McGraw Hill.

### WEBSITES:

1. Khan academy.org
2. NPTEL
3. <http://www.electronicsteacher.com>
4. <http://www.science-ebooks.com>
5. <http://www.abcofelectronics.com>
6. [www.ocw.mit.edu](http://www.ocw.mit.edu)
7. [www.academic.earth](http://www.academic.earth)

## CORE 6 – MAIN PRACTICALS - III

<b>SUBJECT CODE:</b>	<b>PRACTICAL</b>	<b>MARKS: 100</b> <b>INTERNAL: 40</b> <b>EXTERNAL: 60</b>
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**CREDITS: 4**

**SEMESTER: III**

**[At least 4 from experiments (1-8) and 4 from experiments (9-16)]**

1. Single stage R-C Coupled Amplifier
2. Emitter Follower
3. FET Amplifier
4. Colpitt's Oscillator

5. Hartley Oscillator
6. R-C phase Shift Oscillator
7. Relaxation Oscillator
8. IC Regulated Power Supply
9. OPAMP – Inverting and Non-inverting modes, Unity Follower
10. Operational Summing Amplifiers – Inverting and non-inverting modes.
11. OPAMP – Integrator and Differentiator
12. OPAMP – Square wave generator
13. OPAMP – Sine Wave Generator
14. Monostable multivibrators using IC 555 timer
15. Astable multivibrator using IC 555 timer
16. Schmitt Trigger using IC 555 timer.

## REFERENCE BOOKS

1. Zbar, Malvino and Miller, Basic Electronics, A Text Lab Manual, Tata McGraw Hill.
2. Sugaraj Samuel R., Horsley Solomon, B.E.S. Practicals.
3. Srinivasan M. N., and Others, A text book of practical Physics, Sultan Chand and Sons, New Delhi.

## CORE 7 – DIGITAL ELECTRONICS

<b>SUBJECT CODE:</b>	<b>THEORY</b>	<b>MARKS: 100</b> <b>INTERNAL: 25</b> <b>EXTERNAL: 75</b>
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**CREDITS: 4 SEMESTER: IV**

### COURSE OBJECTIVES:

1. To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.
2. To perform decimal, octal, hexadecimal, and binary conversions.
3. To apply Boolean algebra to solve logic functions.
4. To implement simple logical operations using combinational and sequential logic circuits.
5. To identify and differentiate digital electronics applications.

## UNIT I

**NUMBER SYSTEMS AND CODES** – Decimal, binary, octal, hex numbers, conversion from one to another – codes, BCD, excess 3, gray codes conversion from one to another – Error detection codes.



## **UNIT II**

**BOOLEAN ALGEBRA AND THEOREMS** – Basic, Universal logic gates – Boolean Identities - Boolean theorems De Morgan's Theorem – sum of products, products of sums expressions, simplification by Karnaugh Map method, simplification based on basic Boolean theorems – don't care conditions.

## **UNIT III**

**COMBINATIONAL DIGITAL CIRCUITS** – Arithmetic Building blocks, Half & Full Adders and Half & Full Subtractors, BCD adders – multiplexers, De-multiplexers, encoders, decoders – Characteristics for Digital ICs - RTL, DTL, TTL, ECL CMOS (NAND & NOR Gates).

## **UNIT IV**

**SEQUENTIAL DIGITAL CIRCUITS** – Flip-flops, RS, Clocked SR, JK, D, T, master-slave Flip flop – Conversion of Flip flop - shift registers – ripple counters – synchronous counters and asynchronous counters (4-bit counter).

## **UNIT V**

**BLOCK DIAGRAM OF MEMORY DEVICE** – ROM Organization - PROM Organization – PLA (Programmable Logic Array) – PAL (Programmable Array Logic) – Realization of functions using PROM

### **TEXT BOOKS**

1. R.P. Jain, "Modern digital Electronics", 3rd Edition, TMH, 2003.
2. Puri, V.K., Digital Electronics, Tata Mc Graw Hill
3. Marris mano M., Computer System Architecture, 2nd Edition, Prentice Hall, 1998
4. Malvino and Leach, Digital Principles and applications, McGraw Hill, 1996 IV Edition

### **REFERENCE BOOKS**

1. Millman J., Micro Electronics, McGraw Hill International Book Company, New Delhi 1990 Edition.
2. William H. Gothman, Digital electronics – An int. to theory and practice, 2nd Edition, PHL of India, 2007.
3. Morris Mano M., "Digital Logic and Computer Design" PHI 2005.
4. Morris Mano M. "Digital Design" PHI 2005.
5. Godse A.P., Digital Electronics, Technical Publications.

### **WEBSITES**

1. Khan academy.org
2. NPTEL
3. <http://www.electronicsteacher.com>
4. <http://www.abcofelectronics.com>

5. [www.ocw.mit.edu](http://www.ocw.mit.edu)

## **CORE 8 - MAIN PRACTICAL - IV**

<b>SUBJECT CODE:</b>	<b>PRACTICAL</b>	<b>MARKS: 100</b> <b>INTERNAL: 40</b> <b>EXTERNAL: 60</b>
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**CREDITS: 4**

**SEMESTER: IV**

**(At least EIGHT experiments should be done for the Examination)**

1. Universality of NAND & NOR gates.
2. Verification of Boolean laws using NAND gates (Associative, Commutative & Distributive Laws)
3. Verification of Boolean laws using NOR gates (Associative, Commutative & Distributive Laws)
4. Sum of Products using NAND gates and Product of Sums using NOR Gates.
5. 4-bit binary parallel adder and Subtractor IC 7483
6. Counter using IC 7473
7. Study of RS, D, T and JK Flip-Flops with IC's.
8. Study of Encoder & Decoder.
9. Study of Multiplexer & De-Multiplexer.
10. Half and Full Adder using Simple & NAND Gates.
11. Half and Full Subtractor using Simple & NAND Gates.
12. Study of 7490 BCD Counter – MOD Counters.
13. BCD to Seven segment decoder 7447/7448.

### **REFERENCE BOOKS**

1. Zbar, Malvino and Miller ,Basic Electronics, A Text Lab Manual , Tata McGraw Hill.
2. R.Sugaraj Samuel & Horsley Solomon, B.E.S. Practical .

## **CORE 9 - MICROPROCESSOR (INTEL 8085)**

<b>SUBJECT CODE:</b>	<b>THEORY</b>	<b>MARKS: 100</b> <b>INTERNAL: 25</b> <b>EXTERNAL: 75</b>
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**CREDITS: 4**

**SEMESTER: V**

### **COURSE OBJECTIVES:**

1. To know the microprocessor as a programmable digital system element.
2. To illustrate some basic concepts of microprocessors through the use of assembly language programming.

3. To develop an in-depth understanding of the operation of microprocessors and machine language programming & interfacing techniques.
4. To design simple interfaces to Intel-8085.
5. To Comprehend the various peripheral interface circuits that are necessary for the operation of Intel-8085.

## UNIT I

**ARCHITECTURE OF 8085 MICROPROCESSOR** – Demultiplexing address / data bus – Control Signal Generation and status signals – 8085 – pin-out diagram & functions - Interrupts - Priority Concept

**INSTRUCTION SET OF 8085** – Instruction classification – addressing modes

## UNIT II

**MEMORY**– Instruction cycle – machine cycle – T-state -Timing diagrams for Opcode Fetch Cycle Memory Read, Memory Write, I/O Read, I/O Write, – Functional explanation for RAM, ROM, EPROM, EEPROM.

## UNIT III

**PROGRAMMING EXERCISES** – addition & subtraction(16-bit), multiplication, division, largest, smallest, block transfer (all 8-bit data), Binary to BCD, BCD to Binary, Binary to ASCII, ASCII to Binary, BCD to ASCII, ASCII to BCD (all 8-bit data) - Stack & Subroutines Concept – time delay using single register & calculations – Debugging a program.

## UNIT IV

**INTERFACING MEMORY** – 2K X 8, 4K X 8 ROM, RAM to 8085, Interfacing an I/O port in Memory Mapped I/O and I/O Mapped I/O – Difference between I/O mapped and Memory Mapped I/O.

## UNIT V

**MICROPROCESSOR APPLICATIONS** – Programmable peripheral devices (8255, 8253) – Pin functions, Different Modes & Block Diagram - Keyboard and Display Interface 8279 (Architecture) - Simple temperature controller – Simple traffic light controller.

### TEXT BOOKS

1. Ramesh S. Gaonakar, Microprocessor Architecture, Programming and Application with the 8085-Penram International Publishing, Mumbai.
2. Ram, Fundamentals of microprocessors and microcomputers-Dhanpat Rai Publications, New Delhi
3. Vijayendran, Fundamentals of microprocessor-8085 – S. Viswanathan publishers, Chennai.

### REFERENCE BOOKS

1. Mathur A.P., Introduction to Microprocessors., (3rd edn., Tata McGraw, New Delhi, 1995).
2. Leventhal L.A., Microprocessor Organisation and Architecture, Prentice Hall India.

### **WEBSITES:**

- Khan academy.org
- NPTEL
- [www.ocw.mit.edu](http://www.ocw.mit.edu)
- [www.academic.earth](http://www.academic.earth)

# **CORE 10 - ANTENNAS AND TELEVISION ENGINEERING**

<b>SUBJECT CODE:</b>	<b>THEORY</b>	<b>MARKS: 100</b> <b>INTERNAL: 25</b> <b>EXTERNAL: 75</b>
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**CREDITS: 4**

**SEMESTER: V**

**COURSE OBJECTIVES:**

1. To provide the basic knowledge about the fundamentals of antenna.
2. To describe the electromagnetic radiation with application to antenna theory and design.
3. To make the students understand the radio wave propagation phenomena in modern communication systems.
4. To understand the applications of the electromagnetic waves in free space.
5. To study the analysis and synthesis of TV Pictures, Composite Video Signal, Receiver Picture tubes and Television Camera Tubes.
6. To study the various Color Television systems with a greater emphasis on television standards.
7. To study the advanced topics in digital television and High definition television.

## **UNIT I**

**FUNDAMENTALS OF ANTENNA** – Antenna parameters – Gain and directivity – Efficiency – Effective length – Bandwidth – Beam width – Radiation resistance – Polarization – Grounded and ungrounded antenna's – Effects of antenna height – Radiation Patterns

## **UNIT II**

**TYPES OF ANTENNAS** – Microwave antenna's – Parabolic antenna – Horn antenna's – Lens antenna – Disc one antenna – Rhombic antenna.

## **UNIT III**

**WAVE PROPAGATION** – Electromagnetic radiation – Propagation of Waves – Surface wave propagation – sky wave propagation – space wave propagation – Tropospheric scatter propagation – Virtual height – MUF – skip distance – Ionospheric abnormalities – Introduction to waveguide.

## **UNIT IV**

**ELEMENTS OF TV SYSTEM** – Picture transmission and reception – Sound transmission and reception – Synchronization – Receiver Controls – Colour

television – Transmission & Reception – Image continuity – Number of Scanning lines – Scanning – Sequential – Interlaced Scanning – Picture tubes – Monochrome and colour picture tubes (Delta gun picture tube).

## UNIT V

**CAMERA TUBES** – Image orthicon – Plubicon– color television system – fundamental concepts of three colour system – additive and subtractive colours.

**ADVANCE TECHNIQUES** – Introduction of CCD camera – HDTV – Digital TV – Video disc – Cable TV - VCR

### TEXT BOOKS

1. Srinivasan. K.S., Analog Modulation & Systems
2. Srinivasan. K.S. Digital Communication
3. Bakshi K.A., Bakshi A.V., Bakshi U.A., Antenna & wave propagation, (Technical publications 2009)
4. Gulati R. R., Monochrome and Colour Television (Wiley Eastern, New Delhi, 1995).

### REFERNCE BOOKS:

1. Raju G.S.N., (2004) Antenna & wave propagation, Pearson education India.
2. Grob B., Basic Television and Video Systems,, McGraw Hill.
3. Veera Lakshmi A., Srivel R., (2010) Television And Video Engineering ( Ane Books India,)

### WEBSITES:

1. Khan academy.org
2. NPTEL
3. <http://www.electronicsteacher.com>
4. [www.ocw.mit.edu](http://www.ocw.mit.edu)
5. [www.academic.earth](http://www.academic.earth)

## CORE 11 - ELECTRICAL AND ELECTRONICS INSTRUMENTATION

<b>SUBJECT CODE:</b>	<b>THEORY</b>	<b>MARKS: 100</b> <b>INTERNAL: 25</b> <b>EXTERNAL: 75</b>
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**CREDITS: 4**

**SEMESTER: V**

### COURSE OBJECTIVES:

1. To introduce the basic concepts related to the operation of Electrical and Electronic Measuring Instruments.
2. To study the basics of design of analog and digital circuits used in electronic instrumentation.
3. To understand basic electronic instrument terminology.
4. To understand the proper application of electronic instruments.



## **UNIT I**

**DC INDICATION INSTRUMENTS** – PMMC Galvanometer (D' Arsonal Movement) – Principle, Construction and Working – Conversion of Galvanometer into Ammeter, Voltmeter and Ohmmeter (Series and Shunt Types) – Multimeter – Loading Effect.

**AC INDICATING INSTRUMENTS** – Electrodynamometer – Principle, Construction and Working – Merits and Demerits – Rectifier Type Instruments – thermocouple Instruments (Contact & Non-contact types) – electrostatic Voltmeters – Principle, construction and Working – Watt-hour Meter.

## **UNIT II**

**DC BRIDGES** – Wheatstone bridge – Determination of resistance – Kelvin Double Bridge – Determination of resistance.

**AC BRIDGES** – Maxwell's Bridge – Determination of Self-Inductance – Wien's Bridge – Determination of Frequency – Schering's Bridge – Determination of Capacitance.

## **UNIT III**

**OSCILLOSCOPES** – Block Diagram – Deflection Sensitivity – electrostatic Deflection – Electrostatic Focusing – CRT Screen – Measurement of Waveform frequency, phase difference and Time Intervals – Sampling Oscilloscope – Storage Oscilloscopes (Introduction).

## **UNIT IV**

**INSTRUMENTATION AMPLIFIERS AND SIGNAL ANALYZER** – Instrumentation amplifier – Electronic Voltmeter – Electronic Multimeter – Digital Voltmeter – Ohm meter – Function Generation – Wave analyzer – Fundamentals of Spectrum Analyzer.

## **UNIT V**

**TRANSDUCERS AND DISPLAY DEVICES** – Strain gauge, Linear voltage differential transformer(LVDT), Resistance Thermometer – Photoelectric Transducer – LED,LCD – Seven Segment Display.

### **TEXT BOOKS**

1. W.D. Cooper & A.D. Helfrick, Electronic Instrumentation and Measurement Techniques –Prentice Hall of India.
2. A.K. Sawhney, A course in Electrical and Electronic Measurements and Instrumentation –Dhanpat Rai and Sons.
3. P.B. Zbar, Electronic Instruments & Measurements –McGraw Hill International.

## WEBSITES

- Khan academy.org
- NPTEL
- [www.ocw.mit.edu](http://www.ocw.mit.edu)
- [www.academic.earth](http://www.academic.earth)

## **CORE 12 - MAIN PRACTICALS - V**

<b>SUBJECT CODE:</b>	<b>PRACTICAL</b>	<b>MARKS: 100</b> <b>INTERNAL: 40</b> <b>EXTERNAL: 60</b>
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**CREDITS: 4**

**SEMESTER: V**

**(At least EIGHT experiments should be done for the Examination) Programs using Intel 8085**

1. Addition & Subtraction (8 & 16-bits)
2. Multiplication & Division (8 – bit)
3. Square and Square root
4. Largest & Smallest number in the given array.
5. Ascending & Descending order.
6. Binary to ASCII & ASCII to Binary, BCD to ASCII & ASCII to BCD.
7. Block Transfer of Data.
8. Waveform generation using DAC interface.

### **Communication**

9. Amplitude Modulation and detection.
10. Frequency Modulation and detection.
11. Pulse Amplitude Modulation and detection.
12. Pulse Width Modulation and detection.
13. Pulse Position Modulation and detection.

### **BOOKS FOR REFERENCE**

1. Zbar, Malvino and Miller, Basic Electronics, A Text Lab Manual, Tata McGraw Hill.
2. Sugaraj Samuel R., Horsley Solomon, B.E.S. Practicals.
3. Vijayendran V., Fundamentals of microprocessor-8085, S .Viswanathan publishers, Chennai.

# CORE 13 - MICROCONTROLLER

<b>SUBJECT CODE:</b>	<b>THEORY</b>	<b>MARKS: 100</b> <b>INTERNAL: 25</b> <b>EXTERNAL: 75</b>
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**CREDITS: 4**

**SEMESTER: VI**

## **COURSE OBJECTIVES:**

1. To Familiarize with different types of Microcontroller.
2. To know 8051 microcontroller in detail.
3. To learn Programming and Interfacing with 8051 microcontroller.
4. To develop an in-depth understanding of the operation of microcontrollers & interfacing techniques.
5. To Understand and use various IO devices such as keypads, stepper motor, A to D and
6. To learn D to A converters.

## **UNIT I**

**8051 ARCHITECTURE** – Introduction to Microcontroller – Comparison of Microcontroller & Microprocessor – 8051 Microcontroller – Block diagram – I/O pins, ports and circuits – External memory – Counter and Timers – Serial data I/O – Interrupts.

## **UNIT II**

**8051 INSTRUCTION SET** - Addressing Modes – Logical operation: Byte level - Bit level – Rotate And Swap operation.

**ARITHMETIC OPERATION** Instructions affecting flags – Incrementing and Decrementing - Addition – Subtraction – Multiplication and Division – Example Program.

## **UNIT III**

**JUMP AND CALL INSTRUCTION** – Introduction – The Jump and Call program Range – Jumps: Bit – Byte Unconditional: Calls and Subroutine – Interrupts and Returns – Example program.

## **UNIT IV**

**INTERFACING** – Keyboards – Displays - Stepper motor – ADC & DAC.

## **UNIT V**

**INTRODUCTION TO MICROCONTROLLERS** – 6509 – PIC controllers - 6575 series – Introduction to Embedded Systems.

## TEXT BOOKS

1. Kenneth J. Ayala, "The 8051 Microcontroller, Architecture, Program and Application" , Pen ram International.
2. . Muhammed Ali Mazidi, Janice Gillispie Mazidi "The 8051 Microcontroller and Embedded Systems" – Low Price Edition.
3. Microcontrollers: Theo & App by Ajay V.Deshmuk Tata McGraw-Hill Education,2005..

## REFERNCE BOOKS

1. Microcontroller Hand Book, INTEL, 2008.
2. Microprocessor, Microcontroller & Applications by D.A Godse A.P Godse Technical Publications 2008.

## WEBSITES

1. Khan academy.org
2. NPTEL
3. <http://www.electronicsteacher.com>
4. <http://www.science-ebooks.com>
5. <http://www.abcofelectronics.com>
6. [www.ocw.mit.edu](http://www.ocw.mit.edu)
7. [www.academic.earth](http://www.academic.earth)

## CORE 14 - ADVANCED ELECTRONICS

<b>SUBJECT CODE:</b>	<b>THEORY</b>	<b>MARKS: 100</b> <b>INTERNAL: 25</b> <b>EXTERNAL: 75</b>
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**CREDITS: 4 SEMESTER: VI**

### COURSE OBJECTIVES:

1. To understand the fundamentals of optoelectronics and principles of the optoelectronic devices operation.
2. To be familiar with recent trends in optoelectronics.
3. To study the basic concepts of smart phones.
4. To understand the fundamental concepts of nanoelectronics.

## UNIT I

**OPTOELECTRONIC DEVICES** – Introduction – Classification of OPTO Electronic Devices – Laser Diode - Photoconductive cells (Photo resistive cell, Photo diode, Avalanche Diode) – PhotoVoltaic Cell (or) Solar Cell – Laser Range Finder - Light-activated SCR (LASCR) – Optical Isolator.

## UNIT II

**MEMS** – MEMS Definition – Materials for MEMS Manufacturing (Silicon, Polymers, Ceramics, Metals) - MEMS basic processes - Deposition processes, Patterning, Etching (Only Introductory Level) – Mentioning of Applications of MEMS.

## UNIT III

**Smart Phones** – Symbian – Symbian- Android (operating system – Apple iPhone - Windows Phone - Palm OS - Bada operating system - Open-source development

## UNIT IV

**Nanoelectronics** – Concept of 3D, 2D & 0D Nano Structures

## UNIT V

Voice & Data communication - Wired/Wireless - Communication using IP networks, SDH, Routers.

### TEXT BOOKS

1. Karl Goser, Peter Glosekotter, Jan Dienstuhl Nanoelectronics and Nanosystems , Springer, 2004
2. Dr.Arumugam M., Semiconductor Physics and Opto electronics, 1st Edition, Anuradha Publishers, 2003.
3. P. Rai-choudhury, “MEMS and MOEMS Technology and Applications”, 1st Edition PHI, 2009.

### WEBSITES:

- Khan academy.org
- NPTEL
- <http://www.electronicsteacher.com>
- <http://www.science-ebooks.com>
- <http://www.abcofelectronics.com>
- [www.ocw.mit.edu](http://www.ocw.mit.edu)
- [www.academic.earth](http://www.academic.earth)

## CORE 15 - COMPUTER NETWORKS

<b>SUBJECT CODE:</b>	<b>THEORY</b>	<b>MARKS: 100</b> <b>INTERNAL: 25</b> <b>EXTERNAL: 75</b>
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**CREDITS: 4**

**SEMESTER: VI**

### COURSE OBJECTIVES:

- To learn the definition and basic terminology of Computer Networks.

- To learn the different types of Computer Networks.



- To know the applications of Computer Networks in different fields.
- To know about Multiplexing, transmission media and signals.
- To learn the functioning of OSI model and to describe the responsibilities of each layer.
- To know about the individual components and functioning of the Internet.
- To learn about the hardware components used in the networking.

## UNIT I

**INTRODUCTION TO COMPUTER NETWORKS** – Uses of network – Network structure – The OSI reference model concepts – Layers of the OSI model.

## UNIT II

**THE PHYSICAL LAYER** – Different types of transmission medium - CODEC – Switching techniques – Channel allocation methods – ALOHA protocol-LAN protocol (any one protocol) – IEEE standards 802.3, 802.4 and 802.5.

## UNIT III

**THE DATA LINK LAYER** – design issues – Concept of framing – Different methods – Error detection and correction: Single error correction and cyclic redundancy check.

## UNIT IV

**THE NETWORK LAYER** – design issues – Internal organization of network layer – Congestion control algorithm, Leaky bucket algorithm and token bucket algorithm – Dijkstra routing algorithm.

## UNIT V

Repeaters, bridges, routers and gateways – Brief introduction to the transport layer, session layer, presentation layer and application layer-Basic concepts of Internet – [WWW](#).

### TEXT BOOKS

1. Andrew S. Tanenbaum: Computer networks, Prentice Hall of India.
2. W. Stallings: Data and computer communication, Prentice Hall of India.
3. Behrouz and Forouzan: Introduction to data communications and networking, McGraw Hill.

### WEBSITES:

- Khan academy.org
- NPTEL

- <http://www.electronicsteacher.com>
- <http://www.science-ebooks.com>
- <http://www.abcofelectronics.com>
- [www.ocw.mit.edu](http://www.ocw.mit.edu)
- [www.academic.earth](http://www.academic.earth)

# ALLIED I

## Paper I - MATHEMATICS I

<b>SUBJECT CODE:</b>	<b>THEORY</b>	<b>MARKS: 100</b> <b>INTERNAL: 25</b> <b>EXTERNAL: 75</b>
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**CREDITS: 5**

**SEMESTER: I**

### COURSE OBJECTIVES:

- To acquire knowledge in differentiation and Integration.
- To apply mathematical skills in core topics like signal analysis
- To solve a given problem using appropriate mathematical techniques.
- To understand and recognize the practical applications of mathematics.
- To use mathematical tools in appropriate technological devices.

## UNIT I

**THEORY OF EQUATIONS** - Polynomial equations with real coefficients, irrational roots, complex roots, symmetric functions of roots, transformation of equation by increasing or decreasing roots by a constant, reciprocal equations, Newton's method to find a root approximately – simple problems.

## UNIT II

**MATRICES** - Eigen values and Eigen-vectors, Cayley-Hamilton theorem (without proof) – verification Computation of inverse matrix using Cayley – Hamilton theorem

## UNIT III

**TRIGONOMETRY** - Expansions of  $\sin\theta$ ,  $\cos\theta$ ,  $\tan\theta$  expansions of  $\sin n\theta$ ,  $\cos n\theta$ ,  $\tan n\theta$ . Hyperbolic and inverse hyperbolic functions- Logarithms of complex numbers

## UNIT IV

**DIFFERENTIAL CALCULUS** - nth derivatives, Leibnitz theorem (without proof) and applications, Jacobians, radius of Curvature and Curvature, Maxima and Minima of functions of two variables, – Simple problems.

## UNIT V

**INTEGRAL CALCULUS** - Integration of a rational function of the type.

$$\int \frac{px + q}{ax^2 + bx + c} dx$$

Integrals of the type  $\int (px + q) / (ax^n + bx + c) dx$ ; &  $\int (dx) / (x + p ax^n + bx + c)$

Rational functions of  $\sin x$  and  $\cos x$ .

$$\int (dx)/(a + b \cos x); \quad \int (dx)/(a + b \sin x); \quad \int (a \cos x + b \sin x + c)/(p \cos x + q \sin x + r) dx$$

Evaluation of  $\int e^{ax} \cos bx dx$ ;  $\int e^{ax} \sin bx dx$

Bernoulli's formula for integration by parts, Reduction Formula

## TEXT BOOKS

- Vittal P. R., Allied Mathematics, (Margham Publications).
- Narayanan S., Ancillary mathematics, Viswanathan publishers.
- Singaravelu A., Allied Mathematics, Meenakshi Agency

## REFERENCES

- Duraipandian P., Udayabaskaran S., Allied Maths volumes 1 and 2, Muhil publishers, Chennai.
- Dipak Chatterjee, Integral calculus and differential equations, Tata McGraw Hill publishers co Ltd.
- Kandasamy P., Thilagavathi K., Allied Mathematics, S.Chand and Co.

## WEBSITES

- Khan academy.org
- NPTEL
- Jain R.K., Iyengar S.R.K., Advance Engineering Mathematics, Narasa Publishing House, [www.en.wikipedia.org/wiki/multiple\\_integral](http://www.en.wikipedia.org/wiki/multiple_integral)
- Shankar Rao.G, Engineering Mathematics- Volume I, I.K.International Pvt.Ltd., [www.books.google.co.in](http://www.books.google.co.in).
- Michael Corral, Vector Calculus, [www.mecmath.net/calc3book.pdf](http://www.mecmath.net/calc3book.pdf)

## ALLIED I

### Paper II - MATHEMATICS II

<b>SUBJECT CODE:</b>	<b>THEORY</b>	<b>MARKS: 100</b> <b>INTERNAL: 25</b> <b>EXTERNAL: 75</b>
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**CREDITS: 5**

**SEMESTER: II**

**COURSE OBJECTIVES:**

- To acquire knowledge in differentiation and Integration.
- To apply mathematical skills in core topics like signal analysis
- To solve a given problem using appropriate mathematical techniques.

- To understand and recognize the practical applications of mathematics.
- To use mathematical tools in appropriate technological devices.

## UNIT I

**FOURIER SERIES** – Fourier series for functions in  $(0, 2\pi)$ ,  $(-\pi, \pi)$ , Even - Odd functions, Half range cosine and sine series.

## UNIT II

**ORDINARY DIFFERENTIAL EQUATIONS** – Second order differential equations with constant coefficients.  $(aX^2 + b$

$$X + c)y = \phi(x)$$

where  $\phi(x) = x^m, e^{ax} x^m, e^{ax} \sin mx, e^{ax} \cos mx,$

Second order differential equation with variable coefficient, Variation of Parameters.

## UNIT III

**PARTIAL DIFFERENTIAL EQUATIONS** – Formation, complete integrals and general integrals, four standard types of Lagrange's equations

## UNIT IV

**LAPLACE TRANSFORMS** – Laplace transformations of standard functions and simple properties, inverse laplace transforms Application to solution linear differential equations of order 1 and 2 – simple problems.

## UNIT V

**VECTOR ANALYSIS** – Scalar point functions, vector point functions, gradient, divergence, curl directional derivatives, normal to a surface. Line and surface integrals; Gauss, Stoke's and Green's theorems (without proof)- Simple problems.

### TEXT BOOKS

- Vittal P. R., Allied Mathematics, (Margham Publications).
- Narayanan S., Ancillary mathematics, Viswanathan publishers.
- Singaravelu A., Allied Mathematics, Meenakshi Agency

### REFERENCES

- Duraipandian P., Udayabaskaran S., Allied Maths volumes 1 and 2, Muhil publishers, Chennai.
- Dipak Chatterjee, Integral calculus and differential equations, Tata McGraw Hill publishers co Ltd.
- Kandasamy P., Thilagavathi K., Allied Mathematics, S.Chand and Co.

## WEBSITES

- Khan academy.org
- NPTEL
- Jain R.K., Iyengar S.R.K., Advance Engineering Mathematics, Narasa Publishing House, [www.en.wikipedia.org/wiki/multiple\\_integral](http://www.en.wikipedia.org/wiki/multiple_integral)
- Shankar Rao.G, Engineering Mathematics- Volume I, I.K.International Pvt.Ltd., [www.books.google.co.in](http://www.books.google.co.in).
- Michael Corral, Vector Calculus, [www.mecmath.net/calc3book.pdf](http://www.mecmath.net/calc3book.pdf)

## ALLIED II

### Paper I - BASIC PHYSICS - I

<b>SUBJECT CODE:</b>	<b>THEORY</b>	<b>MARKS: 100</b> <b>INTERNAL: 25</b> <b>EXTERNAL: 75</b>
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**CREDITS: 3**

**SEMESTER: III**

### COURSE OBJECTIVES:

- Physics is a systematic study of the natural world, a discipline that measures reality through application of observation with logic and reason. In order to make use of such a discipline we need certain foundational information.
- To provide basic principles and fundamentals of Physics.
- To understand What is Physics and the different fields of Physics.
- To understand the fundamental laws and their applications in measuring many physical quantities.
- To prepare students for careers where Physics principles can be applied to the development of Technology.

## UNIT – 1

**ROTATION** : Moment of inertia – Radius of gyration – Moment of inertia of a circular ring, circular disc, solid sphere – Kinetic energy of a rolling object – Acceleration of a body rolling down an inclined plane – Uniform circular motion – Centripetal force – Banking of curved tracks.

## UNIT – 2

**ELASTICITY**: stress – strain diagram – factors affecting elasticity -Young's modulus – Bending moment – Bending of beams – Young's modulus by non-uniform bending – Rigidity Modulus - Torsion in a wire – Torsional Pendulum – Definition of Poisson's ratio.

## UNIT – 3

**VISCOSITY**: Streamline and turbulent flow – Comparison of viscosities by burette

method – – Stoke's law – Terminal velocity – Viscosity of a highly viscous liquid – Lubrication.



**SURFACE TENSION:** Molecular theory of surface tension – Excess of pressure inside a soap bubble – surface tension by drop weight method - interfacial surface tension.

## **UNIT – 4**

**HEAT AND THERMODYNAMICS** – Thermal conductivity – Lee’s Disc methods – Radial flow of heat – Thermal insulation in buildings – Laws of thermodynamics – Carnot’s cycle as heat engine and refrigerator – Carnot’s theorem – Concept of entropy

## **UNIT – 5**

**ACOUSTICS** – Acoustics of buildings – Absorption coefficient – Intensity – Loudness – Reverberation time – Sabine’s formula – Noise pollution – Noise control in a machine – Ultrasonics – production – Piezoelectric methods  
– Applications of ultrasonics in Engineering and Medicine.

### **TEXT BOOKS**

1. Brijlal and Subramanyam -Properties of matter-S.Chand & Company.
2. Dr.Dhanalakshmi , Dr.Sabesan -Allied Physics
3. Kamalakkannan, Jayaraman- Allied Physics.
4. Srinivasan. M.N - A text book of Sound-. Himalaya Publishing house.
5. Mathur.D.S, 5th Edition, 2004 -Heat and Thermodynamics, Sultan Chand & Sons.
6. Dr. Arumugam M., 2nd edition ,Engineering Physics, , Anuradha Publications.

### **REFERENCE BOOKS:**

1. Narayanamoothy and others-Mechanics
2. Halliday.D., Resnick.R. and Walker.J, Wiley, NY 1994.-Fundamentals of Physics.
3. Nelkon and Parker-Advanced level Physics
4. Weber, Manning and White-College Physics
5. Brijlal and Subramanyam-A text book of Sound

### **WEBSITES:**

- Khan academy.org
- NPTEL
- [www.ocw.mit.edu](http://www.ocw.mit.edu)
- [www.academic.earth](http://www.academic.earth)

# ALLIED II

## Paper II - BASIC PHYSICS II

<b>SUBJECT CODE:</b>	<b>THEORY</b>	<b>MARKS: 100</b> <b>INTERNAL: 25</b> <b>EXTERNAL: 75</b>
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**CREDITS: 3**

**SEMESTER: IV**

### **COURSE OBJECTIVES:**

- Physics is a systematic study of the natural world, a discipline that measures reality through application of observation with logic and reason. In order to make use of such a discipline we need certain foundational information.
- To provide basic principles and fundamentals of Physics.
- To understand What is Physics and the different fields of Physics.
- To understand the tools and methods that Physicists use range from balance scales to Ultrasonics, laser beam emitters.
- To understand the fundamental laws and their applications in measuring many physical quantities.
- To prepare students for careers where Physics principles can be applied to the development of Technology

## **UNIT – 1**

**OPTICS:** Interference – Newton’s rings – Measurement of wavelength and radius of curvature by Newton’s rings with theory – Diffraction – Elementary theory of formation of spectra by transmission grating (normal incidence) – Determination of wavelength – Polarization – Optical activity – Brewster’s law – Determination of specific rotatory power – Half shade polarimeter – Uses of polarized light.

## **UNIT – 2**

**MODERN PHYSICS:** Photo electricity: Photoelectric emission – Einstein’s theory – Millikan’s experiment – Photoelectric cell – Photovoltaic cell – Photoconductive cell.

**NUCLEAR PHYSICS :** Properties of nuclei – size, charge, mass & spin – Binding Energy – Nuclear fission and fusion – liquid drop model – Semi empirical mass formula – Shell model – magic numbers.

**RADIO ACTIVITY:** Natural radioactivity – Artificial radioactivity – Radio isotopes – Uses of radio isotopes – Nuclear reaction – Q value of a reaction.

## **UNIT 3**

**LASER PHYSICS – Introduction- Principle of spontaneous emission and stimulated emission. Population inversion, pumping. Eienstein’s A and B coefficients-derivation. Types of Lasers- Ruby Laser, Nd-YAG,**

## **Semiconductor lasers-Applications of lasers.**

## UNIT 4

**MEDICAL PHYSICS** – Doppler effect – Blood flow meter – Determination of upward and downward transit time – A-scan, B-scan and M-scan – X-rays – Introduction – Units of X-rays – Diagnostic technologies of X-rays – Radiography.

## UNIT 5

**FIBER OPTICS** – Introduction – Principle and structure of optical fibers – Propagation of light through optical fibers – types of optical fibers – Optical fiber communication system (block diagram) – Fiber Optic Sensors – Medical Applications of Optical fibers- Endoscope- Engineering Applications of Optical fibers- Telecommunications-Computer Networks- Cable television – Advantages.

## TEXT BOOKS

1. Brijal and Subramanian-Text book of optics ,S.Chand & Company.
2. Mr. Kamalakkannan and Jayraman..Allied Physics
3. R. Murugesan- Modern Physics, S.Chand & Co.
4. Dr. Arumugam M, 2nd edition, 2002 -Engineering Physics, , Anuradha Publications.
5. Agarwal. G.P. , 3rd Edition , 2002- “Fiber-Optic Communication Systems” ,John Wiley & Sons

## REFERENCE BOOKS

1. **Thiagarajan-Laser Physics.**
2. Gaur & Gupta- Engineering physics .
3. Dr. Arumugam-Bio Medical Instrumentation - Anuradha Publications.
4. Keiser. G. “Optical fiber communications”, 4th Edition Tata McGraw-Hill, New Delhi, 2008-

## WEBSITES

- Khan academy.org
- NPTEL

### ALLIED II Paper III - BASIC PHYSICS PRACTICAL

<b>SUBJECT CODE:</b>	<b>PRACTICAL</b>	<b>MARKS: 100</b> <b>INTERNAL: 40</b> <b>EXTERNAL: 60</b>
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**CREDITS: 4**

**SEMESTER: IV**

**(At least Seven experiments should be done for the Examination)**

1. Young’s Modulus by non-uniform bending – pin and microscope

2. Rigidity modulus by Torsional pendulum.
3. Surface tension and interfacial surface tension by drop weight.
4. Comparison of viscosities of liquids using un graduated burette.
5. Thermal conductivity of a bad conductor by Lee's disc method
6. Melde's string – frequency of a vibrator
7. Sonometer – determination of AC frequency
8. Spectrometer – i-d curve
9. Spectrometer – grating at normal incidence – determination of wavelength of mercury spectrum
10. Newton's rings – Wavelength of sodium light

## REFERENCE BOOKS

1. Srinivasan M.N. and Others, A text book of practical Physics, Sultan Chand and Sons, New Delhi
2. Srinivasan M.N., Allied Practical Physics, Sultan Chand and Sons, New Delhi
3. Sugaraj Samuel R., Horsley Solomon, B.E.S. Practicals

## FOUNDATION COURSE 1– ELECTRICITY, MAGNETISM AND ELECTROMAGNETISM

<b>SUBJECT CODE:</b>	<b>THEORY</b>	<b>MARKS: 100</b> <b>INTERNAL: 25</b> <b>EXTERNAL: 75</b>
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**CREDITS: 3**

**SEMESTER: III**

### COURSE OBJECTIVES:

- To familiarize the student to the concepts, calculations pertaining to electric, magnetic and electromagnetic fields so that an in depth understanding of antennas, electronic devices, Waveguides is possible.
- To analyze fields and potentials due to static charges .
- To evaluate static magnetic fields.
- To understand how materials affect electric and magnetic fields.
- To understand the relation between the fields under time varying situations.
- To understand principles of propagation of uniform plane waves.

## UNIT I

**ELECTROSTATICS** – Coulomb's Law , Permittivity of free space - Relative permittivity - Electric intensity - Intensity due to a point charge - Electric potential - Relation between potential and intensity - Electric field and equipotential plots - Electric dipole - dipole moment - Normal electric Induction - Gauss theorem and Applications - Electric intensity due to a uniformly charged sphere, infinite cylinder and plane sheet of charge

## UNIT II

**DIELECTRICS** – Dielectric polarization, Electric field in multiple dielectrics – boundary conditions, Poisson's and Laplace's equations – Capacitance-energy density – Dielectric strength Capacitance, computation of capacitance in simple cases (parallel plates); spherical and cylindrical capacitors containing dielectrics

## UNIT III

**MAGNETOSTATICS** – Lorentz Law of force, magnetic field intensity – Biot–savart Law – Ampere’s Law – Magnetic field due to straight conductors, circular loop – Magnetic flux density (B) – B in free space, conductor, magnetic materials – Magnetization – Magnetic field in multiple media – Boundary conditions– Magnetic force – Torque – Inductance – Energy density – Magnetic circuits. Susceptibility - permeability - intensity of magnetization

## UNIT IV

**CURRENT ELECTRICITY** – EMF and Internal resistance of a cell - Cells connected in series and in parallel - Carey-Foster bridge - Potentiometer - Calibration of ammeter, high and low range Voltmeter, comparison of resistances.

## UNIT V

**ELECTROMAGNETIC INDUCTION** - Faraday’s and Lenz’s law; motional e.m.f.- Self Induction-Mutual Induction- calculation of self and mutual inductance in simple cases-inductances in series and parallel- reciprocity theorem LR, CR and LCR circuits- transient and sinusoidal emf cases

### TEXT BOOKS

1. Narayanamoorthi.M. and others - Electricity & Magnetism ,National Publishing Co., Chennai.
2. Murugesan.R. – Electricity & Magnetism -S. Chand & Company Ltd.
3. Brijlal and Subramanyam -Electricity & Magnetism- S.Chand & Company.
4. D.N. Vasudeva-Electricity and magnetism

### BOOKS FOR REFERENCE

1. Sehgal and Chopra-Electricity & Magnetism
2. **Halliday.D., Resnick.R. and Walker.J, Wiley, NY 1994.-Fundamentals of Physics.**
3. CRC Hand book of Physics & Chemistry , 80<sup>th</sup> Ed, CRS Press, NY 1999.

### WEBSITES

- Khan academy.org
- NPTEL
- [www.ocw.mit.edu](http://www.ocw.mit.edu)
- [www.academic.earth](http://www.academic.earth)

# FOUNDATION COURSE II - NUMERICAL METHODS

<b>SUBJECT CODE:</b>	<b>THEORY</b>	<b>MARKS: 100</b> <b>INTERNAL: 25</b> <b>EXTERNAL: 75</b>
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**CREDITS: 3**

**SEMESTER: III**

## **COURSE OBJECTIVES:**

1. To identify and classify the numerical problem to be solved
2. To choose the most appropriate numerical method for its solution based on characteristics of the problem
3. To understand the characteristics of the method to correctly interpret the results
4. To understand the basic methods, algorithms and programming techniques to solve mathematical problems.

## **UNIT – I**

**INTERPOLATION** – Newton’s Forward and Backward formulae – Dividend differences and their properties, Stirling’s and Bessel’s formulae – Langrange’s formula – simple problems.

## **UNIT – II**

**NUMERICAL INTEGRATION** – General Quadrature formula – Trapizoidal rule, Simpson’s 1/3 rule, Euler- Maclaurin’s formula, Stirling’s formula for factorial n – Summation of series by Euler – Maclaurin’s formula.

## **UNIT – III**

### **SOLUTIONS OF TRANSCENDENTAL AND POLYNOMIAL EQUATIONS IN ONE VARIABLE –**

Method of iteration – Newton-Raphson method – Regula Falsi method – Successive bisection method.

Solution of linear equation: Gauss reduction method – Exchange method – Jacobi iteration method – Gauss-Seidel method.

## **UNIT – IV**

**SOLUTIONS OF DIFFERENTIAL EQUATIONS** - Numerical solution of ordinary differential equation of first order – Euler’s method – Modified Euler’s method – Picard’s method of successive approximation – Runge-Kutta method (second and third order only).



## UNIT – V

**METHODS OF CURVE FITTING** – Least square analysis – Matrix inversion – Gauss elimination method – Co-factor method – Partition method.

## TEXT BOOKS

1. Numerical Methods in Science and Engineering – The National Publishing Co.Madras (2001).
2. Gupta B.D., Numerical Analysis, Konark Publishers Pvt. Ltd.
3. James Blaine Scarborough, Numerical Mathematical Analysis, Published by Oxford and IBH

## REFERENCE BOOKS

1. Sastry S.S., (2003) 3rd Edition, Introductory Methods of Numerical analysis, Prentice – Hall of India, New Delhi
2. Saxena. H.C., The Calculus of finite differences and Mathematical Analysis, S. Chand.
3. Venkataraman. M.K. , Numerical Methods in Science and Engineering

## WEBSITES

1. Khan academy.org
2. NPTEL
3. [www.ocw.mit.edu](http://www.ocw.mit.edu)
4. [www.academic.earth](http://www.academic.earth)

# FOUNDATION COURSE III - PRINCIPLES OF COMMUNICATION

<b>SUBJECT CODE:</b>	<b>THEORY</b>	<b>MARKS: 100</b> <b>INTERNAL: 25</b> <b>EXTERNAL: 75</b>
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**CREDITS: 3**

**SEMESTER: IV**

### COURSE OBJECTIVES:

1. To learn the basic principles of analog and digital communication systems.
2. To familiarize the student with modulation techniques.
3. To recognize and understand common modulation schemes for continuous wave modulation including amplitude modulation, frequency modulation, and phase modulation.
4. To recognize and understand common digital pulse modulation schemes including delta modulation and pulse-code modulation.
5. To understand the common analog pulse modulation schemes including pulse-amplitude modulation, pulse-width modulation, and pulse-position modulation.

## UNIT I

**INTRODUCTION TO FOURIER TRANSFORM** - properties of Fourier Transform - Sampling theorem – Natural Sampling & Flat-top Sampling (Qualitative analysis)

## UNIT II

**AMPLITUDE MODULATION & DEMODULATION** – Block diagram of Communication System – Types of Communication Systems – Need for Modulation – Amplitude Modulation – Definition & Representation – Generation of Amplitude Modulation (Balanced modulator) – Generation of SSB-SC AM (Frequency discriminator method) – Generation of VSB – Detector – AM demodulator – FDM

**AM TRANSMITTER** – Block diagram of AM Transmitter – definition of low level & high level modulation – Superheterodyne receiver – General Characteristics of receiver.

## UNIT III

**FREQUENCY MODULATION** – Representation of FM – Generation of FM – Direct method (Varactor diode modulator) – indirect method (Armstrong method) – FM detection – slope detector – Foster seeley discriminator.

**FM TRANSMITTER** – Direct method & Armstrong method – FM super heterodyne receiver – Pre-emphasis & De-emphasis – Comparison of AM & FM -

## UNIT IV

**ANALOG PULSE CODE MODULATION** - Generation & Detection of PAM, PWM & PPM.

**DIGITAL PULSE MODULATION & DEMODULATION** – PCM – Quantizing & Coding – Generation & Demodulation of PCM – Companding & encoding – Applications of PCM – Basic Concept of DM & ADM.

## UNIT V

**DIGITAL COMMUNICATION** – TDM in PCM – Binary Systems – ASK – FSK and PSK – Detection of Digital Communication Signals. Introduction to FDM.

### TEXT BOOKS

1. Kennedy, Electronic Communication System, McGraw-Hill Inter Student Edition.
2. Shanmugam, Sam K., Digital and Analog Communication System, John Willey.
3. Srinivasan. K.S., Digital Communication, Tata McGraw-Hill Education
1. Arokh Singh and Chhabra A.K. , Principles of Communication Engineering – S. chand
2. Theraja . BL., Basic Electronics, S. chand

### REFERENCE BOOKS

1. Venkatraman SK., Digital Communication, S. Chand
2. Roddy and Coolen, Communication electronics, PHI
3. Lathi B.P., Communication System, Wiley Eastern
4. Samshanmugam K., Digital and Analog Communication System, John Wiley

5. Robert M. Gaghardi, Satellite Communication, CBS Publication
6. Taub and Shilling, Communication Systems, McGraw Hill.
7. Carlson A.B., Communication Systems, McGraw Hill India.
8. Chitode J.S., Principles of Digital Communication, (1<sup>st</sup> edition, 2008), Technical Publications Pune.

## WEBSITES

1. Khan academy.org
2. NPTEL
3. <http://www.electronicsteacher.com>
4. <http://www.abcofelectronics.com>
5. [www.ocw.mit.edu](http://www.ocw.mit.edu)
6. [www.academic.earth](http://www.academic.earth)

## FOUNDATION COURSE IV - PROGRAMMING IN 'C' & OOPS CONCEPT

<b>SUBJECT CODE:</b>	<b>THEORY</b>	<b>MARKS: 100</b> <b>INTERNAL: 40</b> <b>EXTERNAL: 60</b>
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**CREDITS: 3**

**SEMESTER: IV**

### COURSE OBJECTIVES:

1. To Understand how to use and manipulate variables and types to change the program state, including numeric, character, array and pointer types, as well as the use of structures and typedefs.
2. To understand the purpose and use of function libraries.
3. To understand the purpose of pointers for parameter passing, referencing and dereferencing, and linking data structures.
4. To understand object-oriented programming features in C++.
5. To understand the implementation of various data structures and algorithms in C++.

## UNIT I

**FUNDAMENTALS** – Character set – Keywords – Identifiers – Data types – Constants  
Variables – Operators – Expression – Statements character I/O functions.

## UNIT II

**DECISION MAKING STATEMENTS** – if-else – while – do-while – for – switch – break – continue – goto statements.

**FUNCTIONS** – Definitions – Arguments – Function prototype – Recursion – Library function.

## UNIT III

**ARRAYS** – Array definition – Processing arrays – Passing array to a function –  
Multidimensional arrays – Strings – Storage classes.

**POINTERS** – Pointer declaration – Pointers and arrays – Pointer operation – Passing pointers to a function – Passing function to a function.

## **UNIT IV**

**STRUCTURES AND UNIONS** – Structure definition – Processing a structure – Structures and Pointers – self- referential structures – Unions.

**DATA FILES** – Opening, closing, creating, Processing, data files – Register variables and bitwise operations – Command line parameters – C pre processors.

## **UNIT V**

**LIMITATION OF PROCEDURAL LANGUAGE** – Characteristics of Object Oriented Language – Objects – Class – Inheritance – Reusability – Structure of C++ program – Polymorphism – Overloading – Applications of OOPS.

### **TEXT BOOKS**

1. Balagurusamy E., "Programming in C", Tata McGraw Hill Publication
2. Herbert shield, The complete reference C ++ ,Tata McGraw Hill Publication.
3. Sourav Sahay, Object-Oriented Programming with C++, Oxford University Press, 2006.

### **REFERENCE BOOKS**

1. Byron S Gottifried, Schaum's outline series, "Programming with C", Tata McGraw Hill Publication.
2. Mullish Cooper "The Spirit of C" , Schaum's outline series, Tata McGraw Hill Publication.
3. Yeswant Kanetkar , "Let Us C", BPB Publications.
4. Robert Lafore , Object Oriented Programming in-C++ , Techmedia Publication

### **WEBSITES**

1. Khan academy.org
2. NPTEL
3. <http://www.cprogramming.com>
4. [www.ocw.mit.edu](http://www.ocw.mit.edu)
5. [www.academic.earth](http://www.academic.earth)

# ELECTIVE - THEORY OF ROBOTICS AND AUTOMATION

<b>SUBJECT CODE:</b>	<b>THEORY</b>	<b>MARKS: 100</b> <b>INTERNAL: 25</b> <b>EXTERNAL: 75</b>
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**CREDITS: 4**

**SEMESTER: V or VI**

## UNIT I

**BASIC CONCEPTS** – Origin & various generation of Robots - Robot definition - Robotics system components – Robot classification - Coordinate frames - Asimov's laws of robotics – degree of freedom – work volume - Need for Automation – types of automation – fixed, programmable and flexible automation.

## UNIT I

**SENSORS AND VISION SYSTEM** – Sensing - Range, proximity, position, velocity, acceleration, Touch, Force, Torque. Optical & laser sensors.

**MACHINE VISION**- Introduction, Image acquisition, Illumination Techniques, Image conversion, Cameras, Image processing and analysis – image data reduction – segmentation feature extraction – Object recognition.

## UNIT III

**GRIPPERS AND ROBOT DYNAMICS** – Introduction - various types of grippers- design considerations. Construction of Manipulator – Introduction to Robot-Dynamics – Lagrange formulation – Newton Euler formulation – Properties of robot dynamic equations.

## UNIT IV

**KINEMATICS AND PATH PLANNING** – Forward Kinematics – Denavit Hartenberg Representation. Inverse Kinematics – Geometric approach.

## UNIT V

**PROGRAMMING LANGUAGES AND APPLICATIONS** – Robot programming - Fixed instruction, sequence control, General programming language, Specific programming languages. Robots for welding, painting and assembly – Remote Controlled robots – Robots for nuclear, thermal and chemical plants.

## **TEXT BOOKS:**

1. Mikell P. Groover, Weiss G.M. Nagel R.N. Odraj . N.G. , "Industrial Robotics", Tata Mc Graw Hill, 3rd Reprint, Edition 2008.
2. Deb.S.R. "Robotics Technology and flexible Automation", Tata Mc Graw Hill, 9th Reprint 2004.
3. K.S Fu, R C.Gonzalez, CSG Lee- "Robotics", McGraw Hill, Edition 2008.



## REFERENCE BOOKS:

1. John J Craig "Introduction to Robotics Mechanics & control, Low price Edition, 7th Reprint, 2005.
2. Ghosh, "Control in Robotics and Automation : Sensor Based Integration", Allied Publishers.

## WEBSITES:

1. Khan academy.org
2. NPTEL
3. <http://www.electronicsteacher.com>
4. <http://www.abcofelectronics.com>
5. [www.ocw.mit.edu](http://www.ocw.mit.edu)
6. [www.academic.earth](http://www.academic.earth)

## ELECTIVE - INDUSTRIAL ELECTRONICS

<b>SUBJECT CODE:</b>	<b>THEORY</b>	<b>MARKS: 100</b> <b>INTERNAL: 25</b> <b>EXTERNAL: 75</b>
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**CREDITS: 4**

**SEMESTER: VI**

### UNIT I

**INDUSTRIAL ELECTRONIC DEVICES** – Characteristics and applications of Thyatron, Ignitron, Thyristor, SCR and UJT – AC and DC switches – over voltage protection – flashers – static circuit breakers.

### UNIT II

**POWER SUPPLIERS** – DC voltage regulators – different types of series voltage regulators – voltage and current regulation – controlled rectifiers and inverters – uninterruptible power supplies – Switched Mode Power Supply (SMPS).

### UNIT III

**MOTORS AND CONTROLS** – DC motors – automatic regulation of speed and overload – reversing motors – AC motors – Induction motors – Speed control – Synchronous motors.

### UNIT IV

**WELDING AND HEATING** – Principle and theory of induction heating – dielectric heating – resistance welding – Control Processes – Sequence timer – Synchronous Welding control – Temperature control circuits.

## UNIT V

**APPLICATIONS IN INDUSTRY** – Relays and their characteristics and applications – Generation , Detection and Application of Ultrasonic’s Application of LASER in industry.

### BOOKS

4. M.G. Chute and R.D. Chute, Electronics and Industry –McGraw Hill Kogakusha.
5. C. Rai, Industrial and Power Electronics –Umesh Publications, New Delhi.
6. G.K. Mithal, Industrial Electronics –Khanna Publishers (14<sup>th</sup> Ed) New Delhi.
7. Noel Morris, Industrial Electronics –Tata McGraw Hill (II Edition).

### WEBSITES:

1. Khan academy.org
2. NPTEL
3. <http://www.electronicsteacher.com>
4. <http://www.abcofelectronics.com>
5. [www.ocw.mit.edu](http://www.ocw.mit.edu)
6. [www.academic.earth](http://www.academic.earth)

## ELECTIVE - MICROWAVE AND FIBER OPTIC COMMUNICATION SYSTEMS

<b>SUBJECT CODE:</b>	<b>THEORY</b>	<b>MARKS: 100</b> <b>INTERNAL: 25</b> <b>EXTERNAL: 75</b>
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**CREDITS: 4 SEMESTER: V or**

### VI COURSE OBJECTIVES:

1. To study the principles of generation, transmission and application of microwaves.
2. To explore the optical communication systems techniques and compare with other methods of transmission.
3. To study the properties and design of Oscillator and amplifier.
4. To understand the concepts of multi-mode and single-mode.
5. To understand how fiber-optic communication systems work.
6. To understand the applications of Radar.

## **UNIT I**

**INTRODUCTION TO MICROWAVES** – Introduction – Maxwell's equation – Amperes law – Faradays law – Gauss law – Wave equation – Types of wave guides – TE and TM modes – Propagation of TM waves in rectangular wave guide – TM modes in rectangular wave guides.

## **UNIT II**

**MICROWAVE AMPLIFIERS AND OSCILLATORS** – Microwave tubes: - Two cavity Klystron – Multi cavity Klystron – Reflex Klystron – Traveling wave tube (TWT) – Backward wave Oscillator (BWO) – Magnetron – Applications.

## **UNIT III**

**MICROWAVE DEVICES** – Microwave transistors – Gallium Arsenide (GaAs) metal semi-conductor FET – Varactor Diode – PIN diode – Scotty diode – Tunnel diode – Gunn diode – IMPATT diode – TRAPATT diode – BARITT diode – Maser principle – Applications.

## **UNIT IV**

**RADAR** – Introduction – Block diagram – Classification – Radar range equation – Factors affecting the range of a radar receivers – Line pulse modulator – PPI (Plane Position Indicator) – Moving Target Indicator (MTI) – FM CW Radar- Applications.

## **UNIT V**

**OPTICAL FIBER COMMUNICATION** – A basic fiber optic system – Frequencies – Fiber optic Cables – Refraction – Numerical Aperture – Graded index cables – Single mode – Multi mode – Cable Constructions – Cable losses – Connectors – Light Sources – Light Detector – Systems Components – Advantages and Disadvantages.

### **BOOKS FOR STUDY AND REFERENCE:**

1. Kennedy; Davis – "ELECTRONIC COMMUNICATION SYSTEMS" Tata McGraw Hill Publishing Company Limited, III edition.
2. Robert J Schoenbeck "ELECTRONIC COMMUNICATIONS MODULATION AND TRANSMISSION", PHI,1999
3. M.Kulkarni – "MICROWAVE AND RADAR ENGINEERING" Umesh Publications, 2nd edition.
4. Samuel Y.Liao – "MICROWAVE DEVICES AND CIRCUITS" PHI Private Limited, 2nd edition.
5. Anikh Singh – "PRINCIPLES OF COMMUNICATION ENGINEERING" S.Chand & Company Limited, 2<sup>nd</sup> Edition.

### **WEBSITES:**

- Khan academy.org
- NPTEL

- <http://www.electronicsteacher.com>
- <http://www.science-ebooks.com>
- <http://www.abcoelectronics.com>

## **ELECTIVE - MOBILE COMMUNICATION**

<b>SUBJECT CODE:</b>	<b>THEORY</b>	<b>MARKS: 100</b> <b>INTERNAL: 25</b> <b>EXTERNAL: 75</b>
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**CREDITS: 4**

**SEMESTER: V or VI UNIT**

I

### **CELLULAR MOBILE RADIO SYSTEMS AND ELEMENTS OF CELLULAR RADIO SYSTEM DESIGN**

– Introduction to Cellular Mobile System, Performance criteria, uniqueness of mobile radio environment, operation of cellular systems, Hexagonal shaped cells, Analog and Digital Cellular systems, General description of the problem, concept of frequency channels, Co-channel Interference Reduction Factor, desired C/I from a normal case in a omni directional Antenna system, Cell splitting, consideration of the components of Cellular system.

### **UNIT II**

**INTERFERENCE AND CELL COVERAGE FOR SIGNAL AND TRAFFIC** – Introduction to Co-Channel

Interference, real time Co-Channel interference, Co-Channel measurement, design of Antenna system, Antenna parameters and their effects, diversity receiver, non-co channel interference-different types, Signal reflections in flat and hilly terrain, effect of human made structures, phase difference between direct and reflected paths, constant standard deviation, straight line path loss slope, general formula for mobile propagation over water and flat open area, near and long distance propagation antenna height gain, form of a point to point model.

### **UNIT III**

**CELL SITE AND MOBILE ANTENNAS, FREQUENCY MANAGEMENT, CHANNEL ASSIGNMENT,**

**HANDOFF** – Sum and difference patterns and their synthesis, omni directional antennas, directional antennas for interference reduction, space diversity antennas, umbrella pattern antennas, minimum separation of cell site antennas, high gain antennas, Numbering and grouping, setup access and paging channels channel assignments to cell sites and mobile units, channel sharing and borrowing, sectorization, overlaid cells, non fixed channel assignment, Handoff, dropped calls and cell splitting, types of handoff, handoff invitation, delaying handoff, forced handoff, mobile assigned handoff. Intersystem handoff, cell splitting, micro cells,

vehicle locating methods, dropped call rates and their evaluation.

#### **UNIT IV**

**WIRELESS SYSTEMS AND STANDARDS AND DIGITAL CELLULAR NETWORKS** – Second generation

and Third generation Wireless Networks and Standards, WLL, Bluetooth, GSM, IS-95, DECT, GSM architecture, GSM channels, multiplex access scheme, TDMA, CDMA.

#### **UNIT V**

**INTELLIGENT NETWORK FOR WIRELESS COMMUNICATIONS** – Intelligent Cell Concept, Advanced Intelligent Network, SS7 Network and ISDN for AIN, AIN for Mobile communication, Asynchronous Transfer Mode Technology, Future Public Land Mobile Telecommunication System, Wireless Information Superhighway.

## BOOKS

1. W.C.Y. Lee, "Mobile Cellular Telecommunications", 2nd Edition, Tata McGraw Hill, 2006.
2. Gordon L. Stuber, "Principles of Mobile Communications", 2nd Edition, Springer International, 2007.
3. Theodore. S. Rappoport, "Wireless Communications", 3rd Edition, Pearson Education, 2003.
4. Lee, "Wireless and Mobile Communications", 3rd Edition, McGraw Hill, 2006.
5. Jon W. Mark and Weihua Zhqung, "Wireless Communication and Networking", PHI, 2005.
6. R. Blake, "Wireless Communication Technology", Thompson Asia Pvt. Ltd., 2004.

## WEBSITES:

1. Khan academy.org
2. NPTEL
3. <http://www.electronicsteacher.com>
4. <http://www.abcofelectronics.com>
5. [www.ocw.mit.edu](http://www.ocw.mit.edu)
6. [www.academic.earth](http://www.academic.earth)

## ELECTIVE – MEDICAL ELECTRONICS

<b>SUBJECT CODE:</b>	<b>THEORY</b>	<b>MARKS: 100</b> <b>INTERNAL: 25</b> <b>EXTERNAL: 75</b>
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**CREDITS: 4**

**SEMESTER:V or VI**

### UNIT-1

**BIO-AMPLIFIERS** : Bio potentials - bio - electricity, Necessity for special types of amplifiers for biological signal  
amplifications - different types of Bio-OP-AMPS.

### UNIT-2

**BIO-POTENTIAL RECORDING** : ECG - EEG - EMG - ERG - Specific types of electrodes used - different lead systems - their waveforms.

### UNIT-3

**MEASUREMENT OF BIOLOGICAL PARAMETERS** -Measurement of respiration rate - measurement of heart beat rate - measurement of temperature - measurement of blood pressure - patient monitoring set up - blood flow meters EM and plethsmographic technique.

## UNIT-4

**HIGH ENERGY RADIATION APPLICATIONS** : Applications of X-ray and isotopes for diagnostics and therapeutic applications - application of Lasers in biological medium.

## UNIT-5

**HIGH FREQUENCY APPLICATIONS** : Diathermy effect - Short wave diathermy - UltrasOnic diathermy - Microwave diathermy.

## BOOKS FOR STUDY AND REFERENCE

1. Clinical Engineering - Jacobster and Webster, PHI.
2. Applied Biomedical Instrumentation - Geddes and Baker, John Wiley & Sons.
3. Biomedical Instrumentation - M.Arumugham, Anuraçlha Agencies Publishers (II Edition)

## WEBSITES

1. Khan academy.org
2. NPTEL
3. <http://www.electronicsteacher.com>
4. <http://www.abcoelectronics.com>
5. [www.ocw.mit.edu](http://www.ocw.mit.edu)
6. [www.academic.earth](http://www.academic.earth)



## ELECTIVE - CONSUMER ELECTRONICS

<b>SUBJECT CODE:</b>	<b>THEORY</b>	<b>MARKS: 100</b> <b>INTERNAL: 25</b> <b>EXTERNAL: 75</b>
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**CREDITS: 4 SEMESTER: V or**

### VI UNIT-I

**MICROWAVE OVENS** – Microwaves (Range used in Microwaves Ovens) - Microwave oven block diagram -

LCD timer with alarm – Single-Chip Controllers – Types of Microwave oven - Wiring and Safety instructions - Care and Cleaning.

### UNIT-II

**WASHING MACHINES** – Electronic controller for washing machines - Washing machine hardware and software

- Types of washing machines - Fuzzy logic washing machines - Features of washing machines.

### UNIT-III

**AIR CONDITIONERS AND REFRIGERATORS** – Air Conditioning - Components of air conditioning systems - All water air conditioning systems - All air conditioning systems - Unitary and central air conditioning systems - Split air conditioners.

### UNIT-IV

**HOME / OFFICE DIGITAL DEVICES** – Facsimile machine - Xerographic copier - Calculators - Structure of a calculator - Internal Organization of a calculators - Servicing electronic calculators - Digital clocks - Block diagram of a digital clock.

### UNIT-V

**DIGITAL ACCESS DEVICES** – Digital computer - Internet access - Online ticket reservation - Functions and networks - Barcode Scanner and decoder - Electronic Fund Transfer - Automated Teller Machines (ATMs) - Set- Top boxes - Digital cable TV - Video on demand.

### BOOKS

1. S.P. Bali, Consumer Electronic - Pearson Education, New Delhi, 2005.

### WEBSITES:

- Khan academy.org

- NPTEL

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## DEPARTMENT OF B.COM [C.S]

### **LIST OF COURSES COMMON FOR B.COM (CORPORATE SECRETARYSHIP) FROM B.COM (GENERAL)**

#### SEMESTER I

1. Financial Accounting
2. Business Communication

#### SEMESTER II

3. Advanced Financial Accounting
4. Business Economics

#### SEMESTER III

5. Corporate Accounting - I
6. Business Statistics

#### SEMESTER IV

7. Advanced Corporate Accounting
8. Indirect Taxation

#### SEMESTER V

9. Business Laws
10. Income Tax Law & Practice I
11. Marketing

#### SEMESTER VI

12. Management Accounting
13. Entrepreneurial Development
14. Income Tax Law & Practice II

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## SEMESTER 1

### Core Paper I - FINANCIAL ACCOUNTING

-

#### Course objectives

Number of Credits: 4

1. To enable the students to know the Principles of Accounting in General
2. To Understand the System of Keeping Financial Accounting Records

#### Unit I: Preparation of Financial Statements

Preparation of Final Accounts of a Sole Trading Concern - Adjustments - Preparation of Receipts and Payments Account, Income and Expenditure Account and Balance Sheet of Non-Trading Organizations.

#### Unit II: Rectification of Errors and Bank Reconciliation Statement

Classification of Errors - Rectification of Errors - Preparation of Suspense A/c. Bank Reconciliation Statement - Need and preparation.

#### Unit III: Depreciation and Insurance Claims

Depreciation - Meaning - Causes - Types - Straight Line method - Written down value method - Change in method - Concept of useful life under Companies Act, 2013 - Insurance Claims - Calculation of Claim Amount - Average Clause.

#### Unit IV: Single Entry System

Meaning and Features of Single Entry System - Defects - Difference between Single Entry and Double Entry System - Methods of Calculation of Profit - Statement of Affairs Method- Conversion Method.

#### Unit V: Hire Purchase and Instalment System

Hire purchase system - Default and repossession - Hire purchase trading account - Instalment system - calculation of profit - Average Due Date and Account Current

**Note: Questions in Sec. A, B & C shall be in the proportion of 20:80 between Theory and Problems.**

#### Suggested Readings

1. Gupta, R.L & Gupta, V.K, Advanced Accounting, Sultan Chand & Sons, New Delhi.

2. Jain & Narang, Financial Accounting, Kalyani Publishers, New Delhi.
3. Reddy, T.S & Murthy, A. Financial Accounting, Margham Publications, Chennai.
4. Shukla & Grewal, Advanced Accounting, S. Chand & Co. New Delhi.
5. Parthasarathy, S. & Jaffarulla, A. Financial Accounting, Kalyani Publishers, New Delhi.
6. S.Thothadri & S.Nafeesa, Financial Accounting, McGraw Hill Education, New Delhi

### **E-Resources**

[www.accountingcoach.com](http://www.accountingcoach.com)

[www.accountingstudyguide.com](http://www.accountingstudyguide.com)

[www.futureaccountant.com](http://www.futureaccountant.com)

[www.onlinelibrary.wiley.com](http://www.onlinelibrary.wiley.com)

## **Core Paper II – BUSINESS COMMUNICATION**

### **Course Objectives**

**Number of Credits: 4**

1. To facilitate the students to understand the concept of Communication.
2. To know the Basic Techniques of the Modern forms of Communication.

### **Unit I: Communication**

Definition - Methods - Types - Principles of Effective Communication - Barriers to Communication - Business letters - lay out.

### **Unit II: Business Letters**

Meaning - Kinds of Business Letters - Application for a situation - Interview - Appointment letter - Acknowledgement - Promotion - Enquiries - Reply Letter to Enquiries - Orders - Sales Letter - Circular Letter - Complaints Letter.

### **Unit III: Correspondence**

Bank Correspondence - Insurance Correspondence - Agency Correspondence - Correspondence with Share Holders & Directors.

### **Unit IV: Reports and Meetings**

Reports - Meaning - Writing of Reports - Meetings - Agenda - Minutes - Memorandum - Office order - Circular Notes.

## **Unit V: Forms of Communication**

Modern forms - Fax - email - video conference - internet - websites - uses of the various forms of communication.

### **Suggested Readings**

1. Rajendra Paul & Korlahalli, J.S. Essentials of Business Communication, Sultan Chand & Sons, New Delhi.
2. Shirley Taylor, Communication for Business, Pearson Publications, New Delhi.
3. Bovee, Thill, Schatzman, Business Communication Today - Pearson Education Private Ltd - New Delhi.
4. Penrose, Rasbery, Myers, Advanced Business Communication, Bangalore.
5. Simon Collin, Doing Business on the Internet, Kogan Page Ltd, London.
6. Mary Ellen Guffey, Business Communication - Process and Product, International Thomson Publishing, Ohio.
7. Sundar, K. A, Business Communication, Vijay Nicole Imprints Pvt. Ltd., Chennai.

### **E-Resources**

[www.newagepublishers.com](http://www.newagepublishers.com)

[www.managementstudyguide.com](http://www.managementstudyguide.com)

[www.businesscommunication.org](http://www.businesscommunication.org)

[www.smallbusiness.chron.com](http://www.smallbusiness.chron.com)

## **ALLIED PAPER I – INTERNATIONAL TRADE**

### **Course Objectives:**

**No of Credits: 5**

1. To acquire specialised knowledge in international trade
2. To learn about WTO and how globalisation of Economy takes place.

### **UNIT 1**

Theories of International Trade – Ricardo – Haberlers Opportunity cost - Heckscher Ohlin theorem.

### **UNIT – II**

Trade policy – case for protection – Regional integration – European Union – EEC- UNCTAD – GATT – Asian – Development Bank.

### **UNIT III**

WTO – Functions of WTO – An Overview.

## **UNIT IV**

Balance of payments – Disequilibrium – Remedies – Exchange control – Purchasing Power parity Theory.

## **UNIT V**

International monetary system – IMF – SDR – International liquidity – IBRD.

### **Suggested Readings**

1. K.R.Gupta – International Economics, Atlantic Publisher Distributors Pvt Ltd.
2. P. Saravanan – International Marketing
3. S.Sankaran – Money, Banking and International Trade, Margham Publication, Chennai.
4. Francis Cherunilam – International Trade and Export Management, Himalaya Publishing House.

## **NON-MAJOR ELECTIVE PAPER I**

### **1. BASIC ELEMENTS OF LOGISTICS MANAGEMENT**

#### **Level of Knowledge: Basic Level**

#### **Unit – I**

Logistics – Concept & Significance – Logistics System Fundamentals – Transport System: Railway, Road, Air, Waterways, Pipe Lines, Animals and Animal driven vehicles – Economics of transportation – Stocking Policies –Storage and handling capacities – Warehousing.

#### **Unit – II**

Packaging – Principles, functions and types – Containerization – Concepts – Infrastructure – Inventory Policy – Concept of Supply Chain Management and its strategic role in the organization – Intra and Inter Organization Supply Chain.

#### **Suggested Readings:**

1. Strategic Logistics Management – Lambert
2. Logistical Management – The Integrated Supply Chain Process – Bowersox
3. Logistics & Supply Chain Management – Christopher
4. Supply Chain Management – Sunil Chopra
5. Logistics & Supply Chain Management – Raghuram
6. Supply Chain Management for 21<sup>st</sup> Century – Sahay.

## **2. BASICS OF CORPORATE E- MANAGEMENT Level of Knowledge: Basic Level**

### **UNIT - I**

Introduction to computers - Classification - Anatomy of digital computer - Hardware and Software - Memory Devices - input devices - output devices - Storage devices - Concept of programming languages - Operating system, Assembler, Compiler, Interpreter, Multimedia.

Introduction to Internet - Internet Service Providers (ISPs), Internet Addressing - E-Mail - Web Browsers - Intranet - Website establishments - Advertising in the web.

### **UNIT - II**

Introduction of e-commerce - opportunities - Modes of e-commerce – business requirements - Payment Processing - Secure Electronic payment protocol (SEPP) - Secure electronic Transaction (SET).

Management Information System (MIS) - Concept – meaning - role of MIS in management.

#### **Suggested Readings:**

1. Alexix Leon, Mathew Leon - Fundamentals of Computer Science and Communication Engineering.
2. Alexix Leon, Mathew Leon - Fundamentals of Information Technology
3. John Callahan - Every Students guide to Internet.
3. 4 W.S Jawadekar - Management Information System
4. 5 K.K.Bajai and Debjani Nag - E-Commerce - The cutting edge of Business



**ATED DEGREE COURSES**  
**SYLLABUS – OTHER LANGUAGES**

**PART-I - HINDI**  
**(With effect from the Academic Year 2015-2016)**

**BP1-LHIN1**

**I YEAR – I SEMESTER**

PAPER – I - PROSE, FUNCTIONAL HINDI & LETTER WRITING

I . PROSE (Detailed Study) : HINDI GADHYA MALA

Ed. by Dr. Syed Rahamathulla

Poornima Prakashan, 4/7 Begum III Street  
Royapettah, Chennai – 14.

LESSONS PRESCRIBED :

1. Sabhyata ka Rahasya
2. Mitrata
3. Yuvavon sen
4. Paramanu Oorja evam Khadya Padarth Sanrakshan
5. Yougyata aur Vyavasay ka Chunav.

II. FUNCTIONAL HINDI & LETTER WRITING

Students are expected to know the office and Business Procedures, Administrative and Business Correspondence.

1. General Correspondence:

1. Personal Applications
2. Leave Letters
3. Letter to the Editor
4. Opening an A/C
5. Application for Withdrawal
6. Transfer of an A/C
7. Missing of Pass Book / Cheque Leaf
8. Complaints
9. Ordering for Books
10. Enquiry

III. OFFICIAL CORRESPONDENCE:

1. Government Order
2. Demi Official Letter
3. Circular
4. Memo
5. Official Memo
6. Notification
7. Resolution
8. Notice

BOOKS FOR REFERENCE :

1. Karyalayeen Tippaniya : Kendriya Hindi Sansthan, Agra
2. Prayojan Moolak Hindi : Dr. Syed Rahamathulla, Poornima Prakashan  
4/7, Begum III Street, Royapettah, Chennai – 14.

**UNIVERSITY OF MADRAS**  
**UG & 5 YR INTEGRATED DEGREE COURSES**  
**SYLLABUS – OTHER LANGUAGES**

**UNITISED SYLLABUS**

**UNIT – I**

1. Sabhyata ka Rahasya
2. Personal Applications
3. Leave Letters
4. Government Order
5. Administrative Terminology Hindi to English (25 Words )

**UNIT - II**

1. Mitrata
2. Letter to the Editor
3. Opening an A/C
4. Demi Official Letter
5. Administrative Terminology English to Hindi ( 25 Words )

**UNIT-III**

1. Yuvavon Se
2. Application for Withdrawal
3. Circular
4. Memo
5. Administrative Terminology Hindi to English ( 25 Words )

**UNIT-IV**

1. Paramanu Oorja evam Khadya Padarth Sanrakshan
2. Transfer of an A/C
3. Missing of Pass Book / Cheque Leaf
4. Official Memo
5. Administrative Terminology English to Hindi ( 25 Words )

**UNIT-V**

1. Yougyata aur Vyavasay ka Chunav
2. Complaints
3. Ordering for Books
4. Notification
5. Official Noting Hindi to English ( 25 words )

**UNIT-VI**

1. Enquiry
2. Resolution
3. Notice
4. Official Noting English to Hindi ( 25 words )

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**SYLLABUS – OTHER LANGUAGES**

PAPER – I - PROSE, FUNCTIONAL HINDI & LETTER WRITING

**QUESTION PAPER PATTERN**

Time : 3 Hours

Maximum Marks : 75

**SECTION – A (5x3= 15)**

I Answer any **5 out of 8** Questions . Answer in **50 Words**

i) 1 to 4 from Prose

ii) 5 to 8 from Functional Hindi

5) Equivalent Administrative Terminology six from English to Hindi 6 out of 10 Q

6) Equivalent Administrative Terminology six from Hindi to English 6 out of 10 Q

7) Equivalent Official Phrases three out of five from English to Hindi 3 out of 5 Q

8) Equivalent Official Phrases three out of five from Hindi to English 3 out of 5 Q

**SECTION – B ( in 200 words )(3x5= 15)**

II. a) Three Annotations out of Five (3x5 = 15) (Q.

No.9 to 13 annotations from Prose only)

b) One Question from out of two (1x5 = 5)

(Q. No.14 to 15)

(Definition and references of official letter i.e., D.O., Circular, Order, Memo, Notification, Resolution, Notice Etc.)

**SECTION C (4X 10 = 40)**

**III. Answer in 500 Words**

a) Two essays out of Three from Prose (2x10 = 20)

(Q. No. 16 to 18)

b) Two Letter out of Three (2x10 =20)

(Q. No.19 to 21)

(From General Correspondence i.e. Personal Applications, Leave Letters, Letter to Editor, Opening an A/C, Application for withdrawal, Transfer of an account, Missing of Pass Book/Cheque leaf, Insurance Letters, Ordering Books, Enquiry, Complaints, Exchange, Damages etc.)

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**SYLLABUS – OTHER LANGUAGES**

**BP1-LFRE1**

**PART – I: FRENCH**

(with effect from 2018-2019)

**SEMESTER I**

Title of the Paper : Prescribed text and grammar-I

**Prescribed textbook:**

- Régine Mérieux & Yves Loiseau, *Latitudes 1*, Paris, Didier, 2017 (**Units 1-6 only**).

**Questions not to be asked from the Autoévaluation and Préparation au DELF**

**Paper setters to strictly adhere to the syllabus and ask questions only from the pages included in the syllabus. Questions should cover the entire syllabus.**

**QUESTION PAPER PATTERN**

Time : 3 Hours

Maximum

Marks : 75

**Section A (7 x 5 = 35 Marks)**

Answer any 7 questions

10 Grammar exercises to be given from the prescribed textbook

**Section B (10 x 2 = 20 Marks)**

Answer any TEN questions

15 questions to be asked on cultural aspects found in the prescribed textbook

**Section C (2 x 10 = 20 Marks)**

Answer any TWO

2 must be answered out of 4 topics (1 dialogue writing, 1 letter /email writing, 2 compositions based on the themes found in the prescribed textbook)

## SEMESTER II

### Core Paper III – ADVANCED FINANCIAL ACCOUNTING

#### Course Objectives

Number of Credits: 4

1. To enable the students to get a comprehensive understanding of the Financial Accounting
2. To make the students know the various methods of maintaining the accounting records in various forms of Business

#### Unit I: Branch Accounts

Dependent Branches - Stock and Debtors system - Distinction between Wholesale Profit and Retail Profit - Independent Branches (Foreign Branches excluded)

#### Unit II: Departmental Accounts

Basis of Allocation of Expenses - Calculation of Profit - Inter-departmental Transfer at Cost or Selling Price.

#### Unit III: Partnership Accounts

Admission of a Partner - Retirement of a Partner - Death of a Partner.

#### Unit IV: Partnership Accounts

Dissolution of a Partnership Firm - Insolvency of a Partner - Insolvency of all Partners - Piece meal Distribution of cash in case of Liquidation of Partnership Firm.

#### Unit V: Accounting Standards for Financial Reporting

Objectives and uses of financial statements for users - role of accounting standards - development of accounting standards in India - requirements of International Accounting Standards - Role of IFRS - IFRS adoption or convergence in India - Implementation plan in India - IndAS - Difference between IndAS and IFRS

**Note: Questions in Sec. A, B & C shall be in the proportion of 20:80 between Theory and Problems.**

#### Suggested Readings

1. Gupta, R.L & Gupta, V.K, Advanced Accounting, Sultan Chand & Sons, New Delhi.
2. Jain & Narang, Financial Accounting, Kalyani Publishers, New Delhi.
3. Reddy, T.S & Murthy, A. Financial Accounting, Margham Publications, Chennai.
4. Shukla & Grewal, Advanced Accounting, S. Chand & Co., New Delhi.
5. Tulsian P.C. - Financial Accounting.

6. Parthasarathy, S. & Jaffarulla, A. Financial Accounting, Kalyani Publishers, New Delhi.
7. S.Thothadri & S.Nafeesa, Financial Accounting, McGraw Hill Education, New Delhi

### **E-Resources**

[www.accountingcoach.com](http://www.accountingcoach.com)

[www.accountingstudyguide.com](http://www.accountingstudyguide.com)

[www.futureaccountant.com](http://www.futureaccountant.com)

[www.onlinelibrary.wiley.com](http://www.onlinelibrary.wiley.com)

## **Core Paper IV - CORPORATE MANAGEMENT**

### **Course Objectives:**

**No of Credits: 4**

- To make the students to understand the basic concept of management.
- To prepare the students to know about the significance of management in corporate world

### **UNIT 1 Introduction to Management**

Nature and functions of Management – Principles – role and function of Manager – Levels of Management – Development of Scientific Management and other Schools of thought and Approaches.

### **UNIT 2 Planning and Organising**

Planning – need and importance – forms – types – steps – decision making – types – process.

Organisation – types – Organisation structure – Centralisation and Decentralisation – Departmentation.

### **UNIT 3 Human Resource Management**

Human Resource – HRM and Personnel Management – Recruitment, Selection and Training methods – Human Resource Audit.

### **UNIT 4 Performance Appraisal and Incentives**

Performance Appraisal – methods – promotions and transfer – incentives – monetary and non-monetary- welfare and social security measures.

### **UNIT 5 Direction and Control**

Direction – purpose – requirements of effective direction – motivation theories.

Co-ordination – need, type and techniques for excellent co-ordination – controlling- meaning and importance – control process.

### **Suggested Readings:**

1. Wehrich and Koontz, Essentials of Management, McGraw Hill, New Delhi
2. Dinakar Pagare, Principles of Management, Sultan Chand & Sons, New Delhi.
3. C.B.Gupta – Business Management, Sultan Chand & Sons, New Delhi.
4. L.M.Prasad – Principles of Management, Sultan Chand & Sons, New Delhi.
5. L.M.Prasad – Human Resource Management, Sultan Chand & Sons, New Delhi.
6. Ashwathappa, Human Resource Management, Tata McGraw Hill, New Delhi.
7. Tripathi - Human Resource Management, Sultan Chand & Sons, New Delhi.

## **Allied Paper II - BUSINESS ECONOMICS**

### **Course Objectives**

**Number of Credits: 5**

1. To make the students to understand the basic concepts of economics
2. To prepare the students to know about the demand and supply, laws of production and consumer behaviour

### **UNIT I**

Introduction to Economics – Wealth, Welfare and Scarcity Views on Economics - Positive and Normative Economics - Definition – Scope and Importance of Business Economics - Concepts: Production Possibility frontiers – Opportunity Cost – Accounting Profit and Economic Profit – Incremental and Marginal Concepts – Time and Discounting Principles – Concept of Efficiency

### **UNIT II**

Demand and Supply Functions: Meaning of Demand – Determinants and Distinctions of demand – Law of Demand – Elasticity of Demand – Demand Forecasting – Supply concept and Equilibrium.

### **UNIT III**

Consumer Behaviour: Law of Diminishing Marginal utility – Equimarginal Utility – Indifference Curve – Definition, Properties and equilibrium.

### **UNIT IV**

Production: Law of Variable Proportion – Laws of Returns to Scale – Producer's equilibrium – Economies of Scale - Cost Classification – Break Even Analysis

## **UNIT V**

Product Pricing: Price and Output Determination under Perfect Competition, Monopoly – Discriminating monopoly – Monopolistic Competition – Oligopoly – Pricing objectives and Methods

### **Suggested Readings**

1. Shankaran S, Business Economics - Margham Publications - Ch -17
2. Mehta P L, Managerial Economics – Analysis, Problems & Cases - Sultan Chand & Sons - New Delhi – 02.
3. Francis Cherunilam, Business Environment - Himalaya Publishing House - Mumbai – 04.
4. Peter Mitchelson and Andrew Mann, Economics for Business - Thomas Nelson Australia -Can -004603454.
5. Chaudhary C M, Business Economics - RBSA Publishers - Jaipur - 03.
6. Ahuja H L, Business Economics – Micro & Macro - Sultan Chand & Sons - New Delhi – 55.

## **NON-MAJOR ELECTIVE PAPER II**

### **1. EVERYDAY BANKING**

#### **UNIT- I**

Banking – Definition – pass book – cheque book – Format of Cheque – Filling up of Cheque- Deposit Challan – Filling up – Clearing cheque – Transfer cheque – Collection Cheque – Payable at par – Demand Draft – application filling  
– Account Opening form – Filling up – Documents required - Debit Card – Credit Card – ATM Machine – Cash Deposit Machine – Pass book printing machine. MICR- IFSC- Fund transfer through ECS – NEFT – RTGS – Form filling for Fund transfer.

#### **UNIT- II**

On line Banking – Sign up – Process – Requirements – Log in – Customer ID – User ID – Pass word – Hints for creating Pass words – change of pass word – on line transactions – Account statements – Fund Transfer – Payment of bills – Utility payments – Loans – Repayment for Loans – other services. Mobile Banking – meaning – importance – Advantages – Mobile Applications (App) – WAP (Wireless Application Protocol)- USSD (Unstructured Supplementary Service



Data)- Registration process – through Mobiles – Process at Bank Branch – ATM- User ID-MPIN- change of MPIN –IMPS D(Immediate Mobile Payment System) - UPI(Unified Payment interface) – BHIM(Bharat Interface for money)- NPCI (National Payment Corporation of India) - Bank account Management – Transfer Funds – paying Bills – Locating ATMs - QR code payments- Alerts and notifications- Tracking Spending habits – Cash back-Safe banking methods.

### **Suggested Readings:**

1. B.Santhanam- Banking & Financial systems, Margham Publications
2. S.N.Maheshwari Banking theory, law and practice , Kalyani Publications
3. Parameswaran- Indian Banking, S.Chand& Co.

### **Web References:**

1. [https://en.wikipedia.org/wiki/Online\\_banking](https://en.wikipedia.org/wiki/Online_banking)
2. <https://www.sbi.co.in/portal/web/services/internet-banking>
3. <https://www.hdfcbank.com/assets/popuppages/netbanking.htm>
4. <https://www.investopedia.com/terms/m/mobile-banking.asp>
5. [www.scotiabank.com/mobile/ca/en/0,,5181,00.html](http://www.scotiabank.com/mobile/ca/en/0,,5181,00.html)

## **2. FUNDAMENTALS OF INSURANCE**

Level of Knowledge: Basic Level

Unit – I

Origin and history of Insurance – Meaning and definition of Insurance – Features of Insurance - Principles of Insurance – Objectives and advantages of Insurance- Types of Insurance – Insurance Organizations in India and their Profile

- Insurance Regulatory and Development Authority – its Duties and Functions Unit

– II

Meaning and Definition of Life Insurance – its Features – its Fundamental Principles - Types of policies in Life Insurance – Meaning and Definition of Fire Insurance - its Features – its Fundamental Principles – Types of policies in Fire Insurance - Meaning and Definition of Marine Insurance - its Features – its Fundamental Principles - Types of Policies in Marine Insurance.

### **Suggested Readings:**

1. A.Murthy – Elements of Insurance.
2. M.N.Mish – Insurance – Principles and Practice.

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**SYLLABUS – OTHER LANGUAGES**

**I YEAR – II SEMESTER**

**PAPER – II – ONE ACT PLAY, SHORT STORY & TRANSLATION**

**I . ONE ACT PLAY (Detailed Study): AATH EKANKI**

**Edited By:** Devendra Raj Ankur, Mahesh Aanand

Vani prakashan, 4695, 21-A Dariyagunj,; New Delhi – 110 002

**LESSONS PRESCRIBED :**

1. Aurangzeb ki Aakhari Raat
2. Laksmi Ka Swagat
3. Basant Ritu ka Naatak
4. Bahut Bada Sawal

**II. SHORT STORIES (Non- Detailed Study): SWARNA MANJARI Edited**

**by:** Dr. Chitti. Annapurna  
Rajeswari Publications

21/3, Mothilal Street, (Opp. Ranganathan Street),

T. Nagar, Chennai – 600 017.

**LESSONS PRESCRIBED :**

1. Mukthidhan
2. Mithayeewala
3. Seb aur Dev
4. Vivah ki Teen Kathayen

**III. TRANSLATION PRACTICE : (English to Hindi) BOOKS**

**FOR REFERENCE :**

1. Prayojan Moolak Hindi : Dr. Syed Rahamathulla  
Poornima Prakashan, 4/7, Begum III Street,  
Royapettah, Chennai – 14.
2. Anuvad Abhyas Part III Dakshin Bharat Hindi Prachar Sabha  
T. Nagar, Chennai -17.

**UNITISED SYLLABUS**

**UNIT – I**

1. Aurangzeb ki Aakhari Raat
2. Mukthidhan
3. Practice of Annotation Writing
4. Practice of Summary and Literary evaluation Writing

**UNIT – II**

1. Laksmi ka Swagat
2. Mithayeewala
3. Practice of Annotation Writing
4. Practice of Summary and Literary evaluation Writing

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**SYLLABUS – OTHER LANGUAGES**

UNIT-III

1. Basant Ritu ka Natak
2. Seb Aur Dev
3. Practice of Annotation Writing
4. Practice of Summary and Literary evaluation Writing

UNIT-IV

1. Bahut Bada Sawal
2. Vivah ki Teen Kathayen
3. Practice of Annotation Writing
4. Practice of Summary and Literary evaluation Writing

UNIT-V

1. Translation Practice. (English to Hindi)

**QUESTION PAPER PATTERN**

Time : 3 Hours

Maximum Marks : 75

**SECTION – A (5x3= 15)**

I Answer any **5 out of 8** Questions . Answer in **50 Words**

- i) 1 to 4 from One Act Play
- ii) 5 to 8 from Short Stories

**SECTION – B ( in 200 words )(3x5= 15)**

- II. a) Three Annotations out of Five (3x5 = 15)  
(Q. No.9 to 13 annotations from One Act Play only)
- b) One Question out of two (1x5 = 5)  
(Q. No.14 to 15)

(One characteristic out of two from short stories)

**SECTION C (4X 10 = 40)**

**III. Answer in 500 Words**

- a) Literary Evaluation of One Act Play -2 out of 3 (2x10 = 20)  
(Q. No. 16 to 18)
- b) Literary Evaluation of Short Story 1 out of 2 (2x10 =20)  
(Q. No.19 to 20)
- c) One Translation passage from English to Hindi (1x10=10)  
(Q. No. 21)

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**SYLLABUS – OTHER LANGUAGES**

**SEMESTER II**

Foundation Course: Paper II-French II

Title of the Paper : Prescribed text and grammar-II

**Prescribed  
textbook:**

- Régine Mérieux & Yves Loiseau, *Latitudes 1*, Paris, Didier, 2017 (**Units 7-12 only**).

**Questions not to be asked from the Autoévaluation and Préparation au DELF**

**Paper setters to strictly adhere to the syllabus and ask questions only from the pages included in the syllabus. Questions should cover the entire syllabus.**

**QUESTION PAPER PATTERN**

Time : 3 Hours

Maximum Marks : 75

**Section A (7 x 5 = 35 Marks)**

Answer any 7 questions

10 Grammar exercises to be given from the prescribed textbook

**Section B (10 x 2 = 20 Marks)**

Answer any TEN  
questions

15 questions to be asked on cultural aspects found in the prescribed textbook

**Section C (2 x 10 = 20 Marks)**

Answer any TWO

2 must be answered out of 4 topics (1 dialogue writing, 1 letter /email writing, 2 compositions based on the themes found in the prescribed textbook)

**SEMESTER III**  
**Core Paper V - CORPORATE ACCOUNTING**

**Course Objectives**

**Number of Credits: 4**

- To enable the students about the Preparation of the Company accounts.
- To motivate the students to understand the various Provisions of the Companies Act.

**Unit I: Share Capital**

Issue of Shares - Types of Shares - Forfeiture of shares - Reissue of shares - Underwriting of shares - Stock split - Meaning of Redemption - Redemption of Preference Shares.

**Unit II: Debentures & Acquisition of Business**

Meaning - Types of Debentures - Issue - Underwriting of Debentures - Redemption of Debentures. Acquisition of Business - Meaning - Profit Prior to Incorporation.

**Unit III: Final Accounts**

Final Accounts - Preparation of P & L A/c and Balance Sheet – Managerial Remuneration- Calculation and Legal Provisions.

**Unit IV: Valuation of Shares and Goodwill**

Valuation of Shares and Goodwill - Meaning - Methods of Valuation of Shares and Goodwill.

**Unit V: Alteration of Share Capital**

Meaning - Internal Reconstruction - Reduction of Share Capital.

**Note: Questions in Sec. A, B & C shall be in the proportion of 20:80 between Theory and Problems.**

**Suggested Readings**

1. Gupta, R.L & Radhaswamy, M, Advanced Accounts, Sulthan Chand, New Delhi.
2. Jain, S.P & Narang, N.L., Advanced Accounting, Kalyani Publications.
3. Reddy T.S. & Murthy, A, Corporate Accounting, Margham Publications, Chennai.
4. Shukla & Grewal & Gupta, Advanced Accounting, S. Chand & Co., New Delhi.
5. P.Radhika & Anita Raman, Corporate Accounting, McGraw Hill Education, New Delhi.

## **E-Resources**

[www.accountingcoach.com](http://www.accountingcoach.com)  
[www.accountingstudyguide.com](http://www.accountingstudyguide.com)  
[www.futureaccountant.com](http://www.futureaccountant.com)  
[www.education.svtuition.org](http://www.education.svtuition.org)

## **CORE PAPER VI - COMPANY LAW & SECRETARIAL PRACTICE**

### **Course Objectives**

**No of Credits: 4**

To acquire knowledge at practical and procedural aspects of a company formation and e-governance including digital signature and compliance requirements.

### **UNIT I INCORPORATION OF COMPANY AND ROLE OF COMPANY SECRETARY**

Evolution of Company law – Meaning and characteristics of a company – Stages of incorporation – e-filing – Memorandum of Association and Articles of Association – Alteration – Effects of registration – Doctrine of constructive notice – Ultravires and indoor management – lifting of Corporate veil.

Role and importance of Company Secretary – Key Managerial Personnel – Compliance officer – Compulsory Appointment - Qualification and disqualifications – Powers, duties and responsibilities of Secretary – Resignation and removal of Company Secretary – Officer in default.

### **UNIT II PROSPECTUS & SHARECAPITAL**

Prospectus – Shelf Prospectus – Red herring Prospectus – Civil & Criminal liability for mis-statement in Prospectus – Statement in lieu of Prospectus - Secretarial duties in the issue of Prospectus.

Share capital – Alteration of Share capital – rights issue, Bonus issue, Private and preferential allotment – Dividend, interim dividends, warrants and mandates – Secretarial duties in the issue of share capital.

### **UNIT III MEMBERS AND SHAREHOLDERS**

Members – Rights and responsibilities – who can be a member – member, shareholder, contributory – difference – transfer and transmission of shares (including depository mode) – Nomination and its importance.



## **UNIT IV KEY MANAGERIAL PERSONNEL AND MEETINGS**

Directors – Women Director – Independent Director and Whole time Key Managerial Personnel – Director Identification Number and its significance – duties, qualification and disqualification.

Board meeting, shareholder meeting, committee meeting, mandatory committee meeting – Role and composition – Powers of the board – Notice , Agenda, minutes and resolution – Secretarial duties in meetings.

## **UNIT V WINDING UP**

Modes of Winding up - Winding up by the tribunal – Voluntary Winding up – NCLT – Special courts – Mediation and Conciliation panel.

**Practical orientation – To encourage the students to role play as company secretary in any meeting of the company (conduct Mock meeting)**

### **Suggested Readings:**

1. Dr. B. Ravi – Company Law and Secretarial Practice ( New Companies Act 2013)
2. N. D Kapoor – Company Law, Sultan Chand & Sons, New Delhi
3. Gaffoor & Thothadri – Company Law and Secretarial Paractice, Vijay Nicole Prints, Chennai
4. V.Balachandran and M.Govindarajan – A Student Handbook on Company Law and Practice, Vijay Nicole Prints, Chennai
5. Taxman’s Companies Act 2013 - Taxman Publications, New Delhi
6. Vinod Kothari – Understanding Companies Act 2013 – Jain book agency, New Delhi.
7. Mr. Srinivasan – Company Law & Secretarial Practice, Margham Publications, Chennai

### **Journals:**

- India business Law Journal, Vantage Asia publishing Limited
- Law Journal/ Corporate Law Reporter
- Symbiosis Contemporary Law Journal
- ICSI - Journals & Bulletins

## **E – learning resources**

- [www.indianlawjournal.org](http://www.indianlawjournal.org)
- [www.icsi.edu](http://www.icsi.edu)
- [www.clioindia.com](http://www.clioindia.com)

## **Allied Paper III - BUSINESS STATISTICS**

### **Course Objectives**

**Number of Credits: 5**

- To facilitate the understanding of the relevance and need of the Statistics in the Current Scenario.
- To Customize the importance of Business Statistics for the Commerce Students.

### **UNIT - I Introduction**

Meaning and Definition of Statistics - Collection and Tabulation of Statistical Data - Presentation of Statistical Data - Graphs and Diagrams

### **UNIT- II Measures of Central Tendency and Measures of Variation**

Measures of Central Tendency - Arithmetic Mean, Median, Mode, Harmonic Mean and Geometric Mean. Measures of Variation - Standard deviation - Mean Deviation - Quartile Deviation - Skewness and Kurtosis - Lorenz Curve

### **UNIT- III Correlation and Regression Analysis**

Simple Correlation - Scatter Diagram - Karl Pearson's Correlation - Spearman's Rank

Correlation - Regression - Meaning - Linear Regression.

### **UNIT - IV Time Series**

Analysis of Time Series - Causes of variation in Time Series Data - Components of Time series; Additive and multiplicative models - Determination of Trend by Semi average, Moving average and Least squares (Linear, Second degree and Exponential) Methods - Computation of Seasonal indices by Simple average, Ratio-to-moving average, Ratio-to Trend and Link relative methods

### **UNIT - V Index Numbers**

Meaning and Types of Index numbers - Problems in Construction of Index numbers - Methods of Construction of Price and Quantity indices - Tests of adequacy - Errors in Index numbers - Chain Base Index numbers - Base shifting - splicing - deflating - Consumer Price index and its uses - Statistical Quality Control

**Note: Questions in Sec. A, B & C shall be in the proportion of 20:80 between Theory and Problems.**

## **Suggested Readings**

1. Dhingra I C & M.P. Gupta, Lectures in Business Statistics, Sultan Chand and Sons, New Delhi, 2009
2. Gupta S P and Archana Agarwal, Business Statistics (Statistical Methods), Sultan Chand and Sons, New Delhi, 9<sup>th</sup> revised edition 2013
3. Gupta S. C, Fundamentals of Statistics, Himalaya Publishing House
4. Sharma J K, Fundamentals of Business Statistics, 2nd edition, Vikas Publishing House Pvt Ltd, 2013
5. Rajagopalan.S.P, and Sattanathan, R., Business Statistics and Operations Research, Vijaya Nicole Imprint Pvt. Ltd., Chennai
6. Joseph Anbarasu, Business Statistics, Vijay Nicole Imprint Pvt. Ltd, Chennai

## **E-Resources**

[www.spss.co.in](http://www.spss.co.in)

<https://statlearning.class.stanford.edu>

<http://www.mit.edu>

[www.springer.com](http://www.springer.com)

**UNIVERSITY OF MADRAS**  
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**SYLLABUS – OTHER LANGUAGES**

**II YEAR - III SEMESTER**

**Paper III Ancient Poetry and Introduction to Hindi Literature**  
**( Upto ReetiKaal )**

**1. Ancient Poetry**

**Prescribed Text Book : Selections in Poetry (2007)**

**University Publications University  
of Madras .**

**Lessons Prescribed :**

1. Kabirdas - Saakhi (Dohas from 1 to 10)
2. Surdas - Bramargeet Saar only
3. Tulasidas – Vinay ke Pad only
4. Meera Bai – Pad only
5. Tiruvalluar (Dharmakaand only)
6. Biharilal ( Dohas 1 to 5 )

**2. Introduction to Hindi Literature (up to Reethikaal)**

**Lessons Prescribed :**

1. Literary Trends of Veeragatha Kaal (Aadikaal) - Important poets : 1. Chand Baradai 2. Vidhyapathi and their Works
2. Literary Trends of Bhakthi Kaal – Important Poets : 1. Kabirdas 2. Joyasi 3. Tulasidas 4. Surdas and their works
3. Literary Trends of Reethikaal – Important Poets : 1. Bihari 2. Bhushan 3. Ghananand

**Reference Books :**

1. Hindi Sahithya Ka Itihas  
By: Ramchandra Shukla , Jayabharathi Publications, 217, B, Maya Press Road, Allahabad  
– 211 003.
2. Hindi Sahithya Yug Aur Pravritthiya  
By: Dr. Sivakumar Varma,  
Asok Prakashan Nayi Sarak, New Delhi – 6
3. Hindi Sahithya ka Sybodh Itihas  
By : Babu Gulabroy, Lakshmi Narayanan Agarwas Book Publishers seller, Anupama Plaza

-1, Block.No.50, Sanjay Place, Agra- 282002.

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**SYLLABUS – OTHER LANGUAGES**

**Unit wise Syllabus for III Semester**

**UNIT –I**

1. Kabirdas - Saakhi (Dohas from 1 to 10)
2. Literary Trends of Veeragatha Kaal (Aadikaal)
3. Chand Baradai and his Works
4. Vidhyapathi and his Works

**UNIT - II**

1. Surdas - Bramargeet Saar
2. Literary Trends of Bhakthi Kaal
3. Gyan Margi Shakha
4. Important Poet : 1.

**Kabirdas UNIT - III**

1. Tulasidas – Vinay ke Pad only
2. Literary Trends of Bhakthi Kaal – Prem Margi Shakha
3. Literary Trends of Bhakthi Kaal - Ram Bhakthi Shakha
4. Important Poets – 1. Joyasi and 2. Tulasidas

**UNIT - IV**

1. Meera Bai – Pad only
2. Tiruvalluar (Dharmakaand only)
3. Literary Trends of Bhakthi Kaal – Krishna Bhakthi Shakha
4. Important Poet –

**Surdas UNIT - V**

1. Biharilal ( Dohas 1 to 5 )
2. Literary Trends of Reethikaal
3. Important Poet : Bihari and his works
4. Bhushan and his works and Ghananand and his works

**QUESTION PAPER PATTERN**

**Time : 3 Hours**

**Maximum Marks : 75**

**SECTION- A ( 5x3=15 )**

**I.** Answer **any 5 out of 8** Questions – Give Answer in **50 Words**

- i) 1 to 4 from Poetry Selection
- ii) 5 to 8 from Sahithya ka itihās

**SECTION- B (4x5=20 )**

**II.** a) Four Annotations out of **Seven**  
( Q.No.9 to 15 annotations from Poetry Selection )

**SECTION- C ( 4x10=40 )**

Answer in **500 Words**

- 1) Literary Evaluation of Poems 2 out of 3 ( 2 X 10 = 20 )  
( Q. No. 16 to 18 )
- 2) Essays from History of Hindi Literature 1 out of 2 ( 1 X 10 = 10 )  
( Q. No. 19 to 20 )

3) Brief note on Poets and Writings ( 1 X 10 + 10 )  
( Any 2 out of 4 ) ( Q. No. 21 )

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**SYLLABUS – OTHER LANGUAGES**

**SEMESTER III**

Foundation Course: Paper III-French III

Title of the Paper : Translation, Comprehension and Grammar-I

**Prescribed textbook:**

- K.Madanagobalane & N.C.Mirakamal, *Le français par les textes*, Chennai, Samhita Publications-Goyal Publisher & Distributors Pvt Ltd, 2017

The following grammar components are chosen from the prescribed textbook:

- Les pronoms relatifs
- Le passé composé
- L'imparfait
- Le plus-que-parfait
- Le subjonctif
- Le conditionnel
- La comparaison

The following texts from the prescribed textbook:

- Les feuilles mortes
- Le vrai Père
- Nos études
- Demain dès l'aube
- Par une journée d'été
- Une visite inattendue
- L'hiver
- Le Libraire

**Paper setters to strictly adhere to the syllabus and ask questions only from the pages included in the syllabus. Questions should cover the entire syllabus.**

**QUESTION PAPER PATTERN**

Time : 3 Hours

Maximum Marks : 75

**Section A (25 Marks)**

**Answer ALL questions**

1. Translate the following passage from the prescribed text into English (10 Marks)
2. Translate the unseen passage into English (15 Marks)

**Section B (25 Marks)**

**Answer ALL questions**

1. FIVE Questions on Comprehension of a passage from the prescribed text (5 x 2 = 10 Marks)
2. FIVE Questions on Comprehension of an unseen passage (5 x 3 = 15 Marks)

**Section C (5 x 5 = 25 Marks)**



Answer any FIVE exercises

7 grammar exercises to be given from the prescribed text.

## **SEMESTER IV**

### **Core Paper VII - ADVANCED CORPORATE ACCOUNTING**

#### **Course Objectives**

**Number of Credits: 4**

- To enable the students to understand the method of solving problems in company accounts
- To facilitate the students to understand liquidation accounting

#### **Unit I: Internal Reconstruction**

Meaning - Alteration of share capital - accounting procedures

#### **Unit II: Amalgamation and External Reconstruction**

Meaning - Amalgamation in the nature of merger, purchase - External Reconstruction - Applicability of AS 14 - Calculation of purchase consideration (all methods) - Journal entries in the books of Transferor and the Transferee Companies - revised balance sheet (excluding inter-company holdings)

#### **Unit III: Consolidation accounting**

Holding Company - Subsidiary Company - Meaning - Preparation of Consolidated Final Statement of Accounts - Treatment of Dividend. (Inter - Company Owing excluded)

#### **Unit IV: Banking Company accounts**

Bank accounts - concept of NPAs - Asset classification - Preparation of Final Accounts of Banking Companies.

#### **Unit V: Liquidation**

Meaning - Preparation of Liquidator's Final Statement of Account - Calculation of Liquidator's Remuneration - Preparation of Statement of Affairs and Deficiency Account

**Note: Questions in Sec. A, B & C shall be in the proportion of 20:80 between Theory and Problems.**

## **Suggested Readings:**

1. Gupta, R.L. & Radhaswamy, M., Advanced Accounts, Sultan Chand & Sons, New Delhi.
2. Jain, S.P. & Narang K.L., Advanced Accounts - Kalyani Publishers.
3. Reddy, T.S & Murthy, A, Corporate Accounting, Margham Publications, Chennai.
4. Shukla, M.C. & Grewal, J.S, Advanced Accounts, S. Chand and Company, New Delhi.
5. P.Radhika & Anita Raman, Advanced Corporate Accounting, McGraw Hill Education, New Delhi.

## **E-Resources**

[www.accountingcoach.com](http://www.accountingcoach.com)  
[www.accountingstudyguide.com](http://www.accountingstudyguide.com)  
[www.futureaccountant.com](http://www.futureaccountant.com)  
[www.education.svtuition.org](http://www.education.svtuition.org)

## **Core Paper: VIII - INDIRECT TAXATION**

### **Course Objectives**

**Number of Credits: 5**

- To make the students to gain knowledge of the Principles of the Indirect Tax.
- To highlight the students about the Customs duty, Excise duty, VAT etc.

### **UNIT I: Introduction**

History and Objectives of Taxation - Canons of Taxation - Tax system in India - Direct and Indirect Taxes - Meaning and Types - powers of Union and States to levy taxes

### **UNIT – II: GST – Overview & Concepts**

Background behind implementing GST- The need for GST- Business impact- Objectives and Benefits of GST-SGST- CGST and IGST- Taxes covered by GST- Definitions - Scope and Coverage Scope of supply- Levy of tax- Rate Structure- Taxable Events - Types of Suppliers - Composite and Mixed Suppliers - Composite Levy - Cross empowerment.

### **UNIT – II: GST Taxation/ Assessment proceedings**

Return- Refunds- Input Tax Credit- Reverse charge Mechanism, Transitional Provisions composition under GST- Administrative structure of GST-Officers as per CGST Act- Officers as per SGST Act-Jurisdiction- Appointment Powers.

## **UNIT-IV GST Audit**

Assessment and Audit under GST- Demands and Recovery- Appeals and revision- Advance ruling Offences and Penalties - NAPA (National Anti- Profiteering Authority).

## **UNIT-V Customs duty**

The custom duty- Levy and collection of customs duty- Organisations of custom departments- Officers of customs- powers- Appellate Machinery- Infringement of the Law-Offences and Penalties- Exemptions from duty customs duty draw back- duties free Zones - Export Incentive Schemes.

**Note: All Units, only Theory**

### **Suggested Readings:**

1. Sweta Jain, GST law and practice, Taxmann Publishers, July 2017.
2. Datt V S, GST- Input Tax Credit- Taxmann Publishers, second edition August 2017
3. Anurag Pandey, Law and Practice of GST- Sumedha Publication House, 2017
4. Vandana Bange, Beginners- Guide Aadhaya Prakashan Publisher, 2017
5. Govindarajan, A practical guide send text publishers, July 2017
6. Datta, D C, Layman's Guide on GST, Taxman Publications
7. Reddy & Dr. Y. Hariprasad Reddy, Business Taxation, Margham Publications, Chennai

### **E-Resources**

[www.legalserviceindia.com](http://www.legalserviceindia.com)

[www.indiacorporateadvisor.com](http://www.indiacorporateadvisor.com)

[www.tnvat.gov.in](http://www.tnvat.gov.in)

[www.cbec.gov.in](http://www.cbec.gov.in)

[www.aces.gov.in](http://www.aces.gov.in)

# **ALLIED IV - SECURITIES LAWS AND MARKET OPERATIONS**

## **Course objectives**

**No of Credits:5**

To promote conceptual understanding and in-depth knowledge of trading in securities and its implication in financial markets.

## **UNIT I Primary Market / New Issue Market**

Meaning – Functions of New issue market – Methods of floating new issues – Players involved in the new issue market (Merchant bankers – Underwriters – Brokers - Registrar- Lead managers & Banks) – Role of SEBI relating to the new issue market – SEBI Guidelines for disclosure & Investor Protection.

## **UNIT II Secondary Market / Stock Exchange**

Origin & Management of stock exchanges in India – Characteristics – Functions – Members – Granting recognition to stock exchanges – Listing of securities & registration of brokers – Kinds of brokers in stock exchange – NSE – BSE – OTCEI – SEBI Guidelines relating to listing of securities.

## **UNIT III Financial Instruments in New Issue & Secondary Market**

Treasury bills- Commercial bills- Certificate of deposits- Equity shares- Preference shares- Sweat equity shares- Debentures- American Depository Receipts- Global Depository Receipts- Exchange traded funds & exchange traded notes – Mutual Funds.

## **UNIT IV Mechanism of Stock Market Trading**

Screen based trading and internet based trading – Demat trading and role of depositories – Market Derivatives, advantages and its types – futures, hedge fund, forward, options & swaps

Market indexes – SENSEX, NIFTY & CNX NIFTY (Basics)

## **UNIT V Credit Rating Agency**

Meaning – Functions – Credit rating in India – Credit rating agencies in India – CRISIL & CARE

## **Practical orientation**

To give practical exposure to students relating to stock trading and market indexes reading of various sectors like manufacturing, pharmaceuticals, health, aviation, hospital etc.

1. Assignment
2. Collage on IPO Issues.

### **Suggested Readings**

1. Dr. L. Natarajan - Securities Laws & Market Operations, Margham Pub. Chennai.
2. K.Natarajan, E.Gordon – Financial market & Services, Himalaya publishing House, Mumbai.
3. S.Gurusamy – Securities Laws & Market operations, Vijay Nichole Prints, Chennai.
4. Gupta L.C – Stock Exchange Trading in India, Society for Capital Market Research and Development, Delhi
5. MachiRaju.H.R – Working of Stock Exchange in India, New Age International.
6. Chandrate K.R; et al : Capital issue, SEBI & Listing; Bharat Publishing House
7. V.K . Bhaliya – Financial Derivatives – Risk Management, Sultan Chand Ltd, New Delhi.

### **JOURNALS**

- Taxman – SEBI and Corporate Laws
- Corporate Law Advisor
- SEBI Monthly Bulletins
- NSE Yearly Publications

### **e-LEARNING RESOURCES**

- <http://corporatefinanceinstitute.com>
- [www.bseindia.com](http://www.bseindia.com)
- [www.managementstudyguide.com](http://www.managementstudyguide.com)
- [www.investopedia.com](http://www.investopedia.com)

**UNIVERSITY OF MADRAS**  
**UG & 5 YR INTEGRATED DEGREE COURSES**  
**SYLLABUS – OTHER LANGUAGES II**

**YEAR - IV SEMESTER**

Paper –IV Modern Poetry And Introduction To Hindi Literature

(Aadhunik Kaal)”

**1. Modern Poetry**

**Prescribed Text Book : Selections in Poetry**

**University Publications, University of Madras .**

**Lessons Prescribed :**

1. Asha – (Jayashankar Prasad)
2. Tum Logon se Door (Nagarjun)
3. Kavi Aur Kalpana – (Dhramaveer Bhaarathi)
4. Bharat Ki Aarthy - (Shamsher Bahadur Singh)
5. Varadan Mangoonga Nahi (Siva Mangal Singh Suman)
6. Anevalon Se Ek Savaal (Bharat Bhooshan Agarwal)

**2. Introduction to Hindi Literature (Aadhunik Kaal)**

**Lessons Prescribed :**

1. Literary Trends of Chayavaad
2. Literary Trends of Pragathivaad
3. Literary Trends of Nayee Kavita
4. Literary Trends of Hindi Short Stories
5. Literary Trends of Hindi One Act Plays
6. Brief Note on the writers and their works

Maithili Saran Gupta, Jayashankar Prasad, Nirala, Mahadevi Varma, Panth,  
Dinakar, Premchand, Yashpaal Jainendra Kumar, Mohan Rakesh,

**Reference Books :**

1. Hindi Sahithya Ka Itihas  
By: Ramchandra Shukla , Jayabharathi Publications, 217, B, Maya Press Road, Allahabad  
– 211 003.
2. Hindi Sahithya Yug Aur Pravritiya  
By: Dr. Sivakumar Varma,  
Asok Prakashan Nayi Sarak, New Delhi – 6
3. Hindi Sahithya ka Sybodh Itihas

By : Babu Gulabroy, Lakshmi Narayanan Agarwas Book Publishers seller,Anupama Plaza  
-1, Block.No.50, Sanjay Place, Agra- 282002.



**UNIVERSITY OF MADRAS**  
**UG & 5 YR INTEGRATED DEGREE COURSES**  
**SYLLABUS – OTHER LANGUAGES**

**Unit wise Syllabus for IV Semester**

**UNIT - I**

1. Asha – (Jayashankar Prasad)
2. Tum Logon se Door (Nagarjun)
3. Literary Trends of Chayavaad

**UNIT - II**

1. Kavi Aur Kalpana – (Dhramaveer Bhaarathi)
2. Bharat Ki Aarathi - (Shamsher Bahadur Singh)
3. Literary Trends of Pragathivaad

**UNIT - III**

1. Varadan Mangoonga Nahi (Siva Mangal Singh Suman)
2. Anevalon Se Ek Savaal (Bharat Bhooshan Agarwal)
3. Literary Trends of Nayee Kavita

**UNIT –IV**

1. Literary Trends of Hindi Short Stories
2. Literary Trends of Hindi One Act Plays

**UNIT- V**

1. Maithili Saran Gupta, Jayashankar Prasad, Nirala,
2. Mahadevi Varma, Panth, Dinakar, Premchand,
3. Yashpaal Jainendra Kumar, Mohan Rakesh,

**QUESTION PAPER PATTERN**

**Time : 3 Hours**

**Maximum Marks : 75**

**SECTION- A ( 5x3=15 )**

- I.** Answer **any 5 out of 8** Questions – Give Answer in **50 Words**
- i) 1 to 4 from Poetry Selection
  - ii) 5 to 8 from Sahithya ka itihās

**SECTION- B ( 4x5=20 )**

- II.** a) Four Annotations out of **Seven**  
( Q.No.9 to 15 annotations from Poetry Selection )

**SECTION- C ( 4x10=40 )**

Answer in **500 Words**

- 1) Literary Evaluation of Poems 2 out of 3 ( 2 X 10 = 20 )  
( Q. No. 16 to 18 )
- 2) Essays from History of Hindi Literature 1 out of 2 ( 1 X 10 = 10 )  
( Q. No. 19 to 20 )

3) Brief note on Poets and Writings

( 1 X 10 + 10 )

( Any 2 out of 4 ) ( Q. No. 21 )

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**UNIVERSITY OF MADRAS**  
**UG & 5 YR INTEGRATED DEGREE COURSES**  
**SYLLABUS – OTHER LANGUAGES**

**SEMESTER IV**

Foundation Course: Paper IV-French IV

Title of the Paper : Translation, Comprehension and Grammar-II

**Prescribed textbook:**

- K.Madanagobalane & N.C.Mirakamal, *Le français par les textes*, Chennai, Samhita Publications-Goyal Publisher & Distributors Pvt Ltd, 2017

The following grammar components are chosen from the prescribed textbook:

- Le passé simple
- Temps du passé - Emplois (le passé composé, l'imparfait, le passé simple, le plus-que-parfait)
- L'expression de la cause
- L'expression de la conséquence
- L'expression du but
- L'expression de la concession
- L'expression de la condition et de l'hypothèse

The following texts from the prescribed textbook:

- Décadi et son grand-père
- Le Petit chose
- L'égoïste puni
- Estula
- Une Saison dans la vie d'Emmanuel
- Une mauvaise nouvelle
- La visite de la grand-mère
- *Le Horla*

**Paper setters to strictly adhere to the syllabus and ask questions only from the pages included in the syllabus. Questions should cover the entire syllabus.**

**QUESTION PAPER PATTERN**

Time : 3 Hours

Maximum Marks : 75

**Section A (25 Marks)**

Answer ALL questions

1. Translate the following passage from the prescribed text into English (10 Marks)
2. Translate the unseen passage into English (15 Marks)

**Section B (25 Marks)**

Answer ALL questions

1. FIVE Questions on Comprehension of a passage from the prescribed text (5 x 2 = 10 Marks)
2. FIVE Questions on Comprehension of an unseen passage (5 x 3 = 15 Marks)

**Section C (5 x 5 = 25 Marks)**

Answer any FIVE exercises

7 grammar exercises to be given from the prescribed text.

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## **SEMESTER V**

### **CORE PAPER IX – COST ACCOUNTING**

#### **Course Objectives:**

**No of Credits: 4**

To gain knowledge on ascertainment of the cost of goods & services accurately on cost control.

#### **UNIT - I Cost Accounting**

Definition, meaning and objectives- Advantages and Importance- Distinction between Cost and Financial Accounting - Elements of Cost and Preparation of Cost Sheets and Tenders.

#### **UNIT – II Materials**

Stores record- purchase records- purchase order- Goods received note- Bin card- Stores Ledger - Inventory Control- ABC Analysis – Economic Ordering Quantity – Maximum, Minimum and Reordering levels – Methods of Pricing Issues - Perpetual Inventory System.

#### **UNIT – III Labour**

Importance of Labour Cost Control- Various Methods of Wage Payments - Calculation of Wages - Methods of Incentives (Bonus) Schemes - Recording Labour time- Treatment of “OVER TIME” and “IDLE TIME”- Labour Turn Over (L.T.O)

#### **UNIT – IV Overheads (Factory, Administration, Selling and Distribution)**

Definition and Meaning of Overheads – Classification – Apportionment of Overheads – Redistribution (Secondary Distribution) – Absorption of Overheads including “Machine Hour Rate”.

#### **UNIT – V Methods of Costing**

Unit Costing – Job Costing (Excluding Contract Costing) – Process Costing – Simple Process Accounts (Excluding Inter Process Profits and Equivalent Production, Joint Product) – Operation and Operating Costing.

**Practical orientation - Students can be advised to prepare a model cost sheet with the help of published financial reports of manufacturing industries.**

### **Suggested Readings:**

1. B.K.Bhar – Cost Accounting, Academic Publishers.
2. Jain & Narang – Cost and Management Accounts, Kalyani Publishers,
3. S.N.Maheshwari – Cost & Management Accounts, Sultan Chand & Sons, New Delhi.
4. S.P.Iyengar – Cost Accounting principles and practice, Sultan Chand & Sons, New Delhi.
5. T.S. Reddy and Y. Hari Prasad Reddy – Cost Accounting, Margham Publications, Chennai.
6. A.Murthy & S.Gurusamy, Cost Accounting, Vijay Nichole Prints, Chennai.
7. S.Thothadri & S. Nafeesa, Cost Accounting, McGraw Hill Edu., New Delhi.

## **CORE PAPER X - CORPORATE GOVERNANCE AND ETHICS**

### **Course Objectives**

**No Of Credits - 5**

- To impart knowledge on governance which ensure ethics in corporate management.
- To provide an understanding on legal enforcement for management of corporate health in the interest of shareholder & public.

### **UNIT 1 Corporate Governance**

Corporate governance – meaning – objectives – need - importance – principles – corporate governance and organisation success. Corporate governance in India

### **UNIT 2 Levels of Governance Structure**

Corporate governance and role, responsibilities and powers - Board of Directors, Corporate Management Committee and Divisional Management Committee.

### **UNIT 3 Corporate Governance Forums**

CII code on corporate governance – features - Various Corporate Governance forums – CACG, OECD, ICGN AND NFCG.

## **UNIT 4 Corporate Social Responsibility**

Corporate Social Responsibility – definition – nature – levels – phases and approaches, principles, Indian models – dimensions. Corporate social reporting - Objectives of Corporate Social Reporting and case studies.

## **Unit 5 Business Ethics**

Business ethics – meaning, significance, scope – factors responsible for ethical and unethical business decision. Unethical practices in Business – Business ethics in India – Ethics training programme.

**Practical orientation – Students can be assigned to submit a report on CSR activities of the Institution in which they have undergone institutional training.**

### **Suggested Readings:**

1. Dr. Neeru Vasishth and Dr. Namita Rajput - Corporate Governance values and ethics, Taxmann Publications Pvt Ltd, New Delhi.
2. S.Sanakaran – International Business & Environment, Margham Publication, Chennai.
3. Dr.S.S. Khanka – Business Ethics and Corporate Governance, S.Chand Publication.
4. Sundar.K, Business Ethics and Value, Vijay Nichole Prints, Chennai.
5. Taxmann - Corporate Governance, Indian Institute of Corporate Affairs,
6. A.C.Fernando, K.P.Muralidharan & E.K.Satheesh – Corporate Governance, Principles, Policies and Practices, Pearson Education.

### **Journals**

- Journal of Corporate Governance Research – Macrothink Institute
- Indian Journal of Corporate Governance, Bi-annual journal – Sage Journals

### **e-learning Resources**

- <https://elearningindustry.com>
- <https://essentialskillz.com>

# Core Paper XI - BUSINESS LAWS

## Course Objectives

Number of Credits: 4

- To highlight the Provisions of Law governing the General Contract and Special Contract.
- To enable the students to understand the Legal Remedies available in the Law to the Business and other People.

### Unit I: Formation of Contract

Indian Contract Act - Formation - Nature and Elements of Contract - Classification of Contracts - Contract Vs Agreement.

### Unit II: Offer, Acceptance and Consideration

Offer - Definition - Forms of Offer - Requirements of a Valid Offer. Acceptance – Meaning - Legal rules as to a Valid Acceptance. Consideration - Definition - Types - Essentials.

### Unit III: Other Elements of Valid Contract

Capacity of Parties - Definition - Persons Competent to contract. Free consent – Coercion - Undue Influence - Fraud - Misrepresentation - Mistake. Legality of object - Void agreements - Unlawful Agreements.

### Unit IV: Performance of Contract

Performance of Contracts - Actual Performance - Attempted Performance - Tender. Quasi Contract - Definition and Essentials. Discharge of Contract - Modes of Discharge - Breach of Contract - Remedies available for Breach of Contract.

### Unit V: Sale of Goods Act

Sale - Contract of Sale - Sale Vs Agreement to Sell - Meaning of Goods - Conditions and Warranty - Caveat Emptor - Exceptions of Caveat Emptor - Buyer and Seller of Goods - Unpaid Seller - Definition - Rights of an Unpaid Seller.

### Suggested Readings:

1. Balachandran. V & Thothadri.S, Business Law, Vijay Nicole Imprints Pvt. Ltd. Chennai
2. Kapoor, N.D. Business Laws, Sultan Chand and Sons.
3. Sreenivasan, M.R. Business Laws, Margam Publications.
4. Dhandapani, M.V. Business Laws, Sultan Chand and Sons.
5. Badre Alam, S. & Saravanavel, P. Mercantile Law
6. Pillai, R.S.N. & Chand, S, Business Law, S Chand & Co, Delhi
7. Ramaswamy, K.N., Business Law, S Chand & Co, Delhi



### **E-Resources**

[www.cramerz.com](http://www.cramerz.com)

[www.digitalbusinesslawgroup.com](http://www.digitalbusinesslawgroup.com)

<http://swcu.libguides.com/buslaw>

<http://libguides.slu.edu/businesslaw>

## **Core Paper XII - INCOME TAX LAW AND PRACTICE - I**

### **Course Objectives**

**Number of Credits: 4**

- To provide a detailed understanding of the various provisions of I.T. Act.
- To enable the students to about the Assessment Procedures and Tax Planning.

### **Unit I: Introduction**

History of Income tax in India - Meaning of Income - Features of Income Tax - Types - Important Definitions Under the Income Tax Act - Assessee - Types - Rates of Tax - Residential Status - Scope of Total Income - Incomes Exempt from tax.

### **Unit II: Income from Salary**

Definition - Allowances - Valuation of perquisites - Deductions from Salary - Gratuity - Pension - Commutation of Pension - Leave Salary - Profits in lieu of Salary - Provident Funds - Deductions under Sec. 80C

### **Unit III: Income from House Property**

Meaning - Exemptions - Annual Value - Meaning and Computation - Deductions from Annual Value – Legal Provisions.

### **Unit IV: Profits and Gains from Business or Profession**

Income from Business or Profession - Allowable expenses - Not allowable expenses - General deductions - Provisions relating to Depreciation - Deemed Business Profits - Undisclosed incomes

### **Unit V: e-filing & Submission of Returns**

e-filing - Concept - Procedure - 26 AS - TDS - Traces - Filing of Return - Due date for filing returns - Various Returns - Permanent Account Number (PAN) - Usage of PAN

**Note: Questions in Sec. A, B & C shall be in the proportion of 20:80 between Theory and Problems.**

## Suggested Readings

1. Vinod, K. Singhania, Students Guide to Income Tax, Taxman Publications Pvt. Ltd.
2. Murthy.A, Income Tax Law & Practice, Vijay Nicole Imprints Pvt. Ltd. Chennai
3. Mehrotra - Income Tax Law & Accounts, Goyal, Sathiya Bhavan Publications.
4. Gaur & Narang, Income Tax Law & Practice, Kalyani Publishers.
5. Reddy, T.S. & Hariprasad Reddy, Y, Income Tax Theory, Law & Practice, Margham Publications, Chennai.
6. HariharanN, Income Tax Law & Practice, Vijay Nicole Imprints Pvt. Ltd. Chennai
7. Anita Raman, Income Tax Theory, Law and Practice, McGraw Hill Education, New Delhi.

## E-Resources

[www.incometaxindia.gov.in](http://www.incometaxindia.gov.in)

[www.incometaxindiaefiling.gov.in](http://www.incometaxindiaefiling.gov.in)

[www.onlineservices.tin.egov-nsdl.com](http://www.onlineservices.tin.egov-nsdl.com)

[www.cleartax.in](http://www.cleartax.in)

## Elective Paper I – MARKETING

### Course Objectives

**Number of Credits: 5**

- To make the students understand the importance and the relevance of Marketing in To-day's Business World.
- To enable the students to understand the Features of the Indian Marketing.

### Unit I: Introduction

Marketing - Meaning - Definition and Functions of Marketing - Marketing Orientation - Role and Importance of Marketing - Classification of Markets.

### Unit II: Market Segmentation and Consumer Behaviour

Market Segmentation - Concept - Benefits - Basis and Levels. Introduction to Consumer Behaviour - Need for study - Consumer Buying Decision Process - Buying Motives. Marketing Research - MIS - Meaning and Differences.

### Unit III: Marketing Mix and Product Policy

Marketing Mix - Meaning - Product - Introduction - Product policy - Product Planning - Stages of New Product Development - Introduction to PLC - Packaging - Branding - Labelling - Product Mix - Price - Pricing Policies and

Methods.

### **Unit IV: Channels of Distribution**

Channels of Distribution - Levels - Channel Members - Promotion - Communication Mix - Basics of Advertising, Sales Promotion and Personal Selling.

### **Unit V: Recent Trends in Marketing**

E - Marketing - Online Retailing - Shopping Malls - Consumer Protection Act - Salient Features - Consumerisation - Consumer Rights, Consumer Grievance Redressal Forums- Role of Social Media in Marketing.

### **Suggested Readings**

1. Rajan Nair, Marketing, Sulthan Chand & Sons, New Delhi.
2. Varshney, Marketing Management, Sulthan Chand & Sons, New Delhi
3. Chandrasekar K S, Marketing Management: Text and Cases, Vijay Nicole Imprints, Chennai, 2014
4. Gandhi, J.C, Marketing, Himalaya Publications.
5. Radha, Marketing, Prasanna Publications, Chennai.
6. Santhanam, Marketing, Margham Publications, Chennai
7. Sundar, K. EssentialsofMarketing, Vijay Nicole Imprints Pvt. Ltd., Chennai

### **E-Resources**

[www.marketmotive.com](http://www.marketmotive.com)

<http://emailmarketing.comm100.com/email-marketing-tutorial/>

[www.marketing91.com](http://www.marketing91.com)

[www.managementstudyguide.com](http://www.managementstudyguide.com)

## SEMESTER VI

### CORE PAPER XIII – INDUSTRIAL LAWS

#### Course Objectives:

No of Credits:4

- To acquire knowledge on various rules and regulations prevalent in the present business scenario.
- To gain insight on various legal Acts passed to protect the health, safety & welfare of the employees.

#### UNIT I Factories act 1948

Definitions – Health – Safety – Welfare – Working Hours of Adults – Employment of Women – Employment of Young Persons – Leave with Wages.

#### UNIT II Industrial Disputes Act 1947

Definitions – Authorities under the Act – Reference of Disputes – Procedures and Powers of Authorities – Strikes and Lock-outs – Lay-off & Retrenchment – Special Provisions relating to Lay-off, Retrenchment & Lock-outs

#### UNIT III The Workmen Compensation Act 1923

Need for the Act – Scope & Coverage of the Act – Definitions – Employer's liability for Compensation (Section 3) including Theory of Notional Extension & Occupational Diseases – Defences available to Employer – Amount & Distribution of Compensation – Notice & Claim – Medical Examination - Obligations & Rights of Employers & Employees - Schedules to the Act

#### UNIT IV Employees State Insurance Act 1948

Objects-definitions-ESI Corporation, functions- contribution and recovery- benefits- penalties for false claims

#### UNIT V Employees Provident Fund and Miscellaneous Provision Act, 1952

Objects- definition- provident fund schemes- contribution and recovery – penalties and offences

**Practical orientation - Students can be assigned to submit a report on welfare, health and safety measures taken by the manufacturing industries of their choice.**

## **Suggested Readings**

1. N.D.Kapoor – Industrial Laws, Sultan Chand & Sons, New Delhi.
2. P.C.Tripathi - Industrial Laws, Sultan Chand & Sons, New Delhi
3. Dr.M.R.Sreenivasan & C.D.Balaji - Industrial Laws & Public Relations, Margham Publications, Chennai.
4. B.Nandha Kumar, Industrial Laws, Vijay Nichole Prints, Chennai.
5. S.Thothadri & Vijayalakshmi.M, IK International Publishing House Pvt Ltd.

## **Core Paper XIV - MANAGEMENT ACCOUNTING**

### **Course Objectives**

**Number of Credits: 4**

- To enable the students to get knowledge about the various techniques of Management Principles.
- To make the students to get practical skill in solving management problems.

### **Unit I: Introduction**

Management Accounting - Meaning - Scope - Importance - Limitations – Management Accounting Vs Cost Accounting - Management Accounting Vs Financial Accounting.

### **Unit II: Financial Statement Analysis**

Analysis and Interpretation of Financial Statements - Nature and Significance - Types of Financial Analysis - Tools of Analysis - Comparative Statements - Common size Statement - Trend Analysis.

### **Unit III: Ratio Analysis**

Meaning - Advantages - Limitations - Types of Ratios - Liquidity Ratios - Profitability Ratios - Turnover Ratios - Capital Structure Ratios - Leverage Ratios - Calculation of Ratios.

### **Unit IV: Cash Flow Analysis & Marginal Costing**

Meaning of Cash Flow Statements - Advantages - Limitations - Preparation of Cash Flow Statement - Types of Cash flows - Operating, Financing and Investing Cash flows. Application of Marginal Costing in Decision Making - Make or Buy - Shutdown or Continue - Exploring New Markets.

## **Unit V: Budgetary Control & Capital Budgeting Control.**

Budgetary Control - Meaning - Preparation of various Budgets - Cash Budget - Flexible Budget - Production Budget - Sales Budget. Capital Expenditure Control - Meaning of Capital Budgeting - Assessment of Capital Expenditure through Pay Back Method, Net Present Value Method and Accounting Rate of Return Method.

**Note: Questions in Sec. A, B & C shall be in the proportion of 20:80 between Theory and Problems.**

### **Suggested Readings:**

1. Maheswari, S.N., Management Accounting, Sultan Chand & Sons
2. Murthy A & Gurusamy S, Management Accounting- Theory & Practice, Vijay Nicole Imprints Pvt. Ltd. Chennai
3. Charles T. Horngren & Gary Sundem, N, Introduction to Management Accounting, Prentice Hall
4. Sharma and Shashi K. Gupta, Management Accounting, Kalyani Publishers
5. Reddy, T.S. & Dr. Hariprasad Reddy, Y, Management Accounting, Margham Publications, Chennai.
6. Hansen - Mowen, Cost Management Accounting and Control, South Western College

### **E-Resources**

[www.accountingcoach.com](http://www.accountingcoach.com)

[www.accountingstudyguide.com](http://www.accountingstudyguide.com)

[www.futureaccountant.com](http://www.futureaccountant.com)

[www.thestudentcpa.com](http://www.thestudentcpa.com)

## **Core Paper XV - ENTREPRENEURIAL DEVELOPMENT**

### **Course Objectives**

**Number of Credits: 4**

- To make the students to understand the concept of Entrepreneurship and their work in life
- To enable the students to know the effectiveness of the Manpower in Entrepreneurship.

**Unit I:** Entrepreneurship - Entrepreneur: Meaning of entrepreneurship – Types of Entrepreneurship – Traits of entrepreneurship – Factors promoting entrepreneurship- Barriers to entrepreneurship- the entrepreneurial culture- Stages in entrepreneurial process – Women entrepreneurship and economic development- SHG.

**Unit II:** Developing Successful Business Ideas - Recognizing opportunities – trend analysis – generating ideas – Brainstorming, Focus Groups, Surveys, Customer advisory boards, Day in the life research – Encouraging focal point for ideas and creativity at a firm level-Protecting ideas from being lost or stolen – Patents and IPR.

**Unit III:** Opportunity Identification and Evaluation - Opportunity identification and product/service selection – Generation and screening the project ideas – Market analysis, Technical analysis, Cost benefit analysis and network analysis- Project formulation – Assessment of project feasibility- Dealing with basic and initial problems of setting up of Enterprises

**Unit IV:** Business Planning Process - Meaning of business plan- Business plan process- Advantages of business planning- preparing a model project report for starting a new venture (Team-based project work).

**Unit V:** Funding - Sources of Finance- Venture capital- Venture capital process- Business angle investors - Commercial banks- Government Grants and Schemes - Crow funding

### **Suggested Readings**

1. Saravanel, P. Entrepreneurial Development, Principles, Policies and Programmes, Ess Pee Kay Publishing House - 1997, Chennai.
2. Tulsian, P.C & Vishal Pandey, Business Organization and Management, Pearson Education India, 2002, Delhi.

3. Janakiram, B, and Rizwana, M, Entrepreneurship Development, Text and Cases, Excel Books India, 2011, Delhi.
4. Arun Mittal & Gupta, S.L - Entrepreneurship Development, International Book House Pvt. Ltd, 2011, Mumbai.
5. Anil Kumar, S, Poornima, S, Abraham, K, Jayashree, K - Entrepreneurship Development, New age International (P) Ltd, 2012, Delhi
6. Gupta C B and Srinivasan NP, Entrepreneurial Development, Sultan Chand & Sons
7. RajShankar, Entrepreneurship, Vijay Nicole Imprints Pvt. Ltd. Chennai

### **E-resources**

<http://inventors.about.com/od/entrepreneur/>

<http://learnthat.com/tag/entrepreneurship/>

[www.managementstudyguide.com](http://www.managementstudyguide.com)

[www.quintcareers.com](http://www.quintcareers.com)

[www.entrepreneur.com](http://www.entrepreneur.com)

## **Core Paper XVI – INCOME TAX LAW AND PRACTICE - II**

Course Objectives:

No of Credits: 4

1. To help the students to understand the relevance and significance of Tax.
2. To facilitate the students in understanding the various Provisions I.T. Act.

### **UNIT I: Income from Capital Gain**

Capital Gain - capital assets - types of capital assets - assets not included in capital assets - transfer of capital assets - Short term and Long term Capital Gains - Cost of Acquisition - Cost of Improvement - Indexation - Capital Gain under different circumstances - Exempted Capital Gains - Computation of Capital Gains.

### **UNIT II: Income from other sources**

Computation - Grossing up - Deductions in Computing Income under the head and other related provisions.

### **UNIT III: Clubbing of Incomes and Set off / Carry forward and Set - Off of losses**

Clubbing of Incomes under various situations - Deemed Incomes - Simple



Problems on clubbing of incomes - Set off - Carry forward and set off of losses.

#### **UNIT IV: Deductions from Gross Income**

Permissible Deductions from Gross Total Income - Sec. 80C, 80CCC, 80CCCD, 80 D, 80DD, 80DDB, 80E, 80G, 80GG, 80GGA, 80QQB, 80RRB, 80U. Assessment of Individual- Computation of Tax.

#### **UNIT V: Income Tax Authorities and Procedure of Assessment**

Income Tax Authorities - Powers of the Central Board of Direct Taxes (CBDT), Commissioners of Income Tax and Income Tax officers. Assessment Procedures - Self Assessment - Best Judgement Assessment - Income Escaping Assessment (Re assessment) - Advance Payment of Tax

#### **Suggested Readings**

1. Vinod, K. Singhania, Students Guide to Income Tax, Taxman Publications Pvt. Ltd.
2. Murthy.A, Income Tax Law & Practice, Vijay Nicole Imprints Pvt. Ltd. Chennai
3. Mehrotra - Income Tax Law & Accounts, Goyal, Sathiya Bhavan Publications.
4. Gaur & Narang, Income Tax Law & Practice, Kalyani Publishers.
5. Reddy, T.S. & Hariprasad Reddy, Y, Income Tax Theory, Law & Practice, Margham Publications, Chennai.
6. Anita Raman, Income Tax Theory, Law & Practice, McGraw Hill, New Delhi.
7. Hariharan N, Income Tax Law & Practice, Vijay Nicole Imprints Pvt. Ltd. Chennai

#### **E-Resources**

[www.incometaxindia.gov.in](http://www.incometaxindia.gov.in)

[www.incometaxindiaefiling.gov.in](http://www.incometaxindiaefiling.gov.in)

[www.onlineservices.tin.egov-nsdl.com](http://www.onlineservices.tin.egov-nsdl.com)

[www.cleartax.in](http://www.cleartax.in)

## **ELECTIVE PAPER II – INSTITUTIONAL TRAINING**

### **Learning outcomes**

1. To bridge the gap between theory & practice and stimulate trainee's desire to face the challenges and problems in a corporate environment.
2. To get an overview of the practical aspects of company secretaryship.

Supervised Institutional Training shall be an integral part of B.Com (Corporate Secretaryship) Degree Course. It is a sort of job testing programme designed to bridge the gap

between theory & practice and create a natural interest in the practical aspects of the Company Secretaryship so as to stimulate trainee's desire to face its challenges and problems.

The training should be given under the joint supervision and guidance of the Training Officer of the Organisation/Institution and Faculty member of Corporate Secretaryship of the college. The details of the training given and the assessment of each student in that regard should be fully documented.

**The duration of the training shall be for a period of 30 days.** The training shall broadly relate to

- (a) Office Management
- (b) Secretarial Practice.

The training relating to Office Management may be designed to acquaint the trainees with:

1. Company's activities, organization structure, departments and authority relationship.
2. Study of layout, working conditions, office maintenance, safety and sanitary conditions.
3. Study of the Secretarial service, communication, equipment, postal and mailing services and equipments.
4. Acquaintance with office machines and equipment and accounting machines.
5. Acquaintance with filing department, sales, purchases, sales accounts, salary, administration and personnel departments.

The training pertaining to Secretarial Practice shall be on all aspects of the functions of a corporate secretary.

The following types of organizations may be selected for the training:

The Report shall include information about the profile of the company, products, projects, milestones, organisation structure, details of departments, and analysis of financial performance. The report shall be around 50 typed pages, excluding tables, figures, bibliographies and appendices. The department of the respective college shall evaluate the report for 100 marks and conduct Viva-Voce (both by internal and external examiners). The marks shall be sent to the University as per the procedure. A candidate failing to secure the minimum for a pass (40%) shall be required to resubmit this report to the department and the marks after valuation shall be forwarded to the University before the commencement of the examination.

The external examiner in consultation with internal examiner should conduct Viva-Voce and evaluate the report.

DEPARMEN

**BMA-CSC01**

T OF

**YEAR: I SEMESTER: I**

MATHS

**UNIVERSITY  
OF MADRAS**

**B.Sc.  
DEGREE COURSE  
IN MATHEMATICS**

**SYLLABUS WITH  
EFFECT FROM 2020-  
22**

CORE-I:  
ALGEBRA  
**(Common  
to B.Sc.  
Maths  
with  
Computer  
Applicatio  
ns)**

Learning Outcomes:

**Students will acquire**

- Basic ideas on Theory of Equations, Matrices and Theory of Numbers.
- Knowledge to solve theoretical and applied problems.

UNIT I

Theory of Equations :Polynomial equations with Imaginary and irrational roots- Relation between roots and coefficients- Symmetric functions of roots in terms of coefficients.  
Chapter 6 : Section 9 to 12.

UNIT II

Reciprocal equations - Standard form-Increase or Decrease the roots of the given equation - Removal of terms Approximate solutions of roots of polynomials by Horner's method.

Chapter 6: section 16, 16.1, 16.2, 17, 30.

#### UNIT III

Summation of Series : Binomial- Exponential -Logarithmic series (Theorems without proof): Chapter 3: Section 10, Chapter 4: Section 3, 3.1, 3.5, 3.6, 3.7 (omit 3.4)

#### UNIT IV

Symmetric- Skew Symmetric- Hermitian- Skew Hermitian- Orthogonal Matrices- Eigen values & Eigen Vectors- Similar matrices- Cayley - Hamilton Theorem.

Chapter 2: Section 6.1 to 6.3, 9.1, 9.2, 16, 16.1, 16.2, 16.3.

#### UNIT V

Prime number and Composite number - Divisors of a given number N- Euler's function (without proof) - Integral part of a real number - congruences. Chapter 5: Section 1 to 13.

#### Contents and treatment as in

1. Algebra, Volume I by T. K. Manicavachagam Pillay, T. Natarajan, K.S. Ganapathy, Viswanathan Publication 2007 - Unit – 1 and 2.
2. Algebra, Volume II by T. K. Manicavachagam Pillay, T. Natarajan, K.S. Ganapathy, Viswanathan Publication 2008 - Unit – 3, 4 and 5.

#### Reference:-

1. Algebra by S. Arumugam (New Gama publishing house, Palayamkottai).
2. Algebra and Trigonometry, Volume I and II by P.R. Vittal, V. Malini (Margham Publishers).

#### e-Resources:

1. <http://mathworld.wolfram.com>
2. <http://www.themathpage.com/>

Inst.Hrs : 4

YEAR: I

Credits : 4

SEMESTER: I

Learning outcomes:

**Students will acquire Knowledge about**

- The basics of differentiation and its applications.
- The notion of curvature, evolutes, involutes and polar co-ordinates.

## UNIT I

Successive differentiation -  $n^{\text{th}}$  derivative- standard results – Trigonometrical transformation – formation of equations using derivatives - Leibnitz's theorem and its applications  
Chapter 3 section 1.1 to 1.6, 2.1 and 2.2

## UNIT II

Total differential of a function – special cases – implicit functions - partial derivatives of a function of two functions - Maxima and Minima of functions of two variables- Lagrange's method of undetermined multipliers.  
Chapter 8 : Section 1.3 to 1.5 and 1.7, Section 4, 4.1 and 5.

## UNIT III

Envelopes – method of finding envelopes – Curvature- circle, radius and centre of curvature- Cartesian formula for radius of curvature – coordinates of the centre of curvature – evolute-and involute - radius of curvature and centre of curvature in polar coordinates – p-r equation  
Chapter 10 Section 1.1 to 1.4 and Section 2.1 to 2.7

## UNIT IV

Polar coordinates - angle between the radius vector and the tangent – slope of the tangent in the polar coordinates – the angle of intersection of two curves in polar coordinates- polar sub tangent and polar sub normal – the length of arc in polar coordinates.  
Chapter 9 Section 4.1 to 4.6

## UNIT V

Definition-Asymptotes parallel to the axes – special cases – another method for finding asymptotes - asymptotes by inspection – intersection of a curve with an asymptote.  
Chapter 11 - Section 1 to 7.

Content and treatment as in

“Calculus”, Volume - 1 by S. Narayanan and T.K. Manicavachagompillay - S.Viswanathan publishers – 2006

Reference:-

1. Calculus , Dr. P.R. Vittal&Dr. V. Malini, Margham Publications, Chennai.
2. Calculus by Thomas and Fenny, Pearson Publication.
3. Calculus by Stewart
4. Calculus , Dr. P.R. Vittal&Dr. V. Malini, Margham Publications, Chennai.

e-Resources:

1. <http://www.themathpage.com/>
2. <http://mathworld.wolfram.com>
3. <http://www.univie.ac.at/future.media/moe/galerie.html>
4. <http://www.analyzmath.com/calculus>

Inst.Hrs : 4

YEAR: I

Credits : 4

SEMESTER: II

Learning outcomes:

**Students will acquire Knowledge**

- About the expansions of Trigonometric Functions, Hyperbolic Functions and sum of Trigonometric Series.

## UNIT I

Expansions of powers of  $\sin\theta$ ,  $\cos\theta$  - Expansions of  $\cos^n\theta$ ,  $\sin^n\theta$ ,  $\cos^m\theta\sin^n\theta$  Chapter 2, Section 2.1, 2.1.1, 2.1.2, 2.1.3

## UNIT II

Expansions of  $\sin n\theta$ ,  $\cos n\theta$ ,  $\tan n\theta$  - Expansions of  $\tan(\theta_1+\theta_2+\dots+\theta_n)$  - Expansions of  $\sin x$ ,  $\cos x$ ,  $\tan x$  in terms of  $x$ -Sum of roots of trigonometric equations – Formation of equation with trigonometric roots. Chapter 3, Section 3.1 to 3.6

## UNIT III

Hyperbolic functions-Relation between circular and hyperbolic functions - Formulas in hyperbolic functions – Inverse hyperbolic functions Chapter 4, Section 4.1 to 4.7 .

## UNIT IV

Inverse function of exponential functions – Values of  $\text{Log}(u+iv)$  - Complex index. Chapter 5, Section 5.1 to 5.3

## UNIT V

Sums of Trigonometric series – Applications of binomial, exponential, logarithmic and Gregory's series - Difference method. Chapter 6, Section 6.1 to 6.6.3

Content and treatment as in

Trigonometry by P. Duraipandian and KayalalPachaiyappa, Muhil Publishers.

Reference:-

- 1.Trigonometry, Calculus , Dr. P.R. Vittal , Margham Publications, Chennai.
- 2.Trigonometry by T.K. Manickavachagam Pillay.S.Viswanathan (Printers and Publishers ) Pvt.Ltd.



e-Resources:

1. <http://mathworld.wolfram.com>
2. <http://ocw.mit.edu/courses/mathematics/>

## CORE-IV: INTEGRAL CALCULUS AND VECTOR ANALYSIS

**(Common to B.Sc. Maths with Computer Applications)**

Inst.Hrs : 5

Credits : 4

YEAR: I  
SEMESTER: II

Learning outcomes:

**Students will acquire Knowledge about**

- Integration and its geometrical applications, double, triple integrals and improper integrals.
- Vector differentiation and Vector integration.

## UNIT I

Reduction formulae– Types, , , , ,

Bernoulli's formula.

Chapter 1 Section 13, 13.1 to 13.10,14,15.1.

## UNIT II

Multiple Integrals- definition of the double integrals- evaluation of the double integrals- double integrals in polar coordinates – triple integrals – applications of multiple integrals

– volumes of solids of revolution – areas of curved surfaces – change of variables – Jacobians.

Chapter 5 Section 1, 2.1, 2.2, 3.1, 4, 6.1, 6.2, 6.3, 7

Chapter 6 Section 1.1, 1.2, 2.1 to 2.4.

## UNIT III

Beta and Gamma functions - infinite integral – definitions – recurrence formula of  $\Gamma$  functions - properties of  $\beta$ -functions - relation between  $\beta$  and  $\Gamma$  functions.

Chapter 7 Sections 1.1 to 1.4 , 2.1, 2.3, 3, 4, 5.

## UNIT IV

Introduction - directional derivative- Gradient- divergence- curl- Laplacian Differential Operator. Chapter 2 Sections 2.1 - 2.13.

## UNIT V

Line, surface and volume integrals - Integral Theorems - Gauss, Greens and Stokes (Without proof) – Problems.

Chapter 3 Sections 3.1 to 3.6 and Chapter 4 Sections 4.1 to 4.5.

Content and treatment as in

1. "Calculus", Vol- II by S. Narayanan and T.K. Manicavachagampillay - S. Viswanathanpublishers– 2007 for Unit 1 , Unit 2 , Unit 3.
2. "Vector Analysis" by P.Duraipandian and KayalalPachaiyappa, S.ChandFor Unit 4, Unit 5.

Reference:-

1. Integral Calculus and differential equations : Dipak Chatterjee (TATA McGraw Hill Publishing companyLtd.).
2. Vector Algebra and Analysis by Narayanan and T.K.Manickvachagam Pillay S .Viswanathan Publishers.
3. Vector Analysis: Murray Spiegel (Schaum Publishing Company, NewYork).

e-Resources:

1. <http://mathworld.wolfram.com>.
2. <http://www.sosmath.com>.

Inst.Hrs : 5

Credits : 4

YEAR: II

SEMESTER: III

Learning outcomes:

**Students will acquire Knowledge**

- To analyze characteristics and properties of two and three dimensional geometric shapes.
- To develop mathematical arguments about geometric relationships.
- In Geometry and its applications in real world.

## UNIT I

Chord of contact – polar and pole,- conjugate points and conjugate lines – chord with  $(x_1, y_1)$  as its midpoint – diameters – conjugate diameters of an ellipse.- semi diameters- conjugate diameters of hyperbola

Chapter 7: Sections 7.1 to 7.3 , Chapter – 8 Section 8.1 to 8.5.

## UNIT II

Polar coordinates: General polar equation of straight line – Polar equation of a circle on  $A_1A_2$  as diameter, Equation of a straight line, circle, conic – Equation of chord, tangent, normal. Equations of the asymptotes of a hyperbola.

Chapter 10 : Sec 10.1 to 10.8.

## UNIT III

Introduction – System of Planes - Length of the perpendicular – Orthogonal projection. Chapter 2 Sec 2.1 to 2.10.

## UNIT IV

Representation of line – angle between a line and a plane- co-planar lines- shortest distance 2 skew lines- Length of the perpendicular- intersection of three planes

Chapter 3 :Sec 3.1 to 3.8.

## UNIT V

Equation of a sphere - general equation - section of a sphere by a plane - equation of the circle - tangent plane - angle of intersection of two spheres- condition for the orthogonality - radical plane.

Chapter 6 : Sec 6.1 to 6.8.

Contents and treatment as in

1. Analytical Geometry of 2D by P.Durai Pandian- Muhil publishers for Unit – 1 and 2
2. Analytical Solid Geometry of 3D by Shanthi Narayan and Dr.P.K. Mittal-S.Chand& Co. Pvt.Ltd.- for Unit – 3 to 5

Reference :

1. Analytical Geometry of Two Dimension by T. K. Manikavachakam Pillai and S. Narayanan.S.Viswanathan (Printers and Publishers ) Pvt. Ltd.
2. Analytical Geometry of Three Dimension by T. K. Manikavachakam Pillai and S. Narayanan.S.Viswanathan (Printers and Publishers ) Pvt. Ltd.

e-Resources:

1. <http://mathworld.wolfram.com>.
2. <http://www.univie.ac.at/future.media/moe/galerie.html>

Inst.Hrs : 4

Credits : 4

YEAR: II  
SEMESTER: III**Learning outcomes:****Students will acquire knowledge**

- About the methods of solving Ordinary and Partial Differential Equations.
- To introduce Differential Equation as a powerful tool in solving problems in Science.

## UNIT I

Ordinary Differential Equations: Variable separable-Homogeneous Equation-Non-Homogeneous Equations of first degree in x and y-Linear Equation-Bernoulli's Equation-Exact differential equations.

Chapter 2: Section 1 to 6.

## UNIT II

Equation of first order but not of higher degree: Equation solvable for  $dy/dx$ - Equation solvable for  $y$ -Equation solvable for  $x$ - Clairauts form-Linear Equations with constant coefficients- Particular integrals  $e^{ax}$ ,  $\sin ax$ ,  $\cos ax$ ,  $x^m$ ,  $Ve^{ax}$  where  $V$  is  $\sin ax$  or  $\cos ax$  or  $x^m$ .

Chapter 4: Section 1, 2.1, 2.2, 3.1.

Chapter 5: Section 4.

## UNIT III

Simultaneous linear differential equations- Linear Equations of the Second Order - Complete solution in terms of a known integrals- Reduction to the Normal form- Change of the Independent Variable - Method of Variation of Parameters.

Chapter 6: Section- 6

Chapter 8:Section- 1,2,3,4.

## UNIT IV

Partial differential equation: Formation of PDE by Eliminating arbitrary constants and arbitrary functions-complete integral-singular integral-General integral- Lagrange's Linear Equations  $Pp+Qq=R$ .

Chapter 12: Section- 1, 2, 3.1, 3.2, 4.

## UNIT V

Special methods - Standard forms - Charpit's Methods - Related

problems Chapter 12: Section-5.1, 5.2, 5.3, 5.4, 6.

Contents and treatment as in

“Differential Equations and its applications”, by S.Narayanan, T.K.Manikavachagam Pillay — S.Viswanathan (Printers and Publishers ) Pvt. Ltd(2006).

Reference:

1. Mathematics for B.Sc-Branch-I Volume –III by P.Kandasamy, K.Thilagavathy  
S.Chand Publications.
2. Differential equations with applications and historical notes by George  
F.Simmons, 2<sup>nd</sup>Ed, TataMcgraw Hill Publications .
3. Differential Equations by Shepley L.Ross, 3<sup>rd</sup>Ed, John Wiley and sons 1984.
4. Differential Equations by N.P.Bali, Laxmi Publications Ltd, New Delhi-2004.
5. Ordinary and Partial differential Equation by Dr.M.D.Raisinghania, S.Chand.

e-Resources:

1. <http://mathworld.wolfram.com>
2. [http://www.anlyzemath.com/calculus/Differential\\_Equations/applications.html](http://www.anlyzemath.com/calculus/Differential_Equations/applications.html)

Inst.Hrs : 4

Credits : 4

YEAR: II

SEMESTER: IV

**Learning outcomes:****Students will acquire knowledge**

- About Laplace Transforms and its inverse
- To apply Laplace transform in solving Ordinary Differential Equations with constant coefficients, simultaneous Ordinary Differential Equations.
- To solve problems in Fourier series and Fourier transforms.

**UNIT I:**The Laplace Transforms-Definitions-Sufficient conditions for the existence of the Laplace transform(without proof)-Laplace transform of periodic functions-some general theorems-evaluation of integrals using Laplace transform-Problems.

*Chapter 5: Section-1 to 5.*

**UNIT II:**The inverse Laplace Transforms- Applications of Laplace Transforms to ordinary differential equations with constant co-efficients and variable co-efficients, simultaneous equations and equations involving integrals-Problems.

*Chapter 5: Section-6 to 12.*

**UNIT III:** Fourier series- Expansion of periodic functions of period  $2\pi$ - Expansion of even and odd functions, Half range Fourier series-Change of intervals –Problems.

*Chapter 6: Section-1 to 6.*

**UNIT IV:** Fourier Transform- Infinite Fourier Transform(Complex form) – Properties of Fourier Transform – Fourier cosine and Fourier sine Transform – Properties – Parseval's identity – Convolution theorem - Problems.

*Chapter 6: Section-8 to 15.*

**UNIT V:** Z Transforms: Definition of Z-Transform and its properties - Z-Transforms of some basic functions- Examples and simple problems

*Chapter 7: Sections -7.1 to 7.3.*



### Contents and treatment as in

1. "Calculus-Volume III" – S.Narayananand T.K.ManicavachagamPillai. (Ananda Book Depot)( **for Units I to IV**)
2. "Engineering Mathematics for Semester III- Third Edition – T.Veerarajan ( Tata McGraw-Hill Publishing Company Ltd, New Delhi) ( **for Unit-V**)

### Reference Books

1. Engineering Mathematics Volume III – P.Kandasamy and others ( S.Chand and Co.)
2. Advanced Engineering Mathematics- Stanley Grossman and William R.Devit.

Engineering Mathematics III-A.Singaravelu, Meenakshi Agency, Chenani, 2008

### e-Resources:

1. <http://mathworld.wolfram.com>.
2. <http://www.sosmath.com>.

**(Common to B.Sc. Maths with Computer Applications)**

Inst.Hrs : 5

Credits : 4

YEAR: II

SEMESTER: IV

## Learning outcomes:

**Students will acquire knowledge about**

- Particles or body in rest under the given forces.
- Forces, equilibrium of a particle and centre of mass of various bodies.

## UNIT I

Force- Newtons laws of motion - resultant of two forces on a particle- Equilibrium of a particle Chapter 2 - Section 2 .1 , 2.2 , Chapter 3 - Section 3.1.

## UNIT II

Forces on a rigid body – moment of a force – general motion of a rigid body- equivalent systems of forces – parallel forces – forces along the sides of a triangle – couples Chapter 4 - Section 4 .1 to 4.6.

## UNIT III

Resultant of several coplanar forces- equation of the line of action of the resultant- Equilibrium of a rigid body under three coplanar forces – Reduction of coplanar forces into a force and a couple.-problems involving frictional forces Chapter 4 - Section 4.7 to 4.9, Chapter 5 - Section 5.1, 5.2.

## UNIT IV

Centre of mass – finding mass centre – a hanging body in equilibrium Chapter 6 - Section 6.1 to 6.3.

## UNIT V

Hanging strings- equilibrium of a uniform homogeneous string – suspension bridge Chapter 9 - Section 9.1, 9.2.

## Contents and treatment as in

“Mechanics” by P. Duraipandian ,LaxmiDuraipandian , MuthamizhJayapragasham, S. Chand and Co limited 2008 .

## Reference:

1. Dynamics – K. ViswanathaNaik and M. S. Kasi, Emerald Publishers.
2. Dynamics – A. V. Dharmapadam, S. Viswanathan Publishers.
3. Mechanics – Walter Grenier.

## e-Resources:

1. <https://www.wikipedia.org/>
2. <https://physics.info>

Inst.Hrs : 6

YEAR: III

Credits : 4

SEMESTER: V

Learning outcomes:

**Students will acquire knowledge about the concepts of Sets, Groups and Rings.**

### UNIT I

Introduction to groups- Subgroups- cyclic groups and properties of cyclic groups- Lagrange's Theorem- A counting principle.  
Chapter 2 Section 2.4 and 2.5.

### UNIT II

Normal subgroups and Quotient group- Homomorphism- Automorphism. Chapter 2 Section 2.6 to 2.8.

### UNIT III

Cayley's Theorem- Permutation groups. Chapter 2 Section 2.9 and 2.10.

### UNIT IV

Definition and examples of ring- Some special classes of rings- homomorphism of rings- Ideals and quotient rings- More ideals and quotient rings.  
Chapter 3 Section 3.1 to 3.5.

### UNIT V

The field of quotients of an integral domain- Euclidean Rings- The particular Euclidean ring. Section 3.6 to 3.8.

Contents and treatment as in

“Topics in Algebra” – I. N. Herstein, Wiley Eastern Ltd.

Reference:

1. Modern Algebra by M.L.Santiago, McGraw Hill Education India pvt Ltd.
2. Modern Algebra by S. Arumugam and others, New Gamma publishing House, Palayamkottai.
3. Modern Algebra by Visvanathan Nayak, Emerald Publishers, Reprint 1992.

e-Resources:

1. <https://nptel.ac.in>
2. <http://garsia.math.yorku.ca/~sdenton/algstruct>.

Inst.Hrs : 6

YEAR: III

Credits : 4

SEMESTER: V

**Learning outcomes:****Students will acquire knowledge to**

- Apply Mathematical concepts and Principles to perform numerical and symbolic computations.
- Understand and perform simple proofs.
- Know how abstract ideas and rigorous methods in Mathematical Analysis can be applied to practical problems.

## UNIT I

Sets and Functions: Sets and elements- Operations on sets- functions- real valued functions- equivalence- countability - real numbers- least upper bounds.

Chapter 1 Section 1. 1 to 1.7

## UNIT II

Sequences of Real Numbers: Definition of a sequence and subsequence- limit of a sequence- convergent sequences- divergent sequences- bounded sequences- monotone sequences-

Chapter 2 Section 2.1 to 2.6

## UNIT III

Operations on convergent sequences- operations on divergent sequences- limit superior and limit inferior- Cauchy sequences.

Chapter 2 Section 2.7 to 2.10

## UNIT IV

Series of Real Numbers: Convergence and divergence- series with non-negative terms- alternating series- conditional convergence and absolute convergence- tests for absolute convergence- series whose terms form a non-increasing sequence- the class  $l^2$

Chapter 3 Section 3.1 to 3.4, 3.6, 3.7 and 3.10

## UNIT V

Limits and Metric Spaces: Limit of a function on a real line-. Metric spaces - Limits in metric spaces.

Continuous Functions on Metric Spaces: Function continuous at a point on the real line- Reformulation- Function continuous on a metric space.

Chapter 4 Section 4.1 to 4.3 Chapter 5 Section 5.1-5.3

Contents and Treatment as in

“Methods of Real Analysis” : Richard R. Goldberg (Oxford and IBH Publishing Co.).

Reference:

1. Principles of Mathematical Analysis by Walter Rudin, Tata McGraw Hill.
2. Mathematical Analysis Tom M Apostol, Narosa Publishing House.

e-Resources:

1. <https://mathcs.org/analysis/reals/numseq/sequence.html>.
2. <http://www-groups.mcs.st-andrews.ac.uk/~john/analysis/index.html>
3. <http://www.phengkimving.com>.

**(Common to B.Sc. Maths with Computer Applications)**

Inst.Hrs : 6

Credits : 4

YEAR: III

SEMESTER: V

Learning outcomes:

**Students will acquire knowledge of**

- The motion of bodies under the influence of forces.
- Rectilinear motion of particles, Projectiles, Impact and Moment of Inertia of Particles.

## UNIT I

Kinematics -Basic units – velocity – acceleration- coplanar motion. Chapter 1 - Section 1.1 to 1.4.

**UNIT II** Work, Energy and power – work – conservative field of force – power – Rectilinear motion under varying Force: Simple harmonic motion ( S.H.M.) – S.H.M. along a horizontal line- S.H.M. along a vertical line  
Chapter 11 - Section 11.1to 11.3, Chapter 12 - Section 12.1 to 12.3

## UNIT III

Projectiles -Forces on a projectile- projectile projected on an inclined plane.  
Impact: Impulsive force - impact of sphere - impact of two smooth spheres – impact of a smooth sphere on a plane – oblique impact of two smooth spheres  
Chapter 13 - Section 13.1,13.2, Chapter 14 - Section 14.1, 14.5

## UNIT IV

Circular motion – Conical pendulum – simple pendulum – central orbits -general orbits - central orbits- conic as centered orbit.  
Chapter 15 - Section 15.1, 15.2, 15.6  
Chapter 16 - Section 16.1 to 16.3

## UNIT V

Moment of inertia, Perpendicular and parallel axes theorem.  
Chapter 17 -Section 17.1, 17.1.1

Contents and treatment as in

“Mechanics” – P. Duraipandian, LaxmiDuraipandian ,MuthamizhJayapragasham, S. Chand and Co limited 2008 .

Reference :

1. Dynamics – K. ViswanathaNaik and M. S. Kasi, Emerald Publishers.
2. Dynamics – A. V. Dharmapadam, S. Viswanathan Publishers.
3. Mechanics – Walter Grenier

**e-Resources:**

1. <https://nptel.ac.in>
2. <https://www.wikipedia.org>

**(Common to B.Sc. Maths with Computer Applications)**

Inst.Hrs : 6

YEAR: III

Credits : 4

SEMESTER: V

Learning outcomes:

**Students will acquire knowledge**

- To apply tools and ideas in Mathematics for solving Applied Problems.
- To Evaluate Boolean functions and to express a logic sentence in terms of predicates, quantifiers, and logical connectives.

UNIT I

Integers: Set, some basic properties of integers, Mathematical induction, divisibility of integers, representation of positive integers  
Chapter 1 - Sections 1.1 to 1.5

UNIT II

Boolean algebra & Applications: Boolean algebra, two element Boolean algebra, Disjunctive normal form, Conjunctive normal form  
Chapter 5 - Sections 5.1 to 5.4

UNIT III

Application, Simplification of circuits, Designing of switching circuits, Logical Gates and Combinatorial circuits.  
Chapter 5 - Section 5.5, 5.6

UNIT IV

Recurrence relations and Generating functions: Sequence and recurrence relation, Solving recurrence relations by iteration method, Modeling of counting problems by recurrence relations, Linear (difference equations) recurrence relations with constant coefficients, Generating functions, Sum and product of two generating functions, Useful generating functions, Combinatorial problems.  
Chapter 6 - Section 6.1 to 6.6

UNIT V

Propositional logic and Predicate logic: Propositional logic, Adequate system of connectives, Translation of sentences in a Natural Language into Statement Formula, Logical validity of arguments, Predicate Logic, Negation of a statement obtained by qualification of a predicate, Logical operations on predicates or quantified predicates, Symbolization of sentences by using predicates, Quantifiers and connectives, Logical validity of arguments.

Chapter 8 - Sections 8.1, 8.5 to 8.8 (Omit Section 8.2 to 8.4)



Contents and treatment as in

“Introduction to Discrete Mathematics”, 2<sup>nd</sup> edition, 2002 by M. K. Sen and B. C. Chakraborty, Books and Allied Private Ltd., Kolkata.

Reference:-

1. Discrete mathematics for computer scientists and mathematicians by J. L. Merty, AbrahamKendel and T. P. Baker prentice-hall, India.
2. Discrete mathematics for computer scientists by John Truss-Addison Wesley.
3. Elements of Discrete Mathematics, C. L. Liu, New York McGraw-Hill, 1977.

**e-Resources:**

1. <https://brilliant.org/wiki/discrete-mathematics/>.
2. [https://www.tutorialspoint.com/discrete\\_mathematics/](https://www.tutorialspoint.com/discrete_mathematics/).

**Inst.Hrs : 6****YEAR: III****Credits : 4****SEMESTER: VI**

Learning outcomes:

Students will acquire knowledge about the Vector Spaces, Dual spaces, Inner product spaces and linear transformations.

## UNIT I

Vector spaces. Elementary basic concepts- linear independence and bases Chapter 4 Section 4.1 and 4.2.

## UNIT II

Dual spaces  
Chapter 4 Section 4.3.

## UNIT III

Inner product spaces.  
Chapter 4 Section 4.4.

## UNIT IV

Algebra of linear transformations- characteristic roots. Chapter 6 Section 6.1 and 6.2.

## UNIT V

Matrices- canonical forms- triangular forms.  
Chapter 6 Section 6.3 and 6.4.

Content and Treatment as in

“Topics in Algebra” – I. N. Herstein-Wiley Eastern Ltd.

Reference:

1. University Algebra – N. S. Gopalakrishnan – New Age International Publications, Wiley Eastern Ltd.
2. First course in Algebra – John B. Fraleigh, Addison Wesley.
3. Text Book of Algebra – R. Balakrishna and N. Ramabadran, Vikas publishing Co.
4. Algebra – S. Arumugam, New Gamma publishing house, Palayamkottai.

**e-Resources:**

1. <https://nptel.ac.in>.
2. <http://ebooks.lpude.in.linearalgebra>.

Inst.Hrs : 6

YEAR: III

Credits : 4

SEMESTER: VI

Learning outcomes:

**Students will acquire knowledge about**

- The Real Numbers and the Analytic Properties of Real- Valued Functions.
- The Analytic concepts of Connectedness, Compactness, Completeness And Calculus.

## UNIT I

Continuous Functions on Metric Spaces: Open sets- closed sets- Discontinuous function on  $\mathbb{R}^1$ . Connectedness, Completeness and Compactness :More about open sets- Connected sets. Chapter 5 Section 5.4 to 5.6  
Chapter 6 Section 6.1 and 6.2

## UNIT II

Bounded sets and totally bounded sets: Complete metric spaces- compact metric spaces, continuous functions on a compact metric space, continuity of inverse functions, uniform continuity.  
Chapter 6 Section 6.3 to 6.8

## UNIT III

Calculus:Sets of measure zero, definition of the Riemann integral, existence of the Riemann integral- properties of Riemann integral.  
Chapter 7 Section 7.1 to 7.4

## UNIT IV

Derivatives- Rolle's theorem, Law of mean, Fundamental theorems of calculus.  
Chapter 7 Section 7.5 to 7.8

## UNIT V

Taylor's theorem- Pointwise convergence of sequences of functions, uniform convergence of sequences of functions.  
Chapter 8 Section 8.5 Chapter 9 Section 9.1 and 9.2

Content and Treatment as in

“Methods of Real Analysis”- Richard R. Goldberg (Oxford and IBH Publishing Co)

Reference:-

1. Principles of Mathematical Analysis by Walter Rudin,TataMcGrawHill.
2. Mathematical Analysis Tom M Apostol,Narosa Publishing House.

**e-Resources:**

1. <https://nptel.ac.in>.
2. <https://mathonline.wikidot.com>.
3. [https://en.wikipedia.org/wiki/Metric\\_space](https://en.wikipedia.org/wiki/Metric_space).

**(Common to B.Sc. Maths with Computer Applications)**

Inst.Hrs : 6

YEAR: III

Credits : 4

SEMESTER: VI

## Learning outcomes:

Students will acquire knowledge about the basic ideas of analysis of Complex Functions in solving Complex Variables.

## UNIT I

Analytic Functions: Functions of a Complex Variable – Limit- Theorems on Limits – Continuous functions- Differentiability – Cauchy – Riemann equations – Analytic functions- Harmonic functions – Conformal mapping.  
Chapter 1 – sec 2.1 to 2.9.

## UNIT II

Bilinear Transformations: Elementary transformations – Bilinear transformations – Cross ratio- Fixed Points of Bilinear Transformations – Mapping by Elementary Functions - The Mapping  $w = z^2$ ,  $z^n$ ,  $n$  is a positive integer,  $w = e^z$ ,  $\sin z$ ,  $\cos z$ .  
Chapter 3 – sec 3.1 to 3.4 , Chapter 5 – sec 5.1 to 5.5

## UNIT III

Complex Integration – definite integral – Cauchy’s Theorem – Cauchy’s integral formula – Higher derivatives. Chapter 6 – sec 6.1 to 6.4

## UNIT IV

Series expansions – Taylor’s series – Laurent’s Series – Zeroes of analytic functions- Singularities. Chapter 7 – 7.1 to 7.4

## UNIT V

Residues – Cauchy’s Residue Theorem – Evaluation of definite integrals. Chapter 8 – 8.1 to 8.3.

## Content and treatment as in

“Complex Analysis” by Dr.S.Arumugam, Thangapandi Isaac, Dr.A.Somasundaram, SciTech publications(India) Pvt Ltd, 2002.

## Reference:

1. Complex variables and Applications (Sixth Edition) by James Ward Brown and Ruel V. Churchill, Mc.Grawhill Inc.
2. Complex Analysis by P.Duraipandian, Kayalak Pachaiyappa, S.Chand & Co Pvt.Ltd.
3. Complex Analysis , T.K.Manickavachagom Pillay, S.Viswanathan Publishers Pvt. Ltd.

**e-Resources:**

1. <http://ebooks.lpude.in/complexanalysis>.
2. <https://nptel.ac.in>.

**B.Sc.DEGREECOURSEINMATHEMATICS**

**SYLLABUSWITHEFFECTFROM2020-2021**

**BMA-CSA03**

**ALLIED:CALCULUSOFFINITE  
DIFFERENCES ANDNUMERICAL  
ANALYSIS-I**

**(Common to B.Sc.Mathswith Computer Applications)**

**Learning outcomes:**

**Students will acquire knowledge about**

- ▮ Numerical techniques used as powerful tools in scientific computing.
- ▮ Linear algebraic, transcendental equations and interpolation using finite difference formulae.

**UNIT I**

Solutions of algebraic and transcendental equations: Bisection method- Iteration method- Regula-falsi method- Newton-Raphson method. - Chapter 1 :Section 1.1 - 1.4

**UNIT II**

Solutions of Simultaneous Linear Equations: Gauss-Elimination method, Gauss-Jordan method, Crout's method, Gauss-Seidel method. - Chapter 2 :Section 2.1 - 2.4 , 2.6

**UNIT III**

Finite Differences: E operators and relation between them- Differences of a polynomial-Factorial polynomials- inverse operator  $\nabla^{-1}$  -Summation Series. - Chapter 3 :Section 3.1 to 3.4, 3.6, 3.7.

**UNIT IV**

Interpolation with Equal Intervals: Newton's Forward and Backward Interpolation formulae- Central Differences Formulae: Gauss-Forward and Backward Formulae- Stirling's Formula and Bessel's Formula-Equidistant terms with one or more missing values.

Chapter 4 :Section 4.1- 4.3 (omit 4.1a, 4.4), 4.7 . - Chapter 5 :Section 5.1- 5.6.

**UNIT V**

Interpolation with Unequal Intervals: Divided Differences - Newton's Divided Differences Formula for Interpolation -Lagrange's Formula for Interpolation-Inverse Interpolation- Lagrange's method- Reversion of Series method. - Chapter 6 :Section 6.1, 6.2, 6.5, 6.7.

**Content and Treatment as in**

"Calculus of Finite Differences and Numerical Analysis" by P. Kandasamy and K. Thilagavathy,  
S. Chand and Co Pvt.Ltd.

**Reference:**

1. "Numerical Analysis " by B. D. Gupta, Konark Publishing.
2. "Numerical methods in Science and Engineering" by M. K. Venkataraman, National Publishing House, Chennai.

**e-Resources:**

1. <https://nptel.ac.in>
2. [https://www.encyclopediaofmath.org/index.php/Finite-difference\\_calculus](https://www.encyclopediaofmath.org/index.php/Finite-difference_calculus)

**B.Sc.DEGREECOURSEINMATHEMATICS**  
**SYLLABUSWITHEFFECTFROM2020-2021**

**BMA-  
CSA04**

**ALLIED:MATHEMATICALSTATISTICS-I**  
**(Common to B.Sc.Math with Computer Applications)**

**Learning outcomes:**

**Students will acquire knowledge of**

- ▮ The laws of Probability and Baye's theorem.
- ▮ Measures of Location, Dispersion, Correlation and Regression
- ▮ The Discrete and Continuous Probability Distributions.

**UNIT I**

Concept of sample space- Events- Definition of Probability (Classical, Statistical & Axiomatic)- Addition and Multiplication laws of Probability- Independence- Conditional Probability- Baye's theorem – Simple Problems.

**UNIT II**

Random Variables (Discrete and Continuous) Distribution function- Expected values and Moments- Moment generating function – Probability generating function- Examples.

**UNIT III**

Characteristic function- Uniqueness and Inversion theorems (Statements and applications only)- Cumulants - Chebychev's Inequality – Simple Problems.

**UNIT IV**

Concepts of bivariate distributions- Correlation and Regression- Linear Prediction- Rank Correlation coefficient- Concepts of partial and multiple correlation coefficients- Simple problems.

**UNIT V**

Standard Distributions – Binomial- Poisson- Normal- Uniform distributions- Geometric- Exponential- Gamma -Beta distributions- Inter relationship between distributions.

**Reference:**

- ▮ S.C.Gupta & V.K.Kapoor : Elements of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
- ▮ Hogg R.V. & Craig A.T. (1988) : Introduction to Mathematical Statistics, McMillan.
- ▮ Mood A.M. & Graybill F.A. & Boes D.G. (1974): Introduction to theory of Statistics, McGraw Hill.

¶ Snedecor G.W. & Cochran W.G(1967) : Statistical Methods, Oxford and IBH.

**e-Resources:**

1. <https://nptel.ac.in>
2. <https://www.wikipedia.org>.
3. <http://ebooks.lpude.in/statistics>.



**B.Sc.DEGREECOURSEINMATHEMATICS**  
**SYLLABUSWITHEFFECTFROM2020-2021**

**BMA-CSA05**

**ALLIED:CALCULUSOFFINITE  
DIFFERENCES ANDNUMERICAL  
ANALYSIS-II**

**(Common to B.Sc.Mathswith Computer Applications)**

**Learning outcomes:**

**Students will acquire knowledge about**

- ▮ Numerical techniques used as powerful tools in scientific computing.
- ▮ Numerical Differentiation, Numerical Integration and Difference Equations.

**UNIT I**

Numerical Differentiation: Derivatives using Newton's forward and backward difference formulae-Derivatives using Stirling's formula- Derivatives using divided difference formula- Maxima and Minima using the above formulae.

Chapter 7 :Section 7.1- 7.4, 7.6.

**UNIT II**

Numerical Integration: General Quadrature formula- Trapezoidal rule-Simpson's one-third rule- Simpson's three-eighth rule- Weddle's rule- Euler-Maclaurin Summation formula-

Stirling's formula for  $n!$ . - Chapter 7 :Section 7.7- 7.9, 7.13- 7.15.

**UNIT III**

Difference equations:Linear homogenous and nonhomogenous difference equation with constant coefficients- particular integrals for  $a^u x^N, x^N, \sin kx, \cos kx$ .

Chapter 8 :Section 8.1- 8.4, 8.6

**UNIT IV**

Numerical solution of Ordinary Differential Equations (I order only):

Taylor's series method- Picard's method- Euler's method- Modified Euler's method.

Chapter 9: Section 9.5-9.7, 9.9.

**UNIT V**

Numerical solution of Ordinary Differential Equations (I order only):

Runge-kuttamethod(fourth order only)- Predictor-Corrector method- Milne's method - Adams-Bashforth method.

Chapter 9 : Section 9.10 - 9.14.

**Content and Treatment as in**

"Calculus of Finite Differences and Numerical Analysis" by P. Kandasamy and K. Thilagavathy, S. Chand and Co. Pvt.Ltd.

**Reference:**

- 1) "Numerical Analysis " by B. D. Gupta, Konark Publishing.
- 2) "Numerical methods in Science and Engineering" by M. K. Venkataraman, National Publishing House, Chennai.

**e-Resources:**

1. <https://nptel.ac.in>
2. [https://www.encyclopediaofmath.org/index.php/Finite-difference\\_calculus](https://www.encyclopediaofmath.org/index.php/Finite-difference_calculus)

**B.Sc.DEGREECOURSEINMATHEMATICS**  
**SYLLABUSWITHEFFECTFROM2020-2021**

**BMA-  
CSA06**

**ALLIED:MATHEMATICALSTATISTICS-II**  
**(Common to B.Sc.Math with Computer Applications)**

**Learning outcomes:**

**Students will acquire knowledge**

- ▮ To provide the foundation of statistical analysis used in varied applications.
- ▮ Of Sampling methods, Tests of significance and testing of hypothesis.

**UNIT I**

Sampling theory – Sampling Distributions – Concept of Standard error – Sampling distribution based on normal distribution- t, Chi Square and F distributions.

**UNIT II**

Point estimation – Concepts of unbiasedness – consistency – efficiency and sufficiency- Cramer Rao inequality – Methods of estimation- Maximum likelihood- moments - minimum square and their properties (Statement only).

**UNIT III**

Test of significance – Standard error- Large sample test, Exact test based on normal, t, chi-square and F distribution with respect to population mean/means, proportion/proportions, variance and correlation coefficient. Test of independence of attributes based on contingency tables- Goodness of fit based on chi-square.

**UNIT IV**

Analysis of Variance: One way, two way classification concepts & Problems. Interval estimation – Confidence intervals for population mean/means- Proportion/proportions and variances based on t, Chi-Square and F.

**UNIT V**

Test of hypothesis- Type I and II errors- Power of test – Neymann Pearson lemma- Likelihood ratio test-concepts of most powerful test- statements and results only-simple problems.

**Reference:**

- ▮ S.C.Gupta & V.K.Kapoor: Elements of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
- ▮ Hogg R.V. & Craig A.T. (1988): Introduction to Mathematical Statistics, McMillan.
- ▮ Mood A.M. & Graybill F.A. & Boes D.G. (1974): Introduction to theory of Statistics, McGraw Hill.
- ▮ Snedecor G.W. & Cochran W.G. (1967): Statistical Methods, Oxford and IBH.
- ▮ Hoel P.G. (1971): Introduction to Mathematical Statistics, Wiley.

▮ Wilks S.S. Elementary Statistical Analysis, Oxford and IBH.

**e-Resources:**

1. <https://nptel.ac.in>
2. <https://www.wikipedia.org>
3. <http://ebooks.lpude.in/statistics>

B.Sc. DEGREE COURSE IN MATHEMATICS  
**SYLLABUS WITH EFFECT FROM 2020-2021**

BMA-DSEA1

ELECTIVE-I: PROGRAMMING IN 'C' WITH PRACTICALS

**Inst.Hrs : 6**

**YEAR: III**

**Credits : 5**

**SEMESTER: V**

Learning outcomes:

**Students will acquire knowledge**

- About the basic concepts and structure of 'C' program.
- To write simple programs with Mathematical Applications.

THEORY

**UNIT I**

Introduction - Constants-Variables-Data-types -Operators, Precedence of operators – Managing Input and Output Operations .  
Chapters : 2,3 and 4.

UNIT II

Decision making and branching: Simple if, if else, nested if, else if ladder and switch statement – conditional operator – go to statement.  
Decision making and looping : while, do while and for statement – nested for loops – jumps in loops (continue and break statements).  
Chapters : 5 and 6.

UNIT III

Arrays : One dimensional and 2 dimensional arrays – declarations – initialization of arrays. Character Arrays and Strings: Declaration and Initialization of Strings - Reading and Writing strings - Operations on strings - String handling functions.  
Chapters: 7 and 8

UNIT IV

Functions : Need for User defined functions- A Multi function Program- Elements of User defined functions - Function definition , Function Call and Function Declaration – Return Values and their types- Categories of functions – Nesting of Functions- Recursion .

Pointers: Understanding Pointers-Accessing address of a variable- Declaration and Initialization of Pointers- Accessing a Variable through its Pointer- Function call by reference - call by value. Chapters : 9 and 11.

UNIT V

File Management in C : Definition-Opening and Closing a file- Input/ Output operations on Files- Error Handling during I/O operations.

## Chapter 12.

B.Sc. DEGREE COURSE IN MATHEMATICS  
SYLLABUS WITH EFFECT FROM 2020-2021

Content and Treatment as in

“Programming in ANSI C”, 7<sup>th</sup> Edition, 2017, by E. Balagurusamy, McGraw Hill Education India Private Limited.

Reference:-

1. “Programming in C” by Venugopal.
2. “Programming with C” by Gottfried.B.S ,Schaum’s outline series, TMH 2001.
3. “Let us ‘C’” by Yashvant Kanitkar ,BPB Publications.
4. “Programming with C” by R.S.Bichkar, Universities Press (INDIA) Pvt.Ltd.

**e-Resources:**

1. <https://www.w3schools.in/c-tutorial>.
2. <https://en.cppreference.com/w/c>.

PRACTICALS

Writing ‘C’ programs for the following:

1. To convert Centigrade to Fahrenheit
2. To find the area, circumference of a circle
3. To convert days into months and days
4. To solve a quadratic equation
5. To find sum of n numbers
6. To find the largest and smallest numbers
7. To generate Pascal’s triangle, Floyd’s triangle
8. To find the trace of a matrix
9. To add and subtract two matrices
10. To multiply two matrices
11. To generate Fibonacci series using functions
12. To compute factorial of a given number, using functions
13. To add complex numbers using functions
14. To concatenate two strings using string handling functions
15. To check whether the given string is a palindrome or not using string handling functions.

Question paper pattern: External (60)+ Internal(40) Internal:

Internal Practical Assessment + Attendance + Record = 30 + 5 + 5 = 40 marks

External:

- Answer any 2 questions out of 3 questions : (2 x 30 = 60)

## B.Sc. DEGREE COURSE IN MATHEMATICS

### SYLLABUS WITH EFFECT FROM 2020-2021

BMA-DSEB2

Inst.Hrs : 6

ELECTIVE-II / III: GRAPH THEORY

YEAR: III

Credits : 5

SEMESTER: VI

Learning outcomes:

Students will acquire knowledge

- To describe and apply some basic algorithms for graph.
- To model real world problems using graph theory.

#### UNIT I

Graphs and Subgraphs: Introduction- Definition and examples, degrees, sub graphs, isomorphism, independent sets and coverings, intersection graphs and line graphs, matrices, operations on graphs

Chapter 2 Sections 2.0 – 2.9 (Omit section 2.5)

#### UNIT II

Degree sequences and Connectedness: Degree sequences and graphic sequences – simple problems. Walks, trails, paths, connectedness and components, blocks, connectivity – simple problems.

Chapter 3 Sections 3.0 – 3.2 , Chapter 4 Sections 4.0 – 4.4

#### UNIT III

Eulerian and Hamiltonian graphs - Chapter 5 Sections 5.0 – 5.2

#### UNIT IV

Trees : Characterisation of Trees, Centre of a Tree -simple problems.

Planarity : Definition and properties, characterization of planar graphs.

Chapter 6 Sections 6.0 – 6.2 , Chapter 8 Sections 8.0 – 8.2

#### UNIT V

Directed Graphs: Definition and basic properties, paths and connections, digraphs and matrices, tournaments - Chapter 10 Sections 10.0 – 10.4

Content and treatment as in

“Invitation to Graph Theory”, by S.Arumugam and S.Ramachandran, Scitech Publications (India) Pvt. Ltd., Chennai 17.

Reference:

1. A first look at graph theory by John Clark and Derek Allan Holton, Allied publishers.
2. Graph Theory by S.Kumaravelu and SusheelaKumaravelu, Publishers authors C/o 182 Chidambara Nagar, Nagarkoil.

**e-Resources:**

1. <https://nptel.ac.in>.
2. <https://mathonline.wikidot.com>.
3. <http://ebooks.lpude.in/graphtheor>  
[y](#).



**Inst.Hrs : 6****YEAR: III****Credits : 5****SEMESTER: VI**

Learning outcomes:

**Students will acquire knowledge in**

- Solving Linear Programming Problems.
- Sequencing the jobs to be carried out based on Cost Optimization.
- Solving assignment and transportation problems and Queuing Theory Models.

## UNIT I

Linear programming: Formulation – graphical solution. Simplex method. Big-M method. Duality-primal-dual relation.

Chapter 6 Sections 6.1 – 6.13, 6.20 – 6.31

## UNIT II

Transportation problem: Mathematical Formulation. Basic Feasible solution. North West Corner rule, Least Cost Method, Vogel's approximation. Optimal Solution. Unbalanced Transportation Problems. Degeneracy in Transportation problems.

Assignment problem: Mathematical Formulation. Comparison with Transportation Model. Hungarian Method. Unbalanced Assignment problems

Chapter 9 Sections 9.1 – 9.12 ,Chapter 8 Sections 8.1 – 8.5

## UNIT III

Sequencing problem: n jobs on 2 machines – n jobs on 3 machines – two jobs on m machines

– n jobs on m machines.

Game theory : Two-person Zero-sum game with saddle point – without saddle point – dominance – solving  $2 \times n$  or  $m \times 2$  game by graphical

method. Chapter 10 Sections 10.1 – 10.6 ,Chapter 12

Sections 12.1 – 12.15

## UNIT IV

Queuing theory: Basic concepts. Steady state analysis of M / M / 1 and M / M / S models with finite and infinite capacities.

Chapter 5 Sections 5.1 – 5.18

## UNIT V

Network: : Project Network diagram – CPM and PERT computations. (Crashing excluded)

Chapter 13

Sections 13.1 – 13.10

Content and treatment as in

Operations Research, by R.K.Gupta , Krishna Prakashan India (p),Meerut Publications.

Reference:

1. Gauss S.I. Linear programming , McGraw-Hill Book Company.
2. Gupta P.K. and Hira D.S., Problems in Operations Research ,S.Chand& Co.
3. KantiSwaroop, Gupta P.K and Manmohan , Problems in Operations Research,Sultan Chand & Sons.
4. Ravindran A., Phillips D.T. and Solberg J.J., Operations Research, John wiley & Sons.
5. Taha H.A. Operation Research, Macmillan pub. Company, New York.
6. Linear Programming, Transporation, Assignment Game by Dr.Paria, Books and Allied (P) Ltd.,1999.
7. V.Sundaresan,K.S. Ganapathy Subramaian and K.Ganesan, Resource Management Techniques, A.R Publications.

**e-Resources:**

1. <http://ebooks.lpude.in.operationsresearch>.
2. <https://ocw.mit.edu>.

NME-I: FUNCTIONAL MATHEMATICS-I

**UNIT I**

Ratio and Proportion

UNIT II

Percentages

UNIT III

Profit and Loss, Discounts

UNIT IV

Simple Interest and Compound interest

UNIT V

Solutions of Simultaneous equations, Problems on Ages and Numbers.

Reference:

Quantitative Aptitude- R.S. Agarwal

NME-II: FUNCTIONAL MATHEMATICS-II

**UNIT I**

Time and work – Pipes and cisterns- Problem

UNIT II

Time and Distance, Relative speeds- Problems on Races, Boats and Trains.

UNIT III

Mensuration – Problems

UNIT IV

Polygons – Interior angles- Number of diagonals- Regular Polygons- Problems

UNIT V

Stocks and Shares – Problems

Reference:

1. Quantitative Aptitude- R.S. Agarwal
2. Functional Mathematics, M. Sivananda Rani, Margham Publications, Chennai.

**UNIVERSITY OF MADRAS**  
**UG & 5 YR INTEGRATED DEGREE COURSES**  
**SYLLABUS – OTHER LANGUAGES**

**PART I - ARABIC**  
**(w.e.f.2012-2013)**

**FIRST YEAR - SEMESTER – I PAPER I –**  
**PROSE AND GRAMMAR – I**

**Books Prescribed:**

**1) Duroos Al-Lugha Al-Arabiyya Part-I**

By Dr. V. Abdur Rahim (Lesson 1 to 12)

Unit 1 : Lesson 1 to 4

Unit 2 : Lesson 5 to 8

Unit 3 : Lesson 9 to 12

**2) An-Nahu Al-Wadeh Part-I (Al-Ibtidaiyyah)**

By Ali Al Jarim and Mustafa Ameen

Unit 4 :

Al-Jumlah Al-Mufeedha, Ajza Al-Jumlah, Al-Fi'l al-Madhi, Al-Fi'l-al-Mudhari', Fi'l al-Amr

Unit 5 : Al-Fa'il, Al-Maf'uool, Al-Mubthdha Wal-Khabar

SEMESTER - II

**PAPER II – COMMUNICATION SKILLS IN ARABIC**

**Books Prescribed:**

**Arabic Conversation Book**

By Mohd. Harun Rashid and Khalid Perwez

Published by Goodword Books

Unit 1 : Lesson 1 to 4

Unit 2 : Lesson 5 to 9

Unit 3 : Lesson 10 to 13

Unit 4 : Lesson 14 to 16

Unit 5 : Lesson 17 to 19

SECOND YEAR- SEMESTER - III PAPER III –  
PROSE AND GRAMMAR – II

**Books Prescribed:**

**1) Duroos Al-Lugha Al-Arabiyya Part-I**

By Dr. V. Abdur Rahim (Lesson 13 to 23)

Unit 1 : Lesson 13 to 17

Unit 2 : Lesson 18 to 20

Unit 3 : Lesson 21 to 23

2) An-Nahu Al-Wadeh Part-I (Al-Ibtidaiyyah)

By Ali Al Jarim and Mustafa Ameen

Unit 4 : Al-Jumlah Al-Fi'liyyah, Al-Jumlah Al-  
Ismiyyah, Nasb Al-Fi'l-al-Mudhari',

Jazm Al-Fi'l-al-Mudhari', Raf' Al-Fi'l-al-Mudhari'

Unit 5 : Kana wa Akhawatuha, Inna wa Akhawathuha, Jarr  
al- Ism, An-Na'tu

**SEMESTER IV**

**PAPER IV – QURAN AND HADITH**

Books Prescribed:

**1) Sooratu Luqman**

Al-Quran – Chapter

31 Unit 1 : Verse 1 to 11

Unit 2 : Verse 12 to 21

Unit 3 : Verse 22 to 34

2) Ahadeeth Sahlah

By Dr. V. Abdur Rahim

Unit 4 : Hadith 1 to 10

Unit 5 : Hadith 11 to 20



REVISED QUESTION PAPER PATTERN

Arabic Language Part –I

Part –A (30 Words)

**10 out of 12 - (10 x 2marks = 20 marks)**

**Part – B (200 words)**

**5 out of 7 - (5 x 5marks = 25 marks)**

**Part – C (500 words)**

**3 out of 5 - (3 x 10marks = 30 marks)**

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**PART-I- URDU**

(With effective from the academic year 2008-2009).

## FIRST SEMESTER

**PAPER-I PROSE AND LETTER WRITING**

3 Hours

Max Marks: 75

**(A) PROSE (following lessons only)**

1. Umeed Ki Khushi by Sir Syed Ahmed Khan.
2. Internel – by Izhar Ahmed
3. Khanvada-e-Walajahi ke Gumnam Shaer – by Dr.Syed Sajjad Hussain.

Book Prescribed

Sogath-e-Adab Ed. By Dr. Syed Sajjad Hussain, published by University of Madras.

**(B) LETTER WRITING**

1. letter to the Principal asking for leave
2. Letter to the Publisher or Book seller placing order for books
3. Letter to a Firm Manager seeking a job.
4. Letter to a Bank Manager seeking a loan
5. Letter to the father asking money for payment of college fees.

Unit wise distribution

Unit-I	(1) Umeed Ki Khushi (First Half) (2) Letter to the Principal
Unit-II	(1) Umeed Ki Khushi (Second Half) (2) Letter to the Publisher
Unit-III	(1) Internel (First Half) (2) Letter seeking a job
Unit-IV	(1) Interner (second half) (2) Letter to a Bankd Manager
Unit-V	(1) Khanvada-e-Walajahi (Full) (2) Letter to the father.

SECOND SEMESTER

PAPER-II PROSE GRAMMAR AND TRANSLATION

3 Hours

Max Marks: 75

(A) PROSE (following lessons only)

1. Ghalib Ke Khutooth by Ghalib
2. Abdul Haqw Marhoom by Rasheed Ahmed Sioddqui.
3. Thirukkural by Dr. Hayath Ifthkhar.

Book Prescribed

Sogath-e-Adab Ed. By Dr. Syed Sajjad Hussain, published by University of Madras.

(B) GRAMMAR –following topics only.

1. Ism aur Uski Qismein
2. Sifath
3. Zameer
4. Fel
5. Tazkeer-o-Taneez

Book Prescribed

Urdu Grammar – Yaqoob Aslam

(C) TRANSLATION

1. Translation of unseen passage from English to Urdu
2. Translation of commercial Words

Commercial Words

- 1.Profit, 2.Loss 3.Expensess 4. Investment 5.Debit 6.Credit 7.Export 8. Import  
9.Wages 10.Salary 11.Warehouse 12.Cash 13.Account 14.Invoice  
15.Tranportations 16.Customer 17.Seller 18.Buyer 19. Discount 20.Commission  
21.Interest 22.Bank Loan 23.Voucher 24.Inventory 25.Godown 26.Insurance  
27.Rate of Interest 28.Receipt 29.Share 30.Trade 31.Commerce 32. Finance.

Unit wise distribution

- Unit-I (1) Ghalib Ke Khutooth  
(2) Ism aur Uski Qismein
- Unit-II (1) Abdul Haqw Marhoom  
(2) Sifath
- Unit-III (1) Thirukkural  
(2) Zameer
- Unit-IV (1) Zameer  
(2) Fel

Unit-V

- (1) Tazkeer-o-Taneez
- (2) Translation of unseen passage from English to Urdu.
- (3) Translation of commercial Words

**QUESTION PAPER**

**PATTERN**

(W.E.F.2008-09)

PART- A (5X3=15)

5 out of 7 Questions (One or two sentences) PART- B  
(5x6=30)

5 out of 7

Questions(Paragraph)

PART -C(3x10=30)

3 out of 6 Questions (Essay Type)

REVISED PATTERN OF QUESTION PAPER

**(W.E.F.2009-2010 And Thereafter)**

Duration :3 hours

Max Marks: 100

The question paper will comprise of Ten Questions, out of which five question have to be answered. Marks are equal for all the five questions i.e. each question will carry 20 Marks Wherever the text of prose and poetry are prescribed one compulsory question on reference to the context should be asked in the case of prose and commentary of couplets should be asked in the case of poetry. These questions will comprise of eight extracts from prose or eight couplets from poetry out of which four has to be answered.



THIRD SEMESTER

**PAPER III POETRY AND HISTORY OF URDU LITERATURE**

(Common to all U.G. courses and Five Year Integrated P.G. courses 2008-2009)

Time : 3 hours

Max.Marks: 75

**(A) POETRY** (Following Ghazals only)

1. Faqeerana Aaye Sadaa Kar Chale - Mir Taqi Mir
2. Dil-e-nadaan Tuje Hua Kya Hai - Mirza Ghalib
3. Khaathir Se Ya Lihaaz se maan tho gaza O Daag Dehlavi
4. Sitaaton se aagae Jahan aur bhi hain - Allama Iqbal
5. Na Ab Musjurrane Ko Ji Chahta Hai – Jigar Muradabadi

*Books Prescribed*

Urdu Saheri –Inthikhaab - (Published by National Council for Promotion of Urdu Language – New Delhi)

**(B) HISTORY OF URDU LITERATURE** (Following topics only)

1. Urdu Zaban Ki Ibtada
2. Ghar Se Door Dakhani Hindustan Mein
3. Dilli Ki Shaeri
4. Nazeer Akbarabadi
5. Dabistan-e-Lucknow

*Books Prescribed*

Urdu Ki Kahani – Ehtisham Hussain (Published by National Council for Promotion of Urdu Language – New Delhi)

*Unit wise Distribution*

- Unit –I (1) Faqeerana Aaye  
(2) Urdu Zaban  
Ki Ibtada Unit–II (1) Dil-  
e-nadaan Tuje  
(2) Ghar  
Se Door Unit–III  
(1) Khaathir Se  
(2) Dilli Ki  
Shaeri Unit–IV (1)  
Sitaaron Se Aage  
(2) Nazeer  
Akbarabadi Unit–V (1) Na  
Ab Muskurane Ko Ji

(2) Dabistan-e-Lucknow

ENVIRONMENTAL STUDIES PROGRAMME  
ABILITY ENHANCEMENT COMPULSORY COURSES

(AECC- Environmental Studies)

Syllabus with effect from the academic year 2018-  
2019

( i.e. for batch of candidates admitted to the course from the academic year 2017-

18) Credits: 2

II Year / III/IV

Sem.

Unit 1: Introduction to Environmental Studies

- Multidisciplinary nature of environmental studies;
- Scope and importance; concept of sustainability and sustainable development.

Unit 2 : Ecosystem (2 lectures)

- What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem:  
Food chains, food webs and ecological succession, Case studies of the following ecosystem:
  - a) Forest ecosystem
  - b) Grassland ecosystem
  - c) Desert ecosystem
  - d) Aquatic ecosystem (ponds, stream, lakes, rivers, ocean, estuaries)

Unit 3: Natural Resources : Renewable and Non – renewable Resources ( 6 lectures)

- Land resources and land use change: Land degradation, soil erosion and desertification.
- Deforestation : Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.
- Water : Use and over –exploitation of surface and ground water, floods, droughts, conflicts over water ( international and inter-state).
- Energy resources : Renewable and non renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

Unit 4: Biodiversity and Conservation ( 8 lectures)

- Levels of biological diversity: genetics, species and ecosystem diversity, Biogeographic zones of India: Biodiversity patterns and global biodiversity hot spots
- India as a mega- biodiversity nation, Endangered and endemic species of India.
- Threats to biodiversity: Habitat loss, poaching of wildlife, man- wildlife conflicts, biological invasions; Conservations of biodiversity: In-situ and Ex-situ Conservation of biodiversity.
- Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.

Unit 5: Environmental Pollution (8 lectures)

- Environmental pollution: types, causes, effects and controls: Air, Water, soil and noise Pollution.

- Nuclear hazards and human health risks
- Solid waste management: Control measures of urban and industrial waste
- Pollution case studies



#### Unit 6: Environmental Policies & Practices ( 8 lecturers)

- Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture
- Environment Laws: Environment Protection Act, Air (Prevention & Control of Pollution) Act; Water (Prevention and Control of Pollution ) Act; Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD).
- Nature reserves, tribal populations and rights, and human Wildlife conflicts in Indian context.

#### Unit 7: Human Communities and the Environment (7 lectures)

- Human population growth, impacts on environment, human health and welfare.
- Resettlement and rehabilitation of projects affected persons; case studies.
- Disaster management: floods, earthquake, cyclone and landslides.
- Environmental movements : Chipko, Silent Valley, Bishnois of Rajasthan.
- Environmental ethics : Role of Indian and other religions and cultures in environmental conservation.
- Environmental communication and public awareness, case studies(e.g. CNG Vehicles in Delhi)

#### Unit 8 : Field Work (6 lectures)

- Visit to an area to document environmental assets: river / forest/ flora/ fauna etc.
- Visit to a local polluted site – Urban / Rural/ Industrial/ Agricultural.
- Study of common plants, insects, birds and basic principles of identification.
- Study of simple ecosystem- pond, river, Delhi Ridge etc.  
(Equal to 5 Lectures)

#### Suggested Readings:

1. Carson , R. 2002.Silent Spring, Houghton Mifflin Harcourt.
2. Gadgil , M.,& Guha, R. 1993.This Fissured Land: An Ecological History of India. Univ.of California Press.
3. Glesson, B. and Low, N.(eds.)1999. Global Ethics and Environment, London, Routledge.
4. Gleick,P.H.1993.Water Crisis. Pacific Institute for Studies in Dev.,Environment & Security. Stockholm Env.Institute, Oxford Univ.Press.
5. Groom, Martha J., Gary K.Meffe, and Carl Ronald Carroll. Principles of Conservation Biology. Sunderland: Sinauer Associates,2006.
6. Grumbine,R.Edward, and Pandit,M.K2013.Threats from India's Himalayas dams .Science,339:36-37
7. McCully,P.1996.Rivers no more :the environmental effects of dams(pp.29-64).Zed books.
8. McNeill,John R.2000.Something New Under the Sun: An Environmental History of the Twentieth Century.
9. Odum,E.P.,Odum, H.T.& Andrees,J.1971.Fundamental of Ecology. Philadelphia Saunders.
10. Pepper,I.L.,Gerba,C.P & Brusseau,M.L.2011.Environmental and Pollution Science. Academic Press.
11. Rao,M.N.& Datta,A.K1987.Waste Water Treatment. Oxford and IBH Publishing Co.Pvt.Ltd.
12. Raven,P.H.,Hassenzahl,D.M & Berg,L.R.2012 Environment.8<sup>th</sup> edition. John Willesons.

13. Rosencranz, A., Divan,S.,& Noble, M.L.2001.Environmental law and policy in India. Tirupathi 1992.
14. Sengupta,R.2003.Ecology and Economics: An approach to sustainable development.OUP
15. Singh,J.S.,Singh,S.P and Gupta,S.R.2014.Ecology,Environmental Science and Conservation. S.Chand Publishing, New Delhi.
16. Sodhi,N.S.,Gibson,L.&Raven ,P.H(eds).2013.Conservation Biology :Voices from the Tropics. John Willey & Sons.
17. Thapar,V.1998.Land of the Tiger: A Natural History of the Indian Subcontinent.
18. Warren,C.E.1971.Biology and water Pollution Control. WB Saunders.
19. Willson,E.O.2006. The Creation: An appeal to save life on earth..New York: Norton.
20. World Commission on Environment and Development.1987.Our Common Future. Oxford University Press.

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FOURTH SEMESTER

**PAPER - IV - POETRY AND NON-DETAILED**

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**Time : 3 hours**

**Max. Marks: 75**

**(A) POETRY (Following Poems only)**

1. Aadmi Nama – Nazeer Akbarabadi
2. Nisar Main Teri Galiyonke – Faiz Ahmed Faiz
3. Taj Mahal – Sahir Ludhianvi
4. Rubaiyaath – Mir Anees, Hali, Akbar Allahabadi, Amjad Hyderabad.

**(B) NON-DETAILED (Following short stories only)**

1. Qaathil - Premchand
2. Jaamun Ka Ped – Krishan Chander
3. Bhola – Rajender Singh Bedi
4. Dard Ka Ehsaas – ameerunissa

*Book Prescribed*

Soghath-e-Adab –Edited by Dr.Syed Sajjad Husain (Published by University of Madras)

*Unit wise Distribution*

- Unit –I (1) Aadmi Naama (First Half)  
(2) Qaathil (First Half)
- Unit–II (1) Aadmi Naama (Second Half)  
(2) Qaathil (Second Half)
- Unit–III (1) Nisar Main Teri Galiyonke  
(2) Jamun Ka Ped
- Unit–IV (1) Nisar Main Teri Galiyonke  
(2) Bhola Unit–V
- (1) Taj Mahal  
(2) Dard Ka Ehsaas

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## **CORE-I: FINANCIAL ACCOUNTING**

Common to BCom(A&F), BCom(CS), BCom(BM),  
BCom(MM), BCom(CA) & BCom(ISM)

**Inst.Hrs : 6**  
**Credits : 4**

**YEAR: I**  
**SEMESTER: I**

### **OBJECTIVES:**

- To enable the students to understand the system of preparing financial statements for various types of organisation
- To familiarize the students with knowledge about financial reporting standards

### **OUTCOMES:**

- The students will be able to analyse and prepare financial statement of different types of organisation
- The students will be aware of the various amendments in financial reporting

### **UNIT I: Preparation of Financial Statement**

Final accounts of sole trading concern-Adjustments-Receipts and Payments-Income and expenditure-Balance sheet of non trading organisation

### **UNIT II: Depreciation and Insurance Claims**

Depreciation Accounting: Depreciation- Meaning –Causes-Types-Straight Line Method- Written down value method- Concept of useful life under Companies Act 2015  
Insurance Accounting: Insurance claims –Calculation of Claim amount-Average clause(Loss of stock only)

### **UNIT III: Single entry system**

Meaning and Features of Single entry-Defects-Difference between single entry and double entry system-Methods of calculation of Profit-Statement of Affairs Method- Conversion Method

### **UNIT IV: Rectification of Errors and Bank Reconciliation Statement**

Classification of Errors – Rectification of Errors – Preparation of Suspense a/c. Bank Reconciliation Statement – Need and preparation.

### **UNIT V: Hire Purchase and Instalment System**

Hire Purchase System- Default and repossession-Hire purchase trading account  
Instalment System-Calculation of Profit.

**Note: Questions in Sec. A, B & C shall be in the proportion of 20:80 between Theory and Problems.**

**TEXT BOOK:**

1. Lt Bhupinder – principles of Financial Accounting – CENGAGE, New Delhi
2. Raj Kumar Sah –Concepts Building Approach to Financial Accounting – CENGAGE, New Delhi
3. Gupta, R.L & Gupta,V.K, Advanced Accounting, Sulthan Chand & Sons, New Delhi

**REFERENCE BOOKS:**

1. Jain & Narang, Financial Accounting, Kalyani Publishers, NewDelhi
2. Reddy, T.S & Murthy,A. Financial Accounting, Margham Publications, Chennai
3. Shukla & Grewal, Advanced Accounting, S.Chand & Co. NewDelhi
4. Parthasarathy, S.& Jaffarulla, A. Financial Accounting, Kalyani Publishers, NewDelhi

**WEB REFERENCE:**

[www.accountingcoach.com](http://www.accountingcoach.com)  
[www.accountingstudyguide.com](http://www.accountingstudyguide.com)  
[www.futureaccountant.com](http://www.futureaccountant.com)  
[www.onlinelibrary.wiley.com](http://www.onlinelibrary.wiley.com)

**B.Com. DEGREE COURSE IN ACCOUNTING &  
FINANCE SYLLABUS WITH EFFECT FROM  
2020-2021**

**BAF-DSC02**

**CORE-II: FINANCIAL PLANNING AND PERFORMANCE**

**Inst.Hrs : 6**

**Credits : 4**

**YEAR: I**

**SEMESTER: I**

**OBJECTIVES**

1. Achieve an understanding of strategic planning, forecasting and budgeting, recall the models of strategic planning with the process, classify the forecasting techniques and demonstrate the budget.
2. To make use of budget to prepare an annual profit plan, analyze performance by using flexible budgets und compare actual results to planned results.
3. To explain the importance and use of standard cost systems, propose performance measures and discuss key performance indicators.

**Unit I: Strategic Planning**

Analysis of external and internal factors affecting strategy - Long-term mission and goals  
- Alignment of tactics with long-term strategic goals - Strategic planning models and analytical techniques - Characteristics of successful strategic planning process.

**Unit II: Budgeting and Forecasting**

Operations and performance goals - Characteristics of a successful budget process – Resource allocation - Regression analysis - Learning curve analysis - Expected value - Annual business plans (master budgets) - Project budgeting - Activity-based budgeting - Zero-based budgeting - Continuous (rolling) budgets - Flexible budgeting - Annual profit plan and supporting schedules  
- Operational budgets - Financial budgets - Capital budgets - Pro forma income – Financial statement projections - Cash flow projections.

**Unit III: Cost and Variance Measures**

Comparison of actual to planned results - Use of flexible budgets to analyze performance  
- Management by exception - Use of standard cost systems - Analysis of variation from standard cost expectations.

**Unit IV: Responsibility centers and reporting segments**

Types of responsibility centers - Transfer pricing - Reporting of organizational segments

**Unit V: Performance Measures:**

Product profitability analysis - Business unit profitability analysis - Customer profitability analysis - Return on investment - Residual income - Investment base issues - Key performance indicators (KPIs) - Balanced scorecard

**RECOMMENDED TEXT BOOKS:**

1. Wiley CMAexcel Learning System, Part 1: Financial Planning, Performance & Analytics

**REFERENCE BOOKS:**

1. Strategic Management and Business Policy: Globalization, Innovation and Sustainability; Thomas Wheelen, J. David Hunger, Alan N. Hoffman, and Chuck Bamford; Pearson
2. Cost Management: A Strategic Emphasis; Edward Blocher, David Stout, Paul Juras, and Gary Cokins; McG raw Hill

3. Cost Accounting: A Managerial Emphasis; Charles Homgren, Srikant Datar, and Madhav Rajan; Pearson
4. Quantitative Methods for Business; David Anderson, Dennis Sweeney, Thomas Williams, Jeffrey Camm, and James Cochran; Cengage Learning



**BGE-CSC02**

**CORE-II: BUSINESS COMMUNICATION**

Common to BCom(A&F) as Allied, BCom(CS), BCom(BM) & BCom(MM)

**Inst.Hrs : 6**

**YEAR: I**

**Credits : Core 4 / Allied 5**

**SEMESTER: I**

**OBJECTIVES:**

- To facilitate the students to understand the concept of Communication.
- To Know the basic techniques of the modern forms of communication

**OUTCOME:**

- Students understand the concept of communication and familiarise with modern form of communication.

**UNIT I: Communication**

Definition – Methods – Types – Principles of effective Communication – Barriers to Communication – Business Letters – Layout.

**UNIT II: Business Letters**

Kinds of Business Letters: Interview – Application for a situation – Interview -Appointment – Acknowledgement – Promotion – Enquiries – Reply letter – Orders – Sales letter – Circular letter – Complaint letter.

**UNIT III: Correspondence**

Bank Correspondence – Insurance Correspondence – Agency Correspondence – Correspondence with Shareholders, Directors.

**UNIT IV: Reports and Meetings**

Report Writing – Meetings – Agenda - Minutes of Meeting – Memorandum – Office Order – Circular – Notes.

**UNIT V: Forms of Communication**

Modern Forms of Communication: Fax – E-mail – Video Conferencing – Internet – Websites – uses of the various forms of communication.

**Recommended Texts**

1. Mallika Nawal –Business Communication – CENGAGE
2. Pragyan Rath, K. Shalini , Debankita Ray - Corporate Communication – CENGAGE

3. C.B.Gupta - Essentil Business Communincation - CENGAGE
4. Rajendra Pal & J.S. Korlahalli, Essentials of Business Communication - Sultan Chand & Sons - New Delhi.
5. Shirley Taylor, Communcation for Business - Pearson Publications - New Delhi.
6. Bovee, Thill, Schatzman, Business Communication Today - Peason Education Private Ltd - New Delhi.
7. Penrose, Rasbery, Myers, Advanced Business Communication - Bangalore.
8. Simon Collin, Doing Business on the Internet - Kogan Page Ltd. - London.
9. Mary Ellen Guffey, Business Communication – Process and Product -International Thomson Publishing - Ohio.
10. Sundar K.A, Business communication Vijay Nicole imprints Pvt. Ltd., Chennai.

#### **E- RESOURCES**

[www.newagepublishers.com](http://www.newagepublishers.com)

[www.managementstudyguide.com](http://www.managementstudyguide.com)

[www.businesscommunication.org](http://www.businesscommunication.org)

[www.smallbusiness.chorn.com](http://www.smallbusiness.chorn.com)

**UNIVERSITY OF MADRAS**  
**UG–NON-MAJORELECTIVE COURSE**  
**OFFERED IN THE DEPARTMENT OF COMMERCE**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BGE-NME04**

**BASICS OF RETAIL MARKETING**

Course Objectives

1. To enable the students to understand the concepts of retail marketing
2. To teach the students on aspects branding and labeling in retail

trade OUTCOME:

Equip the students to get the knowledge of retail marketing and its segmentation,

**UNIT – I**

Retailing – Definition – Retail Marketing – Growth of organized retailing in India – Importance of retailing

**UNIT – II**

Functions of Retailing – characteristics of Retailing – Types of Retailing – store retailing – Non-store retailing

**UNIT – III**

Retail location factors – Branding in retailing – private labeling – Franchising concept.

**UNIT – IV**

Communication tools used in Retailing – Sales promotion, e-tailing- window display

**UNIT - V**

Supply chain management – definition – importance – Role of information Technology in retailing.

**TEXT BOOKS**

- 1.P.K Madhavan – Introduction to Retailing –Vijay Nicole Imprints Private Limited ,Chennai.
2. John J.Coyle , C. John Langley .JR., Robert A. Novack , Brian J.Gibson – Supply Chain Management A Logisticss Perspective – CENGAGE , New Delhi
- 3.Joel D.Wisner , Keah – Choon Tan , G.Keong Leong – Principles of SupplyChain Management A Balanced Approach– CENGAGE, New Delhi

**Reference Books:**

1. Modern Retail Management – J.N.Jain & P.P.Singh Regal Publications , New delhi
2. Retail Management – Suja Nair, Himalaya Publishing house.

**BGE-  
CSC03**

**CORE-III: ADVANCED FINANCIAL ACCOUNTING**

Common to BCom(A&F), BCom(CS), BCom(CA) & BCom(ISM)

**Inst.Hrs : 6**

**Credits : 4**

**YEAR: I**

**SEMESTER: II**

**OBJECTIVES**

To enable the students to understand the system of preparing financial statements for various types of organisation

- To familiarize the students with knowledge about financial reporting standards

**OUTCOME:**

- The students will be able to understand the preparation of financial statements for business units other than corporate undertaking and their utility.

**Unit I: Branch Accounts**

Dependent Branches - Stock and Debtors system – Distinction between Wholesale Profit and Retail Profit – Independent Branches (Foreign Branches excluded)

**Unit II: Departmental Accounts**

Basis of Allocation of Expenses – Calculation of Profit - Inter-departmental Transfer at cost or Selling Price.

**Unit III: Partnership Accounts**

Admission of a Partner – Retirement of a Partner – Death of a Partner.

**Unit IV: Partnership Accounts**

Dissolution of a Partnership Firm – Insolvency of a Partner – Insolvency of all Partners- Piecemeal Distribution of cash in case of Liquidation of Partnership Firm.

**Unit V: Accounting Standards for financial reporting**

Objectives and uses of financial statements for users-Role of accounting standards-Development of accounting standards in India- Requirements of international accounting standards - Role of developing IFRS- IFRS adoption or convergence in India- Implementation plan in India- Ind AS-Difference between Ind AS and IFRS.

**Note: Questions in Sec. A, B & C shall be in the proportion of 20:80 between Theory and Problems.**

**TEXT BOOK:**

1. Lt Bhupinder – principles of Financial Accounting – CENGAGE, New Delhi
2. Raj Kumar Sah –Concepts Building Approach to Financial Accounting - CENGAGE, New Delhi
3. Gupta, R. L & Gupta, V. K, Advanced Accounting, Sulthan Chand & Sons, New Delhi.
4. Jain & Narang, Financial Accounting, Kalyani Publishers, New Delhi.

### **SUGGESTED READINGS:**

1. Reddy, T. S & Murthy, A. Financial Accounting, Margham Publications, Chennai.
2. Shukla & Grewal, Advanced Accounting, S. Chand & Co., New Delhi.
3. Tulsian P.C.-Financial Accounting.
4. Parthasarathy, S. & Jaffarulla, A. Financial Accounting, Kalyani Publishers, NewDelhi

### **WEB REFERENCE:**

[www.accountingcoach.com](http://www.accountingcoach.com)  
[www.accountingstudyguide.c  
om](http://www.accountingstudyguide.com)  
[www.futureaccountant.com](http://www.futureaccountant.com)  
[www.onlinelibrary.wiley.com](http://www.onlinelibrary.wiley.com)

**CORE-IV: PRINCIPLES OF MANAGEMENT**

Common to BCom(A&F), BCom(BM), BCom(CA)-IV  
Sem & BCom(ISM)-IV Sem.

**Inst.Hrs : 6  
Credits : 4**

**YEAR: I  
SEMESTER: II**

**OBJECTIVES**

- To make the students to understand the basic concepts of management.
- To prepare the students to know about the significance of the management in Business.

**OUTCOME:**

- On the completion of syllabus students will understand the basic concepts and significance of management in business.

**Unit I: Introduction**

Definition – Importance – Nature and Scope of Management – Process of Management - Role and functions of Managers - Levels of Management Scientific Management Contributions to Management by different Schools of thought.

**Unit II: Planning**

Nature – Importance -Types of Planning - Steps in planning - Objectives of Planning – Policies - Decision making Process-Types of Decisions. HRM- Meaning, -Nature and scope of HRM.

**Unit III: Organization**

Meaning and Types of organizations - Principles – Formal and Informal organization - Organisation Structure – Span of Control – Departmentalisation – Basis - Meaning and Importance of Departmentalisation. Policies - Meaning and Types – Procedures - Forecasting.

**Unit IV: Authority and Responsibility**

Authority – Definition – Sources – Limitations – Difference between Authority and Responsibility – Delegation of Authority – Meaning – Principles and importance – Centralisation Vs Decentralisation- Leadership & Communication

**Unit V: Direction Co-ordination & Control**

Direction – Nature - Purpose. Co-ordination – Need – Types and Techniques – Requisites for Excellent Co-ordination. Controlling – Meaning – Importance – Control Process.

**TEXT BOOK:**

1. N.V..S.Raju.- Fundamentals of Management - CENGAGE ,New Delhi.
2. James Campbell Quick, Dbra L.nelson, Preetam Khandelwal - CENGAGE ,New Delhi.
3. Gupta,C.B.ManagementTheory&Practice,SulthanChand&Sons,New Delhi.
4. Prasad,L.M.Principles&PracticeofManagement,SultanChand&Sons,New Delhi.

### **REFERENCE BOOKS:**

1. Tripathi,P.C.&Reddy,P.N.PrinciplesofManagements,TataMcGrawHill,NewDelhi.
2. WehrichandKoontz,Management-AGlobalPerspective.
3. PremavathyN,PrinciplesofManagement,SriVishnuPublications,Chennai.
4. Jayasankar,J.BusinessManagement,MarghamPublication,Chennai.
5. Sundar,K.PrinciplesofManagement,VijayNicoleImprintsPvt.Ltd.,Chennai

### **WEB RESOURCE:**

1. [www.wisdomjobs.com](http://www.wisdomjobs.com)
2. [www.aima.in](http://www.aima.in)
3. [www.clep.collegeboard.org](http://www.clep.collegeboard.org)



**ALLIED-II(B): FINANCIAL ANALYTICS AND CONTROL**

**Inst.Hrs : 6  
Credits : 5**

**YEAR: I  
SEMESTER: II**

**OBJECTIVES**

1. To understand information systems, data governance, technology-enabled finance transformation and the application of data analytics and visualization.
2. To be able to define cost behaviour and types of costs, classify costing systems and compare different types of costs.
3. To understand supply chain management and business process improvement.
4. To understand governance, risk, compliance, system controls and security measures for internal controls.

**COURSE UNITS**

**UNIT I: Information Systems and Data Governance**

Accounting information systems - Enterprise resource planning systems - Enterprise performance management systems - Data policies and procedures - Life cycle of data - Controls against security breaches

**UNIT II: Technology-Enabled Finance Transformation and Data Analytics**

Systems Development Life Cycle — Process automation - Innovative applications - Business intelligence - Data mining - Analytic tools - Data visualization

**UNIT III: Cost Measurement Concepts**

Cost behavior and cost objects - Actual and normal costs - Standard costs - Absorption (full) costing - Variable (direct) costing - Joint and by-product costing- Job order costing - Process costing - Activity-based costing - Life-cycle costing - Fixed and variable overhead expenses - Plant-wide versus departmental overhead - Determination of allocation base - Allocation of service department costs

**UNIT IV: Supply Chain Management and Business Process Improvement**

Lean manufacturing - Enterprise resource planning (ERP) - Theory of constraints and throughput costing - Capacity management and analysis - Value chain analysis - Value-added concepts - process analysis - Activity-based management - Continuous improvement concepts - Best practice analysis - Cost of quality analysis - Efficient accounting processes

**UNIT V: Internal Controls**

Internal control structure and management philosophy - Internal control policies for safeguarding and assurance - Internal control risk - Corporate governance - External audit requirements - Systems controls and security measures

**RECOMMEDED TEXT BOOKS:**

1. Wiley CM Aexcel Learning System, Part 1: Financial Planning, Performance & Analytics

**REFERENCE BOOKS:**

1. Cost Management: A Strategic Emphasis; Edward Blocher, David Stout, Paul Juras, and Gary Cokins; McGraw Hill

2. Cost Accounting: A Managerial Emphasis; Charles Homgren, Srikant Datar, and Madhav Rajan; Pearson
3. Core Concepts of Accounting Information Systems; Mark Simkin; Wiley
4. Accounting Information Systems, George Bodnar, and William Hopwood; Pearson

**UNIVERSITY OF MADRAS**  
**UG – NON-MAJOR ELECTIVE COURSE OFFERED IN THE**  
**DEPARTMENT OF COMMERCE**

**SYLLABUS WITH EFFECT FROM 2022-2023**

**BGE-NME-09**

**CONSUMER RIGHTS AND PROTECTION**

**Number of Credits : 2**

**COURSE OBJECTIVES**

1. To familiarise the students with the nature and right of consumers and Consumer Protection Act.
2. To impart knowledge on the ways and means of approaching the consumer protection councils and other statutory bodies in case of disputes.

**COURSE OUT COME:**

- The student will be aware of their rights as consumers and will be in a position to protect their rights legally.

**UNIT - I CONSUMER**

Who is a Consumer - Definitions – Characteristics of Consumer Buying – Consumers in India – Consumer buying behaviour

**UNIT – II CONSUMER RIGHTS**

Consumer rights: Right to Safety, Right to Information, Right to Choose, Right to be Heard, Right against Exploitation, Right to Consumer Education

**UNIT – III – CONSUMER PROTECTION ACT 1986**

Consumer protection Act 1986 – An overview – Salient Features of the Act – Objectives and basic concepts

**UNIT - IV CONSUMER PROTECTION COUNCILS:**

Objects and Procedures of Central ,State and District Consumer Protection Councils

**UNIT - V GRIEVANCES REDRESSAL MECHANISM**

Who can file a complaint? Grounds of filing a complaint; Limitation period; Procedure for filing and hearing of a complaint; Disposal of cases, Relief/Remedy available; Temporary Injunction, Enforcement of order, Appeal.

## **REFERENCE BOOKS:**

- Textbook on Consumer Protection Law, Dr. H K Saharay, Lexis Nexis Publishers, 2017.
- Lectures on torts and consumer protection laws, Dr. Rega Surya Rao, Asia law house. Hyderabad, 2019.
- Consumer protection laws, Prof. Rakesh Khanna, central law agency, 2005.
- Consumer Protection Act - the road map ahead, Rajender Chaudhry, Press Information Bureau, Govt. of India, 2006.

Websites:

[www.ncdr.nic.i](http://www.ncdr.nic.in)

[n](http://www.ncdr.nic.in)

[www.consumeraffairs.nic](http://www.consumeraffairs.nic.in)

[.in www.iso.org.](http://www.iso.org)

[www.bis.org.in](http://www.bis.org.in)

[www.consumereducation.](http://www.consumereducation.in)

[in](http://www.consumereducation.in)

# **B.Com. (GENERAL) DEGREE COURSE**

**SYLLABUS WITH EFFECT FROM 2020-2021**

**BGE-  
CSC05**

## **CORE-V: CORPORATE ACCOUNTING**

Common to BCom(A&F), BCom(CS), BCom(BM), BCom(MM) & BCom(CA)  
Inst.Hrs : 6  
Credits : 4  
YEAR: II  
SEMESTER: III

### **OBJECTIVES**

- To make the students familiarize with corporate accounting procedures
- To enable the students to acquire conceptual knowledge about the preparation of the company accounts.

### **OUTCOME:**

- The students will learn the accounting procedures of corporate undertaking and their financial statement preparations

### **UNIT – I Share Capital**

Issue of Shares - Types of Shares – Forfeiture of Shares- Reissue of Shares- Redemption of Preference Shares.

### **UNIT – II Debentures & Underwriting**

Issue of Debentures – Redemption of Debentures- Profit prior to incorporation.  
Underwriting of Shares & Debentures.

### **UNIT – III Final Accounts**

Final Accounts - Preparation of Profit & Loss account and Balance sheet- Managerial Remuneration.

### **UNIT –IV Valuation of Goodwill & Shares**

Valuation of Goodwill & Shares – Meaning – Methods of valuation.

### **UNIT – V Accounting for Insurance Companies**

Insurance Accounts- Types- Final accounts of Life Insurance- Profit determination of Life Insurance

**Note:** Questions in Sec. A, B & C shall be in the proportion of 20:80 between Theory and Problems.

### **TEXT BOOK:**

1. Raj Kumar Sah-Concepts Building Approach to Corporate Accounting-Cengage, New Delhi.
2. Gupta, R.L & Radhaswamy, M, Advanced Accounts, Sulthan Chand, New Delhi.

### **BOOK REFERENCE:**

1. Jain, S.P & Narang, N.L., Advanced Accounting, Kalyani Publications.
2. Shukla & Grewal & Gupta, Advanced Accounting, S. Chand & Co., New Delhi
3. Reddy T.S. & Murthy, A, Corporate Accounting, Margham Publications, Chennai.

### **WEB RESOURCE:**

[www.accountingcoach.com](http://www.accountingcoach.com)  
[www.accountingstudyguide.com](http://www.accountingstudyguide.com)

[www.futureaccountant.com](http://www.futureaccountant.com)  
[www.education.svtuition.org](http://www.education.svtuition.org)

**B.Com. DEGREE COURSE IN ACCOUNTING &  
FINANCE SYLLABUS WITH EFFECT FROM  
2020-2021**

**BAF-DSC06**

**CORE-VI: FINANCIAL REPORTING**

**Inst.Hrs : 5  
Credits : 4**

**YEAR: II  
SEMESTER: III**

**OBJECTIVES**

1. Achieve understanding of the financial accounting and reporting frameworks used by business enterprises globally (including US GAAP and IFRS).
2. Achieve knowledge and skills required to apply the knowledge of accounting principles (per US GAAP and IFRS) in performing financial reporting and other tasks as corporate finance professionals.

**COURSE UNITS**

**UNIT I: Financial Statements (per US GAAP and IFRS)**

Balance sheet - income statement - Statement of Comprehensive Income - Statement of changes in equity - Statement of cash flows - Integrated reporting

**UNIT II: Revenue Recognition (per US GAAP and IFRS)**

5-Step approach to Revenue Recognition - Certain Customer's Rights & Obligations - Specific Arrangements - Matching principle, Accruals & Deferrals, Adjusting Journal Entries

**UNIT III: Current Assets and Current Liabilities (per US GAAP and IFRS)**

Cash & Cash Equivalents - Accounts Receivable - Notes Receivable - Transfers & Servicing of Financial Assets - Accounts Payable - Employee-related Expenses Payable - Determining Inventory & Cost of Goods Sold - Inventory Valuation - Inventory Estimation Methods

**UNIT IV: Asset Valuation and Valuation of Liabilities (per US GAAP and IFRS)** Acquisition of Fixed Assets - Capitalization of Interest - Costs Incurred After Acquisition - Depreciation - Impairment - Asset Retirement Obligation - Disposal & Involuntary

Conversions - Knowledge-based intangibles (R&D, software) - Legal rights based intangibles (patent, copyright, trademark, franchise, license, leasehold improvements) - Goodwill - Leasehold Assets & Liabilities - Deferred Taxes

**UNIT V: Equity transactions (per US GAAP and IFRS)**

Paid-in capital - Retained earnings - Accumulated other comprehensive income - Stock dividends and stock splits - Stock options - Business Combinations & Consolidations - Differences between US GAAP and IFRS

**RECOMMENDED TEXT BOOKS:**

1. Wiley CM Aexcel Learning System, Part 1: Financial Planning, Performance & Analytics

### **REFERENCE BOOKS:**

1. Intermediate Accounting; Donald E . Kieso, Jerry J. Weygandt, Terry D. Warfield- Wiley
2. Advanced Accounting; Joe Ben Hoyle, Thomas Schaefer, Timothy Douppnik; McG raw Hill
3. Intermediate Accounting; Loren Nikolai, John Bazley, Jefferson Jones; South-Western Cengage Learning.



## **B.Com. (GENERAL) DEGREE COURSE**

**SYLLABUS WITH EFFECT FROM 2020-2021**

**BGE-  
CSC07**

### **CORE-VII: BANKING THEORY LAW AND PRACTICE**

Common to BCom(A&F), BCom(BM), BCom(MM) & BCom(ISM)

**Inst.Hrs : 5  
Credits : 4**

**YEAR: II  
SEMESTER: III**

#### **Objectives:**

1. To facilitate the understanding of the origin and the growth of the Indian Banking System
2. To understand the modern day Developments in Indian Banking Sector.

#### **Out Comes:**

- After completion of this subject students understand the growth of Indian Banking Systems and their Modern Day Development.

### **UNIT-I : Introduction to Banking**

History of Banking- Components of Indian banking -Indian Banking System-Phases of development-Banking structure in India-Payment banks and small banks-Commercial Banking- Definition-Classification of banks. Banking System- Universal banking- Commercial Banking- functions-Role of Banks in Economic Development. Central Banking-Definition –Need- Principles- Central Banking Vs Commercial banking- Functions of Central bank.

### **UNIT-II: RBI**

Establishment-objective-Legal framework-Functions-SBI-Origin and History-Establishment-Indian subsidiaries-Foreign subsidiaries-Non-Banking-Subsidiaries-Personal banking- International banking-Trade Financing-Correspondent banking.Co-operative banks-Meaning and definition-Features-Co-operative banks vsCommercial banks-Structure.-**NBFC-Role of NBFC- RBI Regulations-Financial sector reforms-Sukhmoy committee 1985-Narasimham committee I and II-Prudential norms: capital adequacy norms-classification of assets and provisioning.**

### **UNIT-III: E-Banking**

Meaning-Services-e-bankingandFinancialservices-Initiatives-Opportunities-Internet banking- Meaning-InternetbankingVsTraditionalbanking-Services-Drawbacks-Frauds in Internet banking. Mobile banking–**Anywhere Banking-Any Time Banking-** Electronic MobileWallets. ATM- Evolution -Concept-Features - Types-. Electronicmoney-Meaning- Categories-Meritsofe-money- ElectronicFunds Transfer (EFT)system - Meaning- Steps– Benefits-Monetary policies- final sector reforms- sakhmoy chakrevarthy committee 1985- Narasiman Committee I & II- prudential norms capital adequacy norms-classification of assets & provisionary meaning- Structure of Interest rates (short and long term)-impacts on saving and borrowings.

### **UNIT IV: Bank Account**

Opening – Types of Accounts-FDR-Steps in opening Account-Saving vs Current Account- 'Donatio Mortis Causa' - Passbook-Bank Customer Relationship-Special Types of currents-KYC norms. Bank Lending –Lending Sources-Bank Lending Principles-Forms of lending-Loan evaluation process-securities of lending-Factors influencing bank lending – Negotiable

**B.Com. (GENERAL) DEGREE COURSE**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

Instruments –Meaning –Characteristics-Types. Crossing –Definition –Objectives- Crossing and negotiability-Consequences of Crossing.

**UNIT-V: Endorsement**

Meaning-Components-Kinds of Endorsements-Cheques payable to fictitious person-Endorsement by legal representative –Negotiation bank-effect of endorsement-Rules regarding endorsement.Paying banker-Banker’s duty-Dishonoring of Cheques-Discharge of paying banks- Payments of a crossed cheque payment. Collecting bankers- Statutory protection under section 85-Refusal of cheques Payment. Collecting Banker- Statutory protection under section 131- Collecting bankers’ duty –RBI instruction – Paying Banker Vs Collecting Banker- Customer grievances-Grievance redressal – Banking Ombudsman.

**TEXT BOOKS**

1. Michael W. Brandi – Money, Banking, Financial Markets and Institutions –Cengage , New Delhi
2. Gurusamy S, Banking Theory : Law and Practice, Vijay Nicole Publication, 2015, Chennai

**SUGGESTED READINGS**

1. Clifford Gomez, Banking and finance, Theory, Law and practice, Jain Book Agency, 2010 Mumbai
2. Gupta, R K Banking Law and Practice, Jain Book Agency, 2001, New Delhi.
3. Sundaram and Varshney, Banking Theory Law and Practice, Sultan Chand Co, 2010, New Delhi.
4. Maheswari, S.N. Banking Theory Law and Practice, Kalyani Publications, 2011, Mumbai.
5. Santhanam.B, Banking Theory Law and Practice, Margam Publications.
6. Nirmala Prasad, Banking and Financial Services, Himalaya Publications.

**E-RESOURCES**

[www.lawcommissionofindia.nic.i](http://www.lawcommissionofindia.nic.in)

[n www.rbi.org](http://www.rbi.org)

[www.bankingombudsman.org](http://www.bankingombudsman.org)

# **B.Com. (GENERAL) DEGREE COURSE**

**SYLLABUS WITH EFFECT FROM 2020-2021**

**BGE-  
CSC08**

## **CORE-VIII: MARKETING**

Common to BCom(A&F) & BCom(CS)-V Sem. as Elective

**Inst.Hrs : 5**

**Credits : Core 4 / Elective 5**

**YEAR: II**

**SEMESTER: III**

### **Objectives:**

- To facilitate the students to understand the importance and the relevance of marketing in to- day's Business world
- To enable the students to understand the features of the Indian Marketing

### **Out Come:**

- The Students will understand the basic concepts of Marketing, Market Segmentation, Marketing Mix and Recent trends in Marketing.

### **UNIT I**

Introduction to Marketing –Meaning – Definition and Functions of Marketing – Marketing Orientation – Role and Importance of Marketing – Classification of Markets

### **UNIT II**

Market Segmentation – Concept – Benefits – Basis and Levels. Introduction to Consumer Behaviour – Need for study – Consumer buying decision process – Buying motives.

### **UNIT III**

Marketing mix. Product – Meaning – Introduction to Stages of New Product Development – Types – Introduction to PLC – Product Mix – Price – Pricing Policies and Methods.

### **UNIT IV**

Channels of Distribution (Levels) – Channel Members – Promotion – Communication Mix – Basics of Advertising, Sales promotion and personal selling.

### **UNIT V**

Recent Trends in Marketing. A Basic understanding of E – Marketing, Consumerism, Market Research, MIS and Marketing Regulations.

### **RECOMMENDED BOOKS:**

1. Dawn iacobucci , Anupama Vohra – Marketing Management – CENGAGE, New Delhi.
2. William M.pride , O.C.Ferrell –Principles of marketing - CENGAGE, New Delhi.
3. Atreyee Ganguly , Joyeta Bhadury - Principles of marketing - CENGAGE, New Delhi.

### **REFERENCES**

1. Marketing Management by Rajan Saxena
2. Marketing by William J Stanton
3. Principles of Marketing by Philip Kotler
4. Marketing Management by Still and Cundiff

5. Marketing Management by Dr. K. Nirmala Prasad and Sherlaker

# UNIVERSITY OF MADRAS

## B.Com. (GENERAL) DEGREE COURSE

SYLLABUS WITH EFFECT FROM 2020-2021

**BGE-CSA3A**

### **ALLIED-III(A): BUSINESS STATISTICS**

Common to BCom(A&F), BCom(CS),  
BCom(BM), BCom(MM), B.Com(Co-op), BCom(CA) &  
BCom(ISM)

**Inst.Hrs : 6**

**Credits : 5**

**YEAR: II**

**SEMESTER: III**

#### **OBJECTIVES**

To Facilitate Understanding Relevance and Need Of Statistics in Current Scenario

- To Customize the Importance of Business Statistics for the Commerce Students

#### **UNIT-I Introduction**

Meaning and Definition of Statistics- Collection and Tabulation of Statistical Data-  
Presentation of Statistical Data-Graphs and Diagrams

#### **UNIT-II Measures of Central Tendency and Measures of Variation**

Measures of Central Tendency- Arithmetic Mean, Median, Mode, Harmonic Mean  
and Geometric Mean. Measures of Variation- Standard Deviation -Mean Deviation-  
Quartile Deviation-Skeweness and Kurtosis- Lorenz Curve

#### **UNIT-III Correlation and Regression Analysis**

Simple Correlation-Scatter Diagram- Karl Pearson's Correlation- Spearman's Rank  
Correlation- Regression- Meaning-Linear Regression.

#### **UNIT- IV Time Series**

Analysis of Time Series-Causes of Variation in Time Series Data -Components of  
Time Series- Additive and Multiplicative Models- Determination of Trend By Semi  
Average, Moving Average and Least Square( Linear Second Degree And Exponential)  
Methods- Computation of Seasonal Indices By Simple Average, Ratio to Moving  
Average, Ratio to Trend and Link Relative Methods

#### **UNIT-V Index Numbers**

Meaning and Types of Index Numbers-Problems in Construction of Index Numbers-  
Methods of Construction of Price and Quantity Indices- Test of Adequacy- Errors in  
Index Numbers- Chain Base Index Numbers- Base Shifting -Splicing -Deflation -  
Customer Price Index and Its Uses- Statistical Quality Control

#### **SUGGESTED READINGS**

1. Dhingra IC & MP Gupta, Lectures In Business Statistics, Sultan chand and Sons, New Delhi 2009
2. Gupta SP and Archana Agarwal, Business Statistics (Statistical Methods) Sultan chand and Sons, New Delhi, 9th Edition 2013
3. Gupta SC, Fundamentals of Statistics, Himalaya Publishing House
4. Richard Levin and David Rubin, Statistics for Management, Prentice Hall Of India, New Delhi, 2011,7th Edition
5. Sharma J K, Fundamentals of Business Statistics, Second Edition, Vikas Publishing House Private Limited, 2013
6. Siegel, Andrew, Practical Business Statistics, Irwin Mcgraw Hill International Edition 4th
7. Rajagopalan SP and Sattanathan R B Business Statistics and Operations Research, Vijay Nicole Imprint Private Limited, Chennai

## **PERSONALITY ENRICHMENT – LEVEL I**

### **Unit 1- Self Disclosure**

Characteristics of self disclosure – Self disclosure benefits and appropriateness – Self disclosure and self awareness – Self disclosure and feedback.

#### **Exercise:**

1. Self Description– Reflect and answer the following questions on a sheet of paper about yourself: Who am I? What am I like? How do others perceive me? What are my strengths as a person? In what areas do I want to develop greater skills?
2. Adjective Checklist – the following exercise is aimed at providing an opportunity for participants to disclose their view of themselves to the other members of their group and to receive feedback on how the other group members perceive them.
3. Self Disclosure and Self Awareness – the purpose of this exercise is to allow participants to focus on the areas as described in the Johari Window.

### **Unit II – Anger, Stress and Managing Feelings**

The nature of stress- managing stress through social support systems – the nature of anger – guidelines for managing anger constructively – dealing with an angry person

#### **Exercise:**

1. Handling put downs techniques practiced through role plays.
2. changing your feelings discuss how people can make their assumptions more constructively.
3. defusing the Bomb exercise discuss how one can manage provocations.

### **Unit III – Interpersonal Effectiveness**

Managing anxiety and fear – Breathing – an antidote to stress – progressive muscle relaxation – understanding your shyness – building one' self esteem – avoiding self blame – taking risks,

tolerating failure, persisting and celebrating success – self talk.



### **Exercise:**

1. **being positive about yourself**
2. Understanding your shyness analyze the social situation of shyness and the causes of your shyness.
3. Systematic Muscle Relaxation train one in the procedure for systematic muscle relaxation.
4. Learning how to breathe deeply help one to relax systematically when one is anxious by controlling one's breathing.

### **Unit IV: Study Skills**

Importance of study environment – using VCR3 to increase memory power: visualizing, concentrating, relating, repeating, reviewing- memory hindrances – memory helpers – knowing vs memorizing – memory and studying – the SQ3R method; survey, write questions, read, recite , review – mnemonic devices – rhymes – acronyms – pegging – cooperative learning .

### **Exercise:**

1. Using the techniques of memory enhancers to review your classroom and textbook notes

### **Unit V: Goal Setting and Managing Time**

The basis of effective goals – steps to be followed to obtain optimum results from goal setting – Identifying the reasons for procrastination – guidelines to overcome procrastination – priority

management at home and college

### **Exercise:**

1. Steps to prepare one's short term goals and long term goals.
2. Role play activity through reelection of identifying how priority management affect one's ability to live a balanced life.

### **Reference:**

1. Johnson, D.W. (1997). Reaching out – Interpersonal Effectiveness and Self Actualization. 6<sup>th</sup> ed. Boston: Allyn and Bacon.
2. Sherfield, R. M. ; Montgomery, R.J. and Moody, P, G. (2010). Developing Soft Skills. 4<sup>th</sup>ed.

New Delhi: Pearson.

3. Robbins, S. P. and Hunsaker, Phillip, L. (2009). Training in Interpersonal skills. Tips for managing people at work. 5th ed. New Delhi: PHI Learning.

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**CORE-IX: ADVANCED CORPORATE ACCOUNTING**

Common to BCom(A&F), BCom(CS), BCom(BM) & BCom(CA)

**Inst.Hrs : 6**

**Credits : 4**

**YEAR: II  
SEMESTER: IV**

**OBJECTIVES**

- To provide the students with an understanding of accounting procedure for corporate restructuring.
- To make the students understand the applications of Accounting Transactions in Corporate Sector.

**OUTCOME:**

- The students will be able to understand the procedures of corporate restructuring and to prepare the various accounting statements

**UNIT I: Internal Reconstruction**

Meaning - Alteration of share capital – Accounting Procedures.

**UNIT II: Amalgamation, Absorption & External Reconstruction**

Meaning- Amalgamation in the nature of Merger, Purchase - External Reconstruction – Applicability of AS 14- Calculation of Purchase consideration (all methods) – Journal Entries in the books of Transferor and Transferee Companies, Revised Balance Sheet (excluding inter - company holdings)

**UNIT III: Liquidation**

Meaning – Preparation of Liquidator's Final Statement of Accounts – Calculation of Liquidator Remuneration.

**UNIT IV: Consolidation**

Holding Company –Subsidiary company - Meaning – Preparation of Consolidated Final Statement of Accounts.

**UNIT V: Accounting For Banking Companies**

Bank accounts - Concept of Non-Performing Assets (NPA)-Preparation of Profit and Loss Account - Asset classification - Preparation of Balance Sheet.

**Note:** Questions in Sec. A, B & C shall be in the proportion of 20:80 between Theory and Problems.

**TEXT BOOK:**

- 1.Raj Kumar Sah - Concepts Building Approach to Corporate Accounting - CENGAGE , New Delhi.
- 2.Gupta, R.L.&Radhaswamy,M., Advanced Accounts, Sulthan Chand &Sons, New Delhi.

**REFERENCE BOOKS:**

1. Jain, S.P. & Narang K.L., Advanced Accounts – Kalyani Publishers.
2. Reddy, T.S & Murthy, A, Corporate Accounting, Margham Publications, Chennai.
3. Shukla, M.C. & Grewal, J.S, Advanced Accounts, S.Chand and Company, NewDelhi

**WEB RESOURCE:**

1. [www.accountingcoach.com](http://www.accountingcoach.com)
2. [www.accountingstudyguide.com](http://www.accountingstudyguide.com)
3. [www.futureaccountant.com](http://www.futureaccountant.com)
4. [www.education.svtuition.org](http://www.education.svtuition.org)

**CORE-X: CORPORATE AND BUSINESS LAW**

**Inst.Hrs : 5  
Credits : 4**

**YEAR: II  
SEMESTER: IV**

**OBJECTIVES:**

1. To highlight the provisions of law governing the General Contracts.
2. To help the students to understand the significant provisions of the Companies Act, 2013.

**UNIT I:**

Indian Contract Act Formation - Nature and Elements of Contract - Classification of Contract - Contract Vs Agreement

**UNIT II:**

Offer - Definition - Forms of offer - Requirements of Valid Offer. Acceptance - Meaning - Legal Rules as to a valid acceptance. Consideration - Definition - Essentials - Legal Rules relating to consideration - Contracts without consideration

**UNIT III:**

Capacity of parties. Definition - Persons Competent to contract. Free consent - Coercion - Undue Influence - Fraud — Misrepresentation — Mistake. Legality of object — void agreement - Unlawful agreements - performance of contracts

**UNIT IV:**

Company - Definition - Characteristics - Lifting of corporate veil - Advantages of Incorporation - Company Law Administration - NCLT & NCLAT - Classification of companies - Formation of a Company - Memorandum and Articles of Association.

**UNIT V:**

Prospectus - Definition - Registration - Contents - Shelf Prospectus - Misstatement and their consequences - Share capital - Meaning - kinds - alteration of share capital - Dividend - provisions for declaration of dividend - Meetings - Kinds of Company Meetings.

**SUGGESTED READINGS**

- 1.Kapoor, N.D. Business Laws, Sultan Chand and Sons.
- 2.Sreenivasan, M.R.Business Laws, Margam Publications.
3. Dhandapani, M.V.Business Laws, Sultan Chand and Sons.
- 1.BadreAlam,S.&Saravanavel,P.Mercanti!eLaw
1. Kapoor, N.D. Elements of Company Law, Sultan Chand and Sons

**E -RESOURCES**

www.cramerz.comwww.digitalbusinesslawgroup.com<http://swcu.libguides.com/>

buslaw <http://libguides.slu.edu/businesslaw>

# UNIVERSITY OF MADRAS

## B.Com. DEGREE COURSE IN ACCOUNTING & FINANCE SYLLABUS WITH EFFECT FROM 2020- 2021

BAF-DSC11

### CORE-XI: WORKING CAPITAL MANAGEMENT

Inst.Hrs : 5  
Credits : 4

YEAR: II  
SEMESTER: IV

#### Objectives

- To enable the Students to learn the Working Capital mechanism.
- To facilitate the understanding of the relevance of the working capital

#### UNIT I: Introduction

Working Capital Meaning - Importance of working capital management - components of working capital - Factors Influencing working capital requirements - Estimating working capital management - working capital life cycle - Role of finance manager in working capital.

#### UNIT II: Financing Current Assets

Different approaches to Financing Current Assets - Conservative, Aggressive and Matching approach - Sources of Finance Committees on Working Capital Finance. .

#### UNIT III: Cash Management

Importance - Factors influencing Cash Balance - Determining Optimum Cash Balance - Cash Budgeting - Controlling and Monitoring Collection and disbursements.

#### UNIT IV: Receivables Management

Credit Policy Variables - Credit Standards - Credit period - Cash discount and Collection efforts - Credit evaluation - Control of receivables.

#### UNIT V: Inventory Management

Need for Inventories and Importance of its Management - Techniques for managing Inventory - Economic Order Quantity (EOQ) - Stock levels - Analysis of Investment in inventory - Selective Inventory Control - ABC, VED and FSN Analysis.

**NOTE :** Questions in Sec. A, B & C shall be in the proportion of 80:20 between Theory and Problems.

#### SUGGESTED READINGS

1. Hrishikes Battacharya Working Capital Management strategies and Techniques prentice hall of India 2001.
2. Joshi R.N. Cash Management, New Age International Publishers 1999.
3. Chitnis, K.M. Working Capital Management of large Industrial units, Dastane Ramachandra and company Poona

#### E-RESOURCES

[www.cpdwise.com](http://www.cpdwise.com)  
[www.simplilearn.com](http://www.simplilearn.com)  
[www.findtutorials.com](http://www.findtutorials.com)

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[www.studyfinance.co](http://www.studyfinance.co)

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# UNIVERSITY OF MADRAS

## B.Com. (GENERAL) DEGREE COURSE

SYLLABUS WITH EFFECT FROM 2020-2021

**BGE-CSC12**

### CORE-XII: INDIRECT TAXATION

Common to BCom(A&F), BCom(CS) & BCom(BM)

Inst.Hrs : 5

Credits : 4

YEAR: II

SEMESTER: IV

#### OBJECTIVES:

- To facilitate the students to gain knowledge of the principles of Indirect Taxation.
- To enable the students to gain knowledge of Goods and Services (GST)
- To highlight the students about customs duty.

#### OUTCOME:

- The students will be able to understand the concepts of Indirect taxation, types and Assessment procedures.

#### UNIT – I Introduction

History and Objectives of Taxation – Tax System in India- Direct & Indirect Taxes – Meaning and Types – Powers of Union and State to levy taxes. Constitutional Amendments leading to introduction of GST and their importance

#### UNIT – II GST – Overview & Concepts

Background behind implementing GST- The need for GST- objectives of GST- Business impact- Benefits of GST-SGST- CGST and IGST- Taxes covered by GST- Definitions - Scope and Coverage Scope of supply- Levy of tax- Rate Structure- Taxable Events. Types of Supplies – Composite and Mixed Supplies –Composition Levy.

#### UNIT – II GST Taxation/ Assessment proceedings

Return- Refunds- Input Tax Credit- Reverse charge Mechanism, Transitional Provisions composition under GST- Administrative structure of GST-Officers as per CGST Act- Officers as per SGST Act-Jurisdiction- Appointment Powers. Relevance of Cross Empowerments

#### UNIT-IV GST Audit

Assessment and Audit under GST- Demands and Recovery- Appeals and revision- Advance ruling Offences and Penalties. National Anti-Profiteering Authority – GST Practitioners – eligibility and Practice and Career avenues

#### UNIT-V Customs duty

The custom duty- Levy and collection of customs duty- Organisations of custom departments- Officers of customs- powers- Appellate Machinery- Infringement of the Law-Offences and Penalties- Exemptions from duty customs duty draw back- duties free Zones. Export incentive schemes

#### Recommended Texts

1. Shilpi Sahi – Concepts Building Approaches to Goods and Services Tax (GST), & Customs Law - CENGAGE , New Delhi



## **SUGGESTED READINGS**

1. Sweta Jain GST law and practice Taxmann Publishers, July 2017
2. V.S.Daty – GST- Input Tax Credi- Taxmann Publishers, second edition August 2017
3. C.A. Anurag Pandey- Law and Practice of GST- Sumedha Publication House 2017
4. Dr.Vandana Banger- Beginners- Guide AadhayaPrakashan Publisher 2017
5. Dr.M. Govindarajan- A practical guide send text publishers July 2017

**ALLIED-IV(A): ELEMENTS OF OPERATIONS RESEARCH**

Common to BCom(A&F), BCom(MM), BCom(CA) &  
BCom(ISM)

**Inst.Hrs : 6**  
**Credits : 5**

**YEAR: II**  
**SEMESTER: IV**

**OBJECTIVES**

- To Facilitate this Understanding of the Concept of Operations Research
- To Help the Students to Understand the Various Techniques of Solving Problems

**OUT COME:**

- Understanding of the Concept of Operations Research and to Help the Students to Understand the Various Techniques of Solving Problems

**UNIT I : Introduction**

Operations Research- Meaning-Definition - Origin and History- Characteristic Features – Need-Scope –Steps- Techniques- Application- Limitations

**UNIT II : Linear Programming Problem Lpp**

Meaning- Requirements- Assumptions- Applications- Formulating Lpp –Advantages- Limitations Formulating LP Model (Simple Problems Only)

**UNIT III: Methods Of Lpp**

Obtaining Optimal Solution for Linear Programming Problem (LPP)-Graphical Method - Problems --Simplex Method for Type of LPP and for Slack Variable Case - Maximization Function -Minimization Function (Simple Problem Only)

**UNIT IV : Transportation Problems**

Meaning –(Initial Basic Feasible Solution )Assumptions -Degenerate Solution -North -West Corner Method- Least Cost Method -Vogels Approximation Method - Assignment Problems- Features -Transportation Problem Vs Assignment Problem - Hungarian Method (Simple Problems Only)

**UNIT V: Game Theory**

Meaning- Types of Games- Basic Assumptions- Finding Value of Game for Pure Strategy - Mixed Strategy -Indeterminate Matrix and Average Method -Graphical Method -Pure Strategy- Saddle Point Payoff Matrix Value of Game (Simple Problems Only)

**Recommended Texts**

1. M.Sreenivasa Reddy – Operations Research – CENGAGE , New Delhi
2. S.Gurusamy–Elements of Operations Research–Vijay Nicole Imprints private Limited, Chennai

## **SUGGESTED READINGS**

1. Agarwal NP and Sonia Agarwal, Operations Research and Quantitative Techniques, RBS A Publishers, New Delhi ,2009
2. Anand Sharma, Operations Research, Himalayan Publishing House, 2014 ,Mumbai
3. Gupta Pk And Gupta SP Quantitative Techniques and Operations Research, Sultan Chand and Sons, 2014, New Delhi
4. Kapoor V.K, Operations Research Techniques For Management,Sultan Chand And Sons, 2012 New Delhi
5. Kanti Swarup,P.K. Gupta Man Mohan ,operation research, Jain book agency, 2014, New Delhi
6. Sarangi, SK Applied operations research and Quantitative methods, Himalayan publishing house 2014, Mumbai.

## **E- SOURCES:**

<http://www.learnaboutor.co.uk/>  
<http://www.theorsociety.com/>  
[www.orcomplete.com/](http://www.orcomplete.com/)

## DEPARTMENT OF PLANT BIOLOGY SYLLABUS :-

### **I Semester**

Core Paper 1 Plant Diversity-I Phycology and Algal Biotechnology (6 h)

Core Paper 2 Plant Diversity-I Phycology and Algal Biotechnology - Practical-I (4 h)

### **II Semester**

Core Paper 3 Plant Diversity-II Mycology, Phytopathology and Fungal Biotechnology (6 h) Core Paper 4 Plant Diversity-II Mycology, Phytopathology and Fungal Biotechnology - Practical II (4 h)

### **III Semester**

Core Paper 5 Plant Diversity-III Bryophytes and Pteridophytes (6 h)

Core Paper 6 Plant Diversity-III Bryophytes and Pteridophytes-Practical III (4 h) Environmental Studies (2 h)

### **IV Semester**

Core Paper 7 Plant Diversity-IV Gymnosperms, Paleobotany and Evolution (6 h)

Core Paper 8 Plant Diversity-IV Gymnosperms, Paleobotany and Evolution-Practical IV (4 h)

Environmental Studies (2 h)

### **V Semester**

Core Paper 9 Plant morphology, Taxonomy and Economic botany (5 h)

Core Paper 10 Plant Morphology, Taxonomy and Economic Botany - Practical-V (4 h) Core Paper 11 Plant anatomy and Embryology (5 h)

Core Paper 12 Cell Biology, Genetics and Plant Breeding (6 h) Core Paper 13 Core 11 and 12

(Plant anatomy and Embryology (4 h)

Cell Biology, Genetics and Plant Breeding) - Practical VI

### **Elective-I**

1. Bio-Analytical Techniques (5 h)

2. Aquatic Botany

3. Medicinal Botany

Value Education (1 h)

### **VI Semester**

Core Paper I4 Plant Ecology and Phytogeography (4 h)

Core Paper I5 Plant Biotechnology and Molecular Biology (4 h) Core Paper I6 Plant Physiology and Plant Biochemistry (5 h)

Core Paper 17 Practical covering – Core 14,15 and 16 - Practical VII (6 h)

### **Elective-II**

1. Horticulture Practices (5 h)

2. Phytochemistry

3. Algal Biotechnology

### **Elective-III**

1. Herbal Science (5 h)

2. Computer application and Bioinformatics
3. Forensic Botany

### **Extension Activities (1 h)**

#### **(i) Allied Courses**

#### **(ii) Non major Elective Courses**

### **Non-major elective I (2 h)**

1. Organic farming
2. Seed Technology
3. Environmental Biotechnology
4. Nursery and Landscaping

### **Non-major elective II (2 h)**

1. Mushroom cultivation
2. Herbal Medicine
3. Renewable Energy Sources
4. Global Climate Change

## **5. Examination and Evaluation**

### **(i) Assessment Methods**

A number of appropriate assessment methods of botany will be used to determine the extent to which students demonstrate desired learning outcomes. Making drawings should be compulsory part of practical record books. A continuous assessment method throughout the programme shall inculcate regular reading habit in the students and provide continuous observation learning abilities and challenges of the students'.

Following assessment methodology should be adopted;

1. The oral and written examinations (Scheduled and surprise tests)
2. Closed-book and open-book tests
3. Problem-solving exercises
4. Practical assignments and laboratory reports
5. Observation of practical skills
6. Efficient delivery using seminar presentations

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## DEPARTMENT OF CHEMISTRY –SYLLABUS

### **ALLIED CHEMISTRY - I (THEORY)**

(Branches other than Maths and  
Physics)  
(60 Hours) - 4 Credits

#### Learning Outcome

1. To know the fundamentals of nuclear chemistry
2. To understand the industrial application of fuels, fertilizers and polymers
3. To understand the basic concepts of Organic Chemistry
4. To study the various laws of thermodynamics
5. To learn basics of photochemistry

### **Unit I: NUCLEAR CHEMISTRY (10 Hours)**

Fundamental particles of Nuclear Isotopes, Isobars, Isotones and Isomers - Differences between chemical reactions and nuclear reactions: Fusion and fission - Radioactive series, group displacement law - Mass defect - Applications of radio isotopes- carbon dating, rock dating and in medicine.

### **Unit II: INDUSTRIAL CHEMISTRY (15 Hours)**

Fuels- Classification-gaseous fuels like water gas, producer gas, liquefied petroleum gas, gobar gas, compressed natural gas - Fertilizers- Classification - urea, ammonium sulphate, superphosphate, Triple super phosphate, potassium nitrate- manufacture and uses - Silicones - Preparation, properties and applications . Hardness of water: temporary and permanent hardness, disadvantages of hard water - Softening of hard water - Definition and determinations of BOD and COD.

### **Unit III: FUNDAMENTALS OF ORGANIC CHEMISTRY (15 Hours)**

Classification of organic compounds - Hybridization in methane, ethane, ethylene, acetylene, benzene -Classification of reagents - electrophiles, nucleophiles and free radicals - Classification of reactions - addition, substitution, elimination, condensation and polymerisation.

### **Unit IV: CHEMISTRY OF SOME USEFUL ORGANIC**

## **AND INORGANIC COMPOUNDS**

**(10**

### **Hours)**

Preparation and uses of  $\text{CH}_2\text{Cl}_2$ ,  $\text{CHCl}_3$ , polyethylene, PVC, Nylon and Terylene, phenol – formaldehyde resin, Bakelite, rubber and vulcanisation.

## **Unit V: PHOTOCHEMISTRY**

**(10**

### **Hours)**

Introduction to Photochemistry - statement of Grotthus- Draper Law, Stark-Einstein's Law, Quantum yield. Hydrogen-Chlorine reaction (Elementary idea only) Photosynthesis, photosensitization, phosphorescence, Fluorescence, Chemiluminescence- Definition with examples.

## **BOOKS FOR REFERENCE**

1. Gopalan R. and Sundaram S., Allied Chemistry, Sultan Chand & Sons Publishers, New Delhi 2<sup>nd</sup> ed.
2. Soni P.L. and Mohan Katyal, Text Book of Inorganic Chemistry, Sultan Chand and Company Pvt. Ltd, New Delhi, 20<sup>th</sup> ed.

Bahl B.S. and ArunBahl, A text book of Organic Chemistry 21<sup>st</sup> ed., S. Chand and Company



**UNIVERSITY OF MADRAS**  
**U.G. DEGREE COURSES**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BCY-CSA2B**

**ALLIED CHEMISTRY - II (THEORY)**  
(Branches other than Maths and Physics)  
(60 Hours) - 4 Credits

**Learning Outcome**

1. To understand the fundamentals of coordination chemistry and its applications
2. To learn the structural aspects of biologically important compounds
3. To know the applications of phase rule and freezing mixtures
4. To explain the basics of electrochemistry
5. To understand the basics of Analytical chemistry

**UNIT I: COORDINATION CHEMISTRY (12 Hours)**

Definition of terms-classification of ligands-Nomenclature-chelation-EDTA and its applications-Werner's Theory-Effective Atomic Number-Pauling's Theory-Postulates-Biological role of haemoglobin and chlorophyll, (Elementary idea only)

**UNIT II: CARBOHYDRATES (10 Hours)**

Classification, preparation and reactions of glucose and fructose. Interconversion of glucose to fructose and vice versa. Structure of starch. Cellulose and derivatives of cellulose - Diabetes - Causes and control measures.

**UNIT III: PROTEINS (15 Hours)**

Amino acids-Classification, Preparation and properties of alanine - Preparation of dipeptide using Bergman method - Proteins -Classification according to composition, biological functions and shape - Denaturation and colour reactions of Proteins - Primary and secondary structure of Proteins Nucleic acids: DNA and RNA-Their components and biological functions.

**UNIT IV: ELECTROCHEMISTRY (10 Hours)**

Electrolytic conductance in metals and in electrolytic solution - specific conductance and equivalent conductance - Arrhenius theory of electrolytic dissociation and its limitations - weak and strong electrolytes according to Arrhenius theory - Ostwald's dilution law - applications and limitations - Conductometric titrations - strong acid vs strong base only.

**CATALYSIS (5 Hours)**

Characteristics of catalytic reaction, auto catalysis, promoters, catalytic poisons - Types of catalysis - homogeneous and heterogeneous - Enzyme catalysis (no derivation, elementary idea only)

**UNIT V: ANALYTICAL CHEMISTRY (8 Hours)**

Introduction to Qualitative and Quantitative Analysis - Principle of volumetric analysis - Separation techniques - extraction - distillation - crystallization - Chromatographic separations - Principles and application of column, paper, thin layer.



**UNIVERSITY OF MADRAS**  
**U.G. DEGREE COURSES**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BCY-CSAIB**

**ALLIED CHEMISTRY - I (THEORY)**  
**(Branches other than Maths and Physics)**  
**(60 Hours) - 4 Credits**

**Learning Outcome**

1. To know the fundamentals of nuclear chemistry
2. To understand the industrial application of fuels, fertilizers and polymers
3. To understand the basic concepts of Organic Chemistry
4. To study the various laws of thermodynamics
5. To learn basics of photochemistry

**Unit I: NUCLEAR CHEMISTRY (10 Hours)**

Fundamental particles of Nuclear Isotopes, Isobars, Isotones and Isomers -Differences between chemical reactions and nuclear reactions: Fusion and fission - Radioactive series, group displacement law - Mass defect - Applications of radio isotopes- carbon dating, rock dating and in medicine.

**Unit II: INDUSTRIAL CHEMISTRY (15 Hours)**

Fuels- Classification-gaseous fuels like water gas, producer gas, liquefied petroleum gas, gobar gas, compressed natural gas - Fertilizers- Classification - urea, ammonium sulphate, superphosphate, Triple super phosphate, potassium nitrate- manufacture and uses - Silicones - Preparation, properties and applications . Hardness of water: temporary and permanent hardness, disadvantages of hard water - Softening of hard water - Definition and determinations of BOD and COD.

**Unit III: FUNDAMENTALS OF ORGANIC CHEMISTRY (15 Hours)**

Classification of organic compounds - Hybridization in methane, ethane, ethylene, acetylene, benzene -Classification of reagents - electrophiles, nucleophiles and free radicals - Classification of reactions - addition, substitution, elimination, condensation and polymerisation.

**Unit IV: CHEMISTRY OF SOME USEFUL ORGANIC AND INORGANIC COMPOUNDS (10 Hours)**

Preparation and uses of  $\text{CH}_2\text{Cl}_2$ ,  $\text{CHCl}_3$ , polyethylene, PVC, Nylon and Terylene, phenol – formaldehyde resin, Bakelite, rubber and vulcanisation.

**Unit V: PHOTOCHEMISTRY (10 Hours)**

Introduction to Photochemistry - statement of Grotthus- Draper Law, Stark- Einstein's Law, Quantum yield. Hydrogen-Chlorine reaction (Elementary idea only) Photosynthesis, photosensitization, phosphorescence, Fluorescence, Chemiluminescence- Definition with examples.

**UNIVERSITY OF MADRAS**  
**U.G. DEGREE COURSES**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BCY-CSAP1**

**ALLIED CHEMISTRY I & II (PRACTICALS)**  
(COMMON FOR ALL ALLIED CHEMISTRY)

**I. VOLUMETRIC ANALYSIS**

1. Estimation of Sodium hydroxide using standard Sodium Carbonate.
2. Estimation of Hydrochloric acid using standard Oxalic acid. 3.  
Estimation of Ferrous sulphate using standard Mohr's salt 4.  
Estimation oxalic acid using standard Ferrous Sulphate.
5. Estimation of Potassium permanganate using standard Sodium hydroxide.
6. Estimation of iron from iron tablets using standard potassium permanganate
7. Estimation of magnesium using EDTA.
8. Estimation of calcium from calcium tablets using EDTA
9. Estimation of Ferrous ion using diphenylamine as internal indicator.

**II. Systematic analysis of Organic compounds** The analysis must be carried out as follows

- a) Functional group tests (Carboxylic acid (Benzoic acid, phthalic acid), Phenol,Urea, Glucose, Benzaldehyde, Aniline (Aniline not to be given for exam)
- b) Detection of elements ( N,S,Halogens)
- c) Distinguish between aliphatic and aromatic
- d) Saturated and unsaturated compounds

**REFERENCES**

1. Basic Principles of Practical Chemistry, Venkateswaran, Veerasamy&Kulandaivel S Chand &Co.

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**REFERENCES**

1. Anand P.V. and Warner J.C., Green Chemistry, New Delhi.
2. Ahluwalia-Narain V.K., Green Chemistry, New Delhi.
3. Thomas J.M., Thomas M.J., John Principles and practice of heterogeneous catalysis, A textbook of catalysis.
4. Murty D.S., Shankar P., Raju, Raju D., Murday J., A textbook of nanotechnology, Springer Science and Business Media, 2013
5. Mahesh Karkare, Nanotechnology: Fundamentals and Applications, I K International Publishing House, 2008.
6. Ahluwalia V.K., Kishor, M., New trends in Green Chemistry, 1<sup>st</sup> ed., Anamaya Publications, Delhi, 2004.

Semester	Subject Title	Subject Code	Total Hours	Credit
V	b) POLYMER CHEMISTRY		60	5

**UNIT 1 (12 hrs)**

Introduction to polymers – general characteristics of polymers in comparison with common organic compounds. Basic concept of monomers and polymers. Classification of polymers – natural and synthetic polymers. Distinction between plastics, elastomers and fibres. Types of polymers: thermoplastics and thermosetting plastics. Geometrical structures of polymer molecules: microstructures – chemical structures – geometrical structures – Cross-linked polymers: stereoregular polymers

Mechanism of polymerization: chain polymerization, free radical polymerization, ionic and coordination polymerization. Polyaddition and polycondensation polymerization, ring opening and group transfer polymerization.

**Unit 2 (12 hrs)**

Molecular weight of polymers – number average, weight average and viscosity average. Determination of polymer molecular weights – Osmometry (membrane, vapour phase), Viscometry methods. Light scattering and ultra centrifugation methods. Molecular weight and degree of polymerization – practical significance of polymer molecular weight.

Glass transition temperature – transition and associated properties – factors affecting Glass transition temperature- importance - glass transition temperature of copolymers. Polymer crystallinity – crystallisability – effect of crystallinity on properties .

**Unit 3 (12 hrs)**

Industrially important polymers – preparation, properties and applications. Polyethylene, polypropylene, polyamides, polyvinylchloride, polymethylmethacrylate, polyesters, polycarbonates, polyurethanes, phenol – formaldehyde, melamine – formaldehyde, polysilanes, polyaniline

**Unit 4 (12 hrs)**

Degradation of polymers by thermal – oxidative, mechanical and photodegradation methods. Polymerisation techniques – bulk, solution, suspension, emulsion, polycondensation and interfacial polycondensation.

Polymer processing – compression moulding, casting, extrusion, fibre spinning, injection moulding, thermoforming, vulcanization of elastomers.

**Unit 5 (12 hrs)**

Polymer reactions – hydrolysis, Acidolysis, Aminolysis, hydrogenation, addition and substitution cyclisation reactions – crosslinking reactions.

Natural polymers - Rubber, Silk, Cellulose – structure and applications

Supramolecular polymers – introduction – properties – applications.

**REFERENCES**

1. Billmeyer, F.W. Textbook of polymer Science, 3<sup>rd</sup> ed., John Wiley and Sons, 1984.
2. Gawarikar, V.R., Viswanathan N.V. and Sreedhar J., Polymer Science, 3<sup>rd</sup> ed., New Age International Publishers, New Delhi, 2015.
3. Sharma, B.K., Polymer Chemistry, Goel Publishing House, Meerut, 2014.
4. Odian, G., Principles of Polymerization, 4<sup>th</sup> ed., John Wiley, 2004.

**CORE-I: GENERAL CHEMISTRY-I****Learning outcomes**

1. To know the fundamental concepts of atomic structure and basics of quantum mechanics.
2. To know the periodicity of properties of elements.
3. To understand the various types of chemical bonding and basics of solid state.
4. To learn the principles of inorganic qualitative and quantitative analysis. To understand the basic concepts of nanotechnology
5. To understand the basic concepts of organic chemistry.

Semester	Subject	Hours	Credits
I	General Chemistry –I	75	4

**Unit - I Atomic Structure and Introduction to Quantum Mechanics (15 hrs)**

Rutherford's atomic model, Planck's quantum theory of radiation, Photoelectric effect, Bohr's theory of hydrogen atom - postulates, Bohr's radius, energy of electron, origin of hydrogen spectrum. Particle and wave nature of electron - de Broglie's equation, Heisenberg's uncertainty principle and Compton effect - Schrodinger wave equation (no derivation) - Significance of  $\Psi$  and  $\Psi^2$  - Wave mechanical concept of atomic orbitals, - Shapes of orbitals - Quantum numbers - Zeeman effect, Pauli's exclusion principle,

Aufbau principle - Effective nuclear charge, screening effect, Slater's rules -applications and limitations. Electronic configuration of first 30 elements - extra stability of half-filled and completely filled orbitals. Hund's rule - its basis and applications.

**Unit - II Classification of Elements and Periodicity of Properties (10 hrs)**

Classification of elements - noble gases and s, p, d and f - block elements. Modern periodic table. Position of hydrogen in the periodic table-Variation of atomic volume, atomic and ionic radii, ionization potential, electron affinity, electronegativity along periods and groups-variation of metallic characters-factors influencing the above periodic properties.

**Unit - III****3.1 Chemical Bonding (15hrs)**

Ionic bond - factors influencing the formation of ionic compounds - ionisation energy, electron affinity and lattice energy; inert pair effect, Fajan's rules.

Covalent bond - polarity of covalent bond, percentage ionic character of covalent bond, dipole moment and molecular structures of  $\text{CO}_2$ ,  $\text{H}_2\text{O}$ ,  $\text{NH}_3$  and  $\text{CH}_4$ , bond characteristics - bond length, bond angle and bond energy.

**3.2 Solid State**

Classification of solids, isotropic and anisotropic crystals, representation of planes, Miller indices, space lattice, unit cell, crystal systems. X-ray diffraction-derivation of Bragg's equation, discussion of structures of NaCl, CsCl and ZnS, determination of Avogadro's number.

**Unit - IV Principles of Inorganic Qualitative and Quantitative Analysis (10 hrs)** Common ion effect, solubility product, applications of the solubility product principle in qualitative analysis. Principle of elimination

of interfering anions. Complexation reactions in qualitative analysis. Spot test reagents and tests with them - Cupferon, DMG, thiourea, magneson, alizarin and Nessler reagent. Volumetric analysis - Definitions - normality, molarity, molality and molefraction,

primary and secondary standards, theories of acid - base, redox, complexometric, iodometric and iodimetric titrations, calculations of equivalent weights, theories of acid - base, redox, metal ion and adsorption indicators and choice of indicators.

Nanotechnology (10Hrs)

Introduction to nano science and nanotechnology – Types of nanoparticles, Techniques to synthesize nanoparticles, Physical methods – Physical vapour deposition (evaporation and sputtering) – chemical methods–reduction methods – sol–gel methods

### **Unit - V Basic Concepts of Organic Chemistry**

(15 hrs)

Hybridisation and shapes of molecules - methane, ethane, ethylene, acetylene and benzene. Electron displacement effects - inductive, electromeric, mesomeric (resonance) and hyperconjugation. Steric effect. Cleavage of bonds - homolytic and heterolytic fissions. Reactive intermediates - carbocations, carbanions and free radicals - their formation and stability.

Nomenclature of organic compounds: IUPAC system of nomenclature of compounds containing upto 8 carbon atoms - mono and bifunctional compounds.

### **Textbooks :**

1. Puri B.R., Sharma L.R. and Pathania M.S., Principles of Physical Chemistry, 47th ed., New Delhi, Vishal Publishing Co.,2016.
2. Puri B.R., Sharma L.R. and Kalia K.C., Principles of Inorganic Chemistry, 33th ed., New Delhi, Milestone Publishers and Distributors,2016.
3. Soni P.L., and Chawla H.M., Textbook of Organic Chemistry, 29th ed., New Delhi, Sultan Chand & Sons, 2007.
4. T. Pradeep, Nano: The Essentials, New Delhi, McGraw Hill,2007
5. H.M., Textbook of Organic Chemistry, 29th ed., New Delhi, Sultan Chand & Sons,2007.
6. Fundamentals of Crystal Chemistry, T R N Kutty;J A K Tareen, Universities Press Private Limited, Chennai, 2000
7. Basic Course in Crystallography, A, J A K Tareen;T RN Kutty, Universities Press Private Limited, Chennai, 2000

### **Reference Books**

1. Jain M.K, Sharma S.C. Modern Organic Chemistry, Vishal Publishing Co.,2017
2. Lee J.D. Concise Inorganic Chemistry, 5th ed., Blackwell Science,2005.
3. Soni, P.L. and Mohan Katyal. Textbook of Inorganic Chemistry, 20th ed., Sultan Chand & Sons, 2006.
4. Glasstone Samuel. Textbook of Physical Chemistry, 2<sup>nd</sup> ed., Macmillan India Ltd.,1990.
5. Soni P.L., Dharmarha O.P. and Dash U.N Textbook of Physical Chemistry, 23<sup>rd</sup> ed., New Delhi, Sultan Chand & Sons,2011.



6. Graham Solomons T.W. Organic Chemistry, 3<sup>rd</sup> ed., John Wiley & Sons.
7. Morrison R.T. and Boyd R.N., Organic Chemistry, 6<sup>th</sup> ed., Pearson Education, Asia, 2002.
8. C. N. R. Rao, Chemistry of Nanomaterials: Synthesis, Properties and Applications, Wiley-VCH Verlag GmbH & Co. KGaA, 2004
9. Charles P. Poole Jr., Frank J. Owens, Introduction to Nanotechnology, New Jersey, John Wiley & Sons, 2003

**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE COURSE IN CHEMISTRY**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BCY-DSC05**

**CORE-V: GENERAL CHEMISTRY-IV**

**Learning Outcomes**

1. To understand the chemistry of Redox reactions.
2. To understand the General characteristics of d-Block elements
3. To learn about the preparation and properties of Heterocyclic compounds and dyes.
4. To know about the nomenclature, preparation and properties of alcohols, thiols, ethers and thioethers.
5. To understand the limitation of I law of thermodynamics and the need of II law of thermodynamics.

SEMESTER	Subject Title	Total Hours	Credit
IV	General Chemistry –IV	75	4

**UNIT I: CHEMISTRY OF REDOX REACTIONS (10 hrs)**

Covalency- oxidation number- oxidation state - difference between oxidation number and valency- rules for calculating oxidation number - definition of oxidation and reduction - redox reactions and half reactions - oxidising agents and reducing agents - equivalent weights of oxidising and reducing agents - auto oxidation and induced oxidation - balancing of redox equations by oxidation number method and ion-electron method

**UNIT II: CHEMISTRY OF d-BLOCK ELEMENTS (15 hrs)**

Transition Elements - Electronic configuration - General periodic trend - Atomic and ionic radii, metallic character, melting and boiling points, ionisation energy, oxidation state, reactivity, colour and tendency to form complexes- Group study of Titanium, Vanadium, Chromium, Manganese, Iron, Cobalt, Nickel and Zinc groups - galvanization, Evidences for the existence of mercurous ion as  $Hg_2^{2+}$ .

**UNIT III: HETEROCYCLIC COMPOUNDS AND DYES (15 hrs)**

**3.1 Heterocyclic compounds**

Nomenclature, Preparation, properties and reactions of Furan, Pyrrole, Thiophene and Pyridine. Comparative study of basicity of pyrrole and pyridine with aliphatic amines. Synthesis and reactions of Indole, Quinoline and Isoquinoline

**3.2 Dyes**

Theory of colour and constitution. Preparation and uses of: Azo dye - Bismark brown, Triphenyl methane dye - malachite green, phthalein dye - fluorescein, anthraquinone dye- alizarin and vat dye- indigo.

**CORE-V: GENERAL CHEMISTRY-IV**

## Learning Outcomes

1. To understand the chemistry of Redox reactions.
2. To understand the General characteristics of d-Block elements
3. To learn about the preparation and properties of Heterocyclic compounds and dyes.
4. To know about the nomenclature, preparation and properties of alcohols, thiols, ethers and thioethers.
5. To understand the limitation of I law of thermodynamics and the need of II law of thermodynamics.

SEMESTER	Subject Title	Total Hours	Credit
IV	General Chemistry –IV	75	4

**UNIT I: CHEMISTRY OF REDOX REACTIONS****(10 hrs)**

Covalency- oxidation number- oxidation state - difference between oxidation number and valency- rules for calculating oxidation number - definition of oxidation and reduction - redox reactions and half reactions - oxidising agents and reducing agents - equivalent weights of oxidising and reducing agents - auto oxidation and induced oxidation - balancing of redox equations by oxidation number method and ion-electron method

**UNIT II: CHEMISTRY OF d-BLOCK ELEMENTS****(15 hrs)**

Transition Elements - Electronic configuration - General periodic trend –Atomic and ionic radii, metallic character, melting and boiling points, ionisation energy, oxidation state, reactivity, colour and tendency to form complexes- Group study of Titanium, Vanadium, Chromium, Manganese, Iron, Cobalt, Nickel and Zinc groups - galvanization, Evidences for the existence of mercurous ion as  $\text{Hg}_2^{2+}$ .

**UNIT III: HETEROCYCLIC COMPOUNDS AND DYES****(15 hrs)****3.1 Heterocyclic compounds**

Nomenclature, Preparation, properties and reactions of Furan, Pyrrole, Thiophene and Pyridine. Comparative study of basicity of pyrrole and pyridine with aliphatic amines. Synthesis and reactions of Indole, Quinoline and Isoquinoline

**3.2 Dyes**

Theory of colour and constitution. Preparation and uses of: Azo dye - Bismark brown, Triphenyl methane dye - malachite green, phthalein dye - fluorescein, anthraquinone dye- alizarin and vat dye- indigo.

## UNIT IV:

### 4.1 Alcohols and thiols

(15 hrs)

Monohydric, dihydric (Ethylene glycol) and trihydric (Glycerol) alcohols: Nomenclature, preparation of alcohols from alkenes, alkyl halides, Grignard reagent and carbonyl compounds. Reactions of alcohols- Dehydration, oxidation, action of Grignard reagent, dehydrogenation using copper and esterification.

Thiols: Nomenclature, structure, preparation and properties

### 4.2 Ethers and thioethers

Ethers: Nomenclature, structure, preparation, properties and uses of dimethyl ether, diethyl ether, ethyl methyl ether, anisole and phenetole. Thioethers: Nomenclature, structure, preparation, properties and uses.

## UNIT 5: Thermodynamics-II

(20 hrs)

Second Law of Thermodynamics - Limitations of first law & Need for the second law - Different statements of the law - Carnot's cycle and efficiency of heat engine-Carnot's theorem- Concept of Entropy - Definition and physical significance of entropy - Entropy as a function of P, V and T- Entropy changes during phase changes - Entropy of mixing- Gibb's free energy (G) and Helmholtz free energy (A) - Variation of A and G with P, V and T - Gibb's Helmholtz equation and its applications - Thermodynamic equation of state - Maxwell's relations.

### Text Books

1. Puri B.R., Sharma L.R. and Pathania M.S., Principles of Physical Chemistry, 44th ed., New Delhi, Vishal Publishing Co., 2009.
2. Puri B.R., Sharma L.R. and Kalia K.C., Principles of Inorganic Chemistry, 30th ed., New Delhi, Milestone Publishers and Distributors, 2009.
3. Soni P.L., and Chawla H.M., Textbook of Organic Chemistry, 29th ed., New Delhi, Sultan Chand & Sons, 2007.
4. Jain M.K, Sharma S.C. Modern Organic Chemistry, Vishal Publishing Co., 2018

### Books for References

1. Glasstone S. And Lewis D., Elements of Physical Chemistry, 2<sup>nd</sup> ed., MacMillan & Co. Ltd., London.
2. Morrison R.T. and Boyd R.N., Organic Chemistry, 6th ed. Pearson Education, Asia, 2002
3. Bahl B.S. and ArunBahl, Advanced Organic Chemistry, 12<sup>th</sup> ed., Sultan Chand & Co., New Delhi, 1997.
4. Madan R.D. SathyaPrakash's Modern Inorganic Chemistry, 2<sup>nd</sup> ed., S.Chand & Co. Ltd, New Delhi, 1990.

## CORE-II: GENERAL CHEMISTRY – II

### Units Learning outcomes

1. To equip the learners with concepts of s block elements through comparative study.
2. To equip the learners with concepts of p block elements through comparative study.
3. To understand the aspects of gaseous state.
4. To understand the aspects of liquid state, colloids and carbon nanotubes, fullerenes
5. To understand the chemistry of organic compounds like alkanes, cycloalkanes, alkenes, alkynes and the conformational analysis.

Semester	Subject	Hours	Credits
II	General Chemistry - II	75	4

### UNIT-I Chemistry of s- Block Elements [Group IA and IIA] (10 hrs)

Hydrogen: Position of hydrogen in the periodic table.

Alkali metals: Comparative study of the elements with respect to oxides, hydroxides, halides, carbonates and bicarbonates. Diagonal relationship of Li with Mg. Extraction of Li from its silicate- ores. Preparation, properties and uses of NaOH, Na<sub>2</sub>CO<sub>3</sub>, KBr KClO<sub>3</sub> alkaline earth metals: Comparative study of the elements with respect to oxides, hydroxides, sulphates, halides and carbonates. Extraction and anomalous behaviour of Be.

### UNIT-II Chemistry of p- Block Elements (10 hrs)

2.1 Boron Family[Group-IIIA]: preparation and structure of diborane and borazine. Chemistry of borax. Extraction of Al and its uses. Alloys of Al. 2.2 Carbon Family (Group -IV A) : comparison of carbon with silicon. Carbon-di-sulphide – Preparation , properties , structure and uses. Percarbonates , per monocarbonates and per dicarbonates. Tin- Allotropic forms of Tin, alloys of tin, tinning, tin plating. Lead-lead accumulator (discharging and recharging), leadpigments.

### UNIT-III Gaseous State (15 hrs)

Postulates of kinetic theory of gases, derivation of gas laws from the kinetic gas equation. Kinetic energy and temperature-average translational kinetic energy and its calculation. Maxwell's distribution of molecular velocities(no derivation)-mean, root mean square and most probable velocity. Collision diameter, collision number, collision frequency, mean free path. Principle of equipartition of energy. Real gases- van der Waals equation of state-derivation. Boyle temperature. Significance of critical constants.

### UNIT-IV

#### 4.1 Liquid State (20 hrs)

Some Properties of Liquids(molecular basis)-Equilibrium vapour pressure of a liquid, boiling point, heat of evaporation, heat of condensation, freezing point. Surface tension definition, measurement of surface tension, effect of temperature on surface

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tension. Parachor-definition, calculation and applications.

Viscosity or fluidity-definition, measurement and calculation, factors affecting viscosity.

- 4.2 Nanoparticles of Au, Ag and TiO<sub>2</sub> –preparation, properties and uses. Carbon nanotubes-Types- preparation, properties and uses-Fullerene – Introduction only

### UNIT-V (20 hrs)

- 5.1 Chemistry of Alkanes and Cycloalkanes : General methods of preparation and properties of alkanes and cycloalkanes ,Conformational analysis of ethane and n-butane. Baeyer's strain theory.
- 5.2 Alkenes, Alkynes and Dienes: Preparation of alkenes (dehydrogenation, dehydrohalogenation and dehydration), preparation of alkynes(dehydrohalogenation, dehalogenation).Addition (with mechanisms) of  $H_2$ ,  $X_2$ ,  $HX$ ,  $HOX$ ,  $B_2H_6$  and  $O_3$  to alkenes and alkynes. Addition of  $HBr$  (peroxide effect; free radical reaction mechanism) to alkenes and alkynes. . Allylic substitution of alkenes by  $NBS$ . Dienes types, stability; preparation of- 1,3-butadiene, isoprene, and chloroprene. Reactivity: 1,2- and 1,4- additions to butadiene. Diels-Alder reaction.

#### Textbooks :

1. Puri B.R., Sharma L.R. and Pathania M.S., Principles of Physical Chemistry, 47th ed., New Delhi, Vishal Publishing Co.,2016.
2. Puri B.R., Sharma L.R. and Kalia K.C., Principles of Inorganic Chemistry, 33th ed., New Delhi, Milestone Publishers and Distributors,2016.
3. Soni P.L., and Chawla H.M., Textbook of Organic Chemistry, 29th ed., New Delhi, Sultan Chand & Sons, 2007.
4. Understanding Chemistry, C N R Rao, Universities Press Private Limited, Chennai,1999
5. The Chemistry of the p-Block Elements: Syntheses, Reactions and Applications, Anil J Elias, Universities Press Private Limited, Chennai,2019
6. T. Pradeep, Nano: The Essentials, New Delhi, McGraw Hill,2007

#### Reference Books

1. Lee J.D. Concise Inorganic Chemistry, 5th ed., Blackwell Science,2005.
2. Jain M.K, Sharma S.C. Modern Organic Chemistry, Vishal Publishing Co.,2017
3. Soni, P.L. and Mohan Katyal. Textbook of Inorganic Chemistry, 20th ed., Sultan Chand & Sons, 2006.
4. Glasstone Samuel. Textbook of Physical Chemistry, 2<sup>nd</sup> ed., Macmillan India Ltd.,1990.
5. Soni P.L., Dharmarha O.P. and Dash U.N Textbook of Physical Chemistry, 23<sup>rd</sup> ed., New Delhi, Sultan Chand & Sons,2011.
6. Graham Solomons T.W. Organic Chemistry, 3<sup>rd</sup> ed., John Wiley&Sons.
7. Morrison R T and Boyd R N, Organic Chemistry, 6<sup>th</sup> ed., Pearson Education, Asia,2002.
8. C. N. R. Rao, Chemistry of Nanomaterials: Synthesis, Properties and Applications, Wiley-VCH Verlag GmbH & Co. KgaA,2004
9. Charles P. Poole Jr., Frank J. Owens, Introduction to Nanotechnology, New Jersey, John Wiley & Sons, 2003

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**BCY-DSC04**

**CORE-IV: GENERAL CHEMISTRY – III**

#### Learning Outcomes

1. To understand the general characteristics of Nitrogen and Oxygen families.
2. To know about the chemistry of Halogens and noble gases.
3. To learn the mechanism of Nucleophilic substitution and Elimination reactions.
4. To know about the reaction mechanisms of aromatic and heterocyclic compounds.
5. To understand the basic concepts of Thermodynamics and Thermochemistry.

SEMESTER	Subject Title	Total Hours	Credit
<b>III</b>	General Chemistry – III	75	4

## **UNIT-I: CHEMISTRY OF NITROGEN AND OXYGEN FAMILIES (15hrs)**

1.1 Group VA elements: General characteristics of Group VA elements; chemistry of  $\text{H}_2\text{N}-\text{NH}_2$ ,  $\text{NH}_2\text{OH}$ ,  $\text{HN}_3$  and  $\text{HNO}_3$ . Chemistry of  $\text{PH}_3$ ,  $\text{PCl}_3$ ,  $\text{PCl}_5$ ,  $\text{POCl}_3$ ,  $\text{P}_2\text{O}_5$  and oxyacids of phosphorous ( $\text{H}_3\text{PO}_3$  and  $\text{H}_3\text{PO}_4$ ).

1.2 Group VIA elements: General properties of group VIA elements - Structure and allotropy of elements-chemistry of ozone - Classification and properties of oxides - oxides of sulphur and selenium - Oxyacids of sulphur (Caro's and Marshall's acids).

**UNIT II: CHEMISTRY OF HALOGENS AND NOBLE GASES (15hrs)** 2.1 Chemistry of Halogens: General characteristics of halogen with reference to electro-negativity, electron affinity, oxidation states and oxidizing power. Peculiarities of fluorine. Halogen acids ( $\text{HF}$ ,  $\text{HCl}$ ,  $\text{HBr}$  and  $\text{HI}$ ), oxides and oxyacids ( $\text{HClO}_4$ ). Inter-halogen compounds ( $\text{ICl}$ ,  $\text{ClF}_3$ ,  $\text{BrF}_5$  and  $\text{IF}_7$ ), pseudo halogens [ $(\text{CN})_2$  and  $(\text{SCN})_2$ ] and basic nature of Iodine.

2.2 Noble gases: Position in the periodic table. Preparation, properties and structure of  $\text{XeF}_2$ ,  $\text{XeF}_4$ ,  $\text{XeF}_6$  and  $\text{XeOF}_4$ ; uses of noble gases- clathrate compounds.

## **UNIT III: NUCLEOPHILIC SUBSTITUTION AND ELIMINATION REACTIONS (10hrs)**

3.1 Nucleophilic substitution :  $\text{S}_{\text{N}}1$ ,  $\text{S}_{\text{N}}2$  and  $\text{S}_{\text{N}}\text{i}$  reactions-mechanisms- stereochemistry - effect of solvent, structure of substrate, nucleophilicity of the reagent [nucleophile] and nature of the leaving group.

3.2 Elimination reactions:  $\text{E}1$ ,  $\text{E}2$  and  $\text{E}1\text{CB}$  reactions and mechanisms: Hofmann and Saytzeff rules. Elimination vs Substitution.

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## **UNIT IV: BENZENE AND POLYNUCLEAR AROMATIC HYDROCARBONS (15hrs)**

Aromaticity - conditions for aromaticity - resonance stabilization energy -

Hückel rule with respect to benzene, naphthalene, anthracene and phenanthrene;

Electrophilic substitution in benzene-general mechanism; nitration, sulphonation, halogenations, Friedel-Crafts alkylation and acylation. Orientation [directive influence] and reactivity in mono substituted benzenes. Polynuclear hydrocarbons-naphthalene, anthracene and phenanthrene-preparation, properties and uses.

## **UNIT V: THERMODYNAMICS-I (20 hrs)**

5.1 Terminology of thermodynamics-Thermodynamic equilibrium-nature of work and heat-First law of Thermodynamics-statement-definition of Internal Energy (E), Enthalpy (H) and Heat capacity. Relation between  $C_p$  and  $C_v$ . Calculation of  $W$ ,  $q$ ,  $dE$  and  $dH$  for expansion of ideal and real gases under isothermal and adiabatic condition of reversible and irreversible processes. Joule- Thompson effect and Coefficient ( $\mu_{\text{JT}}$ )-Calculation of  $\mu_{\text{JT}}$  for ideal and real gases - Inversion temperature.

5.2 Thermochemistry - Relation between enthalpy of reaction at constant volume ( $q_v$ ) and at constant pressure ( $q_p$ ) - Temperature dependence of heat of reaction - Kirchoff equation-Derivation and application-Enthalpy of formation and combustion - Bond energy and its calculation from thermochemical data.

**Textbooks :**

1. Puri B.R., Sharma L.R. and Pathania M.S., Principles of Physical Chemistry, 47th ed., New Delhi, Vishal Publishing Co.,2016.
2. Puri B.R., Sharma L.R. and Kalia K.C., Principles of Inorganic Chemistry, 33th ed., New Delhi, Milestone Publishers and Distributors,2016.
3. Soni P.L., and Chawla H.M., Textbook of Organic Chemistry, 29th ed., New Delhi, Sultan Chand & Sons, 2007.
4. Jain M K and Sharma S C, Modern Organic Chemistry, Vishal Publications,2018.

**Reference Books**

1. Lee J.D. Concise Inorganic Chemistry, 5th ed., Blackwell Science,2005.
2. Soni, P.L. and Mohan Katyal. Textbook of Inorganic Chemistry, 20th ed., Sultan Chand & Sons, 2006.
3. Glasstone Samuel. Textbook of Physical Chemistry, 2<sup>nd</sup> ed., Macmillan India Ltd.,1990.
4. Soni P.L., Dharmarha O.P. and Dash U.N Textbook of Physical Chemistry, 23<sup>rd</sup> ed., New Delhi, Sultan Chand & Sons,2011.
5. Graham Solomons T.W. Organic Chemistry, 3<sup>rd</sup> ed., John Wiley & Sons.
6. Morrison R.T. and Boyd R.N., Organic Chemistry, 6<sup>th</sup> ed., Pearson Education, Asia,2002.

**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE COURSE IN CHEMISTRY**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BCY-DSC04****CORE-IV: GENERAL CHEMISTRY – III**

## Learning Outcomes

1. To understand the general characteristics of Nitrogen and Oxygen families.
2. To know about the chemistry of Halogens and noble gases.
3. To learn the mechanism of Nucleophilic substitution and Elimination reactions.
4. To know about the reaction mechanisms of aromatic and heterocyclic compounds.
5. To understand the basic concepts of Thermodynamics and Thermochemistry.

SEMESTER	Subject Title	Total Hours	Credit
<b>III</b>	General Chemistry – III	75	4

**UNIT-I: CHEMISTRY OF NITROGEN AND OXYGEN FAMILIES (15hrs)**

1.1 Group VA elements: General characteristics of Group VA elements; chemistry of  $\text{H}_2\text{N}-\text{NH}_2$ ,  $\text{NH}_2\text{OH}$ ,  $\text{HN}_3$  and  $\text{HNO}_3$ . Chemistry of  $\text{PH}_3$ ,  $\text{PCl}_3$ ,  $\text{PCl}_5$ ,  $\text{POCl}_3$ ,  $\text{P}_2\text{O}_5$  and oxyacids of phosphorous ( $\text{H}_3\text{PO}_3$  and  $\text{H}_3\text{PO}_4$ ).

1.2 Group VIA elements: General properties of group VIA elements - Structure and allotropy of elements-chemistry of ozone - Classification and properties of oxides - oxides of sulphur and selenium - Oxyacids of sulphur (Caro's and Marshall's acids).

**UNIT II: CHEMISTRY OF HALOGENS AND NOBLE GASES (15hrs)** 2.1 Chemistry of Halogens: General characteristics of halogen with reference to electro-negativity, electron affinity, oxidation

states and oxidizing power. Peculiarities of fluorine. Halogen acids (HF, HCl, HBr and HI), oxides and oxyacids (HClO<sub>4</sub>). Inter-halogen compounds (ICl, ClF<sub>3</sub>, BrF<sub>5</sub> and IF<sub>7</sub>), pseudo halogens [(CN)<sub>2</sub> and (SCN)<sub>2</sub>] and basic nature of Iodine.

2.2 Noble gases: Position in the periodic table. Preparation, properties and structure of XeF<sub>2</sub>, XeF<sub>4</sub>, XeF<sub>6</sub> and XeOF<sub>4</sub>; uses of noble gases- clathrate compounds.

### **UNIT III: NUCLEOPHILIC SUBSTITUTION AND ELIMINATION REACTIONS**

**(10hrs)**

3.1 Nucleophilic substitution : S<sub>N</sub>1, S<sub>N</sub>2 and S<sub>N</sub>i reactions-mechanisms- stereochemistry - effect of solvent, structure of substrate, nucleophilicity of the reagent [nucleophile] and nature of the leaving group.

3.2 Elimination reactions: E1, E2 and E1CB reactions and mechanisms: Hofmann and Saytzeff rules. Elimination vs Substitution.

## **UNIVERSITY OF MADRAS** **B.Sc. DEGREE COURSE IN CHEMISTRY** **SYLLABUS WITH EFFECT FROM 2020-2021**

### **UNIT IV: BENZENE AND POLYNUCLEAR AROMATIC HYDROCARBONS**

**(15hrs)**

Aromaticity - conditions for aromaticity - resonance stabilization energy -

Hückel rule with respect to benzene, naphthalene, anthracene and phenanthrene;

Electrophilic substitution in benzene-general mechanism; nitration, sulphonation, halogenations, Friedel-Crafts alkylation and acylation. Orientation [directive influence] and reactivity in mono substituted benzenes. Polynuclear hydrocarbons-naphthalene, anthracene and phenanthrene-preparation, properties and uses.

### **UNIT V: THERMODYNAMICS-I**

**(20 hrs)**

5.1 Terminology of thermodynamics-Thermodynamic equilibrium-nature of work and heat-First law of Thermodynamics-statement-definition of Internal Energy (E), Enthalpy (H) and Heat capacity. Relation between C<sub>p</sub> and C<sub>v</sub>. Calculation of W, q, dE and dH for expansion of ideal and real gases under isothermal and adiabatic condition of reversible and irreversible processes. Joule- Thompson effect and Coefficient (μ<sub>JT</sub>)-Calculation of μ<sub>JT</sub> for ideal and real gases - Inversion temperature.

5.2 Thermochemistry - Relation between enthalpy of reaction at constant volume (q<sub>v</sub>) and at constant pressure (q<sub>p</sub>) - Temperature dependence of heat of reaction - Kirchoff equation-Derivation and application-Enthalpy of formation and combustion - Bond energy and its calculation from thermochemical data.

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1. Puri B.R., Sharma L.R. and Pathania M.S., Principles of Physical Chemistry, 47th ed., New Delhi, Vishal Publishing Co.,2016.
2. Puri B.R., Sharma L.R. and Kalia K.C., Principles of Inorganic Chemistry, 33th ed., New Delhi, Milestone Publishers and Distributors,2016.
3. Soni P.L., and Chawla H.M., Textbook of Organic Chemistry, 29th ed., New Delhi, Sultan Chand & Sons, 2007.
4. Jain M K and Sharma S C, Modern Organic Chemistry, Vishal Publications,2018.



### Reference Books

1. Lee J.D. Concise Inorganic Chemistry, 5th ed., Blackwell Science, 2005.
2. Soni, P.L. and Mohan Katyal. Textbook of Inorganic Chemistry, 20th ed., Sultan Chand & Sons, 2006.
3. Glasstone Samuel. Textbook of Physical Chemistry, 2<sup>nd</sup> ed., Macmillan India Ltd., 1990.
4. Soni P.L., Dharmarha O.P. and Dash U.N Textbook of Physical Chemistry, 23<sup>rd</sup> ed., New Delhi, Sultan Chand & Sons, 2011.
5. Graham Solomons T.W. Organic Chemistry, 3<sup>rd</sup> ed., John Wiley & Sons.
6. Morrison R.T. and Boyd R.N., Organic Chemistry, 6<sup>th</sup> ed., Pearson Education, Asia, 2002.

**UNIVERSITY OF MADRAS**  
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**SYLLABUS WITH EFFECT FROM 2020-2021**

**BCY-DSC04**

**CORE-IV: GENERAL CHEMISTRY – III**

#### Learning Outcomes

1. To understand the general characteristics of Nitrogen and Oxygen families.
2. To know about the chemistry of Halogens and noble gases.
3. To learn the mechanism of Nucleophilic substitution and Elimination reactions.
4. To know about the reaction mechanisms of aromatic and heterocyclic compounds.
5. To understand the basic concepts of Thermodynamics and Thermochemistry.

SEMESTER	Subject Title	Total Hours	Credit
<b>III</b>	General Chemistry – III	75	4

**UNIT-I: CHEMISTRY OF NITROGEN AND OXYGEN FAMILIES (15hrs)**

1.1 Group VA elements: General characteristics of Group VA elements; chemistry of  $\text{H}_2\text{N-NH}_2$ ,  $\text{NH}_2\text{OH}$ ,  $\text{HN}_3$  and  $\text{HNO}_3$ . Chemistry of  $\text{PH}_3$ ,  $\text{PCl}_3$ ,  $\text{PCl}_5$ ,  $\text{POCl}_3$ ,  $\text{P}_2\text{O}_5$  and oxyacids of phosphorous ( $\text{H}_3\text{PO}_3$  and  $\text{H}_3\text{PO}_4$ ).

1.2 Group VIA elements: General properties of group VIA elements - Structure and allotropy of elements - chemistry of ozone - Classification and properties of oxides - oxides of sulphur and selenium - Oxyacids of sulphur (Caro's and Marshall's acids).

**UNIT II: CHEMISTRY OF HALOGENS AND NOBLE GASES (15hrs)**

2.1 Chemistry of Halogens: General characteristics of halogen with reference to electro-negativity, electron affinity, oxidation states and oxidizing power. Peculiarities of fluorine. Halogen acids ( $\text{HF}$ ,  $\text{HCl}$ ,  $\text{HBr}$  and  $\text{HI}$ ), oxides and oxyacids ( $\text{HClO}_4$ ). Inter-halogen compounds ( $\text{ICl}$ ,  $\text{ClF}_3$ ,  $\text{BrF}_5$  and  $\text{IF}_7$ ), pseudo halogens [ $(\text{CN})_2$  and  $(\text{SCN})_2$ ] and basic nature of Iodine.

2.2 Noble gases: Position in the periodic table. Preparation, properties and structure of  $\text{XeF}_2$ ,  $\text{XeF}_4$ ,  $\text{XeF}_6$  and  $\text{XeOF}_4$ ; uses of noble gases - clathrate compounds.

**UNIT III: NUCLEOPHILIC SUBSTITUTION AND ELIMINATION REACTIONS**

**(10hrs)**

3.1 Nucleophilic substitution :  $S_N1$ ,  $S_N2$  and  $S_Ni$  reactions-mechanisms- stereochemistry - effect of solvent, structure of substrate, nucleophilicity of the reagent [nucleophile] and nature of the leaving group.

3.2 Elimination reactions: E1, E2 and E1CB reactions and mechanisms: Hofmann and Saytzeff rules. Elimination vs Substitution.

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**UNIT IV: BENZENE AND POLYNUCLEAR AROMATIC HYDROCARBONS**

**(15hrs)**

Aromaticity - conditions for aromaticity - resonance stabilization energy -

Hückel rule with respect to benzene, naphthalene, anthracene and phenanthrene;

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**UNIT V: THERMODYNAMICS-I**

**(20 hrs)**

5.1 Terminology of thermodynamics-Thermodynamic equilibrium-nature of work and heat-First law of Thermodynamics-statement-definition of Internal Energy (E), Enthalpy (H) and Heat capacity. Relation between  $C_p$  and  $C_v$ . Calculation of W, q, dE and dH for expansion of ideal and real gases under isothermal and adiabatic condition of reversible and irreversible processes. Joule- Thompson effect and Coefficient ( $\mu_{JT}$ )-Calculation of  $\mu_{JT}$  for ideal and real gases - Inversion temperature.

5.2 Thermochemistry - Relation between enthalpy of reaction at constant volume ( $q_v$ ) and at constant pressure ( $q_p$ ) - Temperature dependence of heat of reaction - Kirchoff equation-Derivation and application-Enthalpy of formation and combustion - Bond energy and its calculation from thermochemical data.

**Textbooks :**

1. Puri B.R., Sharma L.R. and Pathania M.S., Principles of Physical Chemistry, 47th ed., New Delhi, Vishal Publishing Co., 2016.
2. Puri B.R., Sharma L.R. and Kalia K.C., Principles of Inorganic Chemistry, 33th ed., New Delhi, Milestone Publishers and Distributors, 2016.
3. Soni P.L., and Chawla H.M., Textbook of Organic Chemistry, 29th ed., New Delhi, Sultan Chand & Sons, 2007.
4. Jain M K and Sharma S C, Modern Organic Chemistry, Vishal Publications, 2018.

**Reference Books**

1. Lee J.D. Concise Inorganic Chemistry, 5th ed., Blackwell Science, 2005.
2. Soni, P.L. and Mohan Katyal. Textbook of Inorganic Chemistry, 20th ed., Sultan Chand & Sons, 2006.
3. Glasstone Samuel. Textbook of Physical Chemistry, 2<sup>nd</sup> ed., Macmillan India Ltd., 1990.
4. Soni P.L., Dharmarha O.P. and Dash U.N Textbook of Physical Chemistry, 23<sup>rd</sup> ed., New Delhi, Sultan Chand & Sons, 2011.
5. Graham Solomons T.W. Organic Chemistry, 3<sup>rd</sup> ed., John Wiley & Sons.

3. Levine I.N., Physical Chemistry 6<sup>th</sup> ed., 1988.
4. Rajaram J. and Kuriacose J.C., Thermodynamics for students & Co., 2013.
5. Bajpai D.N., Advanced Physical Chemistry, S.Chand Publishing, 2001.
6. Negi A.S. and Anand S.C., A Textbook of Physical Chemistry, John 1986.

### PAPER X

Semester	Subject Title	Subject Code	To H
V & VI	<b>INORGANIC QUANTITATIVE ANALYSIS – GRAVIMETRIC ANALYSIS</b>		9

The students are expected to write the procedure during examination for which is awarded as per the scheme of examination

1. Estimation of Lead as Lead chromate
2. Estimation of Barium as Barium chromate
3. Estimation of Nickel as Nickel - DMG complex.
4. Estimation of Calcium as Calcium oxalate
5. Estimation of Barium as Barium sulfate
6. Estimation of sulfate as Barium sulfate.
7. Estimation of Aluminium as Aluminium oxinate (for demonstration)
8. Estimation of Silver as Silver chloride ( for demonstration )

**Books for References**

1. Venkateswaran, V. Veeraswamy R. Kulandaivelu A.R., Basic Chemistry, 2nd Edition, New Delhi, Sultan Chand & Sons, (1997).
2. Jeffery G.H., Bassett J., Mendham J. And Denney R.C, Vogel's Chemical Analysis, 5<sup>th</sup> ed., John Wiley & Sons Inc., New York, 1998.

### PAPER XI

6. Morrison R.T. and Boyd R.N., Organic Chemistry, 6<sup>th</sup> ed., Pearson Education, Asia, 2002.

Semester	Subject Title	Subject Code	Total Hours	Credits
V	b) INDUSTRIAL CHEMISTRY		60	5

**UNIT 1: INDUSTRIAL REQUIREMENTS (12 hrs)**

Requirements of an industry - location - water - industrial water treatment - safety measures. Fuels - types of fuels with examples - coal - carbonization of coal - coal for liquid fuels - gaseous fuels - selection of fuels - nuclear fuels. Energy - sources - renewable and non-renewable energies - non conventional energies.

**UNIT 2: PETROCHEMICAL INDUSTRIES (12 hrs)**

Crude oil - constitution and distillation - composition of different distillates - ignition point octane number - cracking - catalysts used in petroleum industries - structure, applications. Manufacture of synthetic petrol - Dergius and Fischer Tropsh processes - Manufacture of petrochemicals and petrochemical polymers - Manufacture of higher olefins, Acetic acid, Phenol, Carbon disulphide, Vinyl acetate, Butane diols, Xylenes.

**UNIT 3: FERTILIZERS AND SPECIALITY CHEMICALS (12hrs)**

Manufacture - Properties and industrial uses of solvents - DMF, DMSO, THF and Fertilizers - Raw materials, manufacture (flow chart - chemical process with examples) ammonium nitrate, ammonium sulphate, urea, calcium cyanamide, calcium ammonium nitrate, ammonium chloride, ammonium phosphate, super phosphate of fertilizers.

**UNIT 4: OILS, SOAPS AND DETERGENTS (12hrs)**

Oils - difference between oils and fats - manufacture of cotton seed oil and soy manufacture of soaps - toilet and transparent soaps - Detergents - synthetic detergents - active agents and their classification - manufacture of anionic, cationic and non ionic detergents and shampoo.

**UNIT 5: METALLURGY (12hrs)**

General methods of metallurgy - ores - types - methods of concentration of ores - hydrometallurgy - various of reduction process, refining of metals - extraction of Cr, Mn, U and Th. Environmental problems of chemical industries - methods of control - sewage and waste management. Man power in chemical industries - labour problems - Six concept only).

**Books for Reference**

- 1. Sharma B.K., Industrial Chemistry, Goel Publishing House, Meerut, 2003.
- 2. Drydence C.E., Outlines of Chemical Technology, Gopala Rao, Eastwest Press, New Delhi.
- 3. Shreve R. V., Chemical Process Industries, Tata Mc Graw Hill publishing company, Mumbai.
- 4. Steines H., Introduction to Petrochemicals, Pergaman Press.
- 5. Alan Cottrel, An Introduction to Metallurgy, Orient Longman, 2000.
- 6. James A. Kent, Riegel's Handbook of Industrial Chemistry, Springer Science & Business Media, 2013.
- 7. Davis K.H., Handbook of Industrial Chemistry, Vol2, CBS Publishers & Distributors, 2004.

**ELECTIVE - II**

a) Nanomaterials and Green Chemistry OR b) Polymer Chemistry

	Subject Title	Subject Code	Total Hours	Credit
Semester	NANOMATERIALS AND GREEN		60	5

- magnesium, ammonium
5. Analysis of a mixture containing two cations and two anions (of which one is interfering type)

Each student is expected to do the analysis of at least 10 mixtures.

**Book for Reference**

Venkateswaran V, Veeraswamy R., Kulandivelu A.R., Basic Principles of Practical Chemistry, 2<sup>nd</sup> edition, New Delhi, Sultan Chand & Sons (1997)

**PAPER VII**

Semester	Subject Title	Subject Code	Total Hours	Credit
V	PAPER VII INORGANIC CHEMISTRY - I		60	4

**UNIT I: CHEMISTRY OF f-BLOCK ELEMENTS (15hrs)**

General characteristics of f-block elements – Comparative account of lanthanides and actinides - Occurrence, Oxidation states, Magnetic properties, Colour and spectra – Lanthanides and Actinides Separation by ion-Exchange and Solvent extraction methods – Lanthanide contraction-Chemistry of thorium and Uranium-Occurrence, Ores, Extraction, properties and uses – Preparation, Properties and uses of ceric ammonium sulphate, thorium dioxide and uranylacetate.

**UNIT II: COORDINATION CHEMISTRY (15 hrs)**  
Types of ligands - IUPAC Nomenclature, Isomerism - Ionisation, hydrate, linkage, ligand and coordination isomerism. Stereoisomerism-geometrical and optical isomerism in 4 & 6 coordinated complexes. Theories of coordination compounds - Werner's and Sidgwick's EAN concept, Valence Bond theory - hybridisation, geometry and magnetic properties of  $[\text{Ni}(\text{CN})_4]^{2-}$ ,  $[\text{NiCl}_4]^{2-}$ ,  $[\text{Fe}(\text{CN})_6]^{4-}$ ,  $[\text{Co}(\text{NH}_3)_6]^{3+}$  and  $[\text{CoF}_6]^{3-}$ . Crystal field theory - spectrochemical series, splitting of d-orbitals in octahedral and tetrahedral complexes, low spin & high spin complexes, Explanation of colour and magnetic properties using CFT, comparison of VBT and CFT.

**UNIT III: APPLICATION OF COORDINATION COMPOUNDS (12 hrs)**  
Application of coordination compounds - Estimation of nickel using DMG and aluminium using oxine. Estimation of hardness of water using EDTA. Biologically important coordination compounds - Chlorophyll, haemoglobin, vitamin - B<sub>12</sub>. (their structure and applications). Metal Carbonyls: Mono and Poly nuclear Carbonyls of Ni, Fe, Cr, Co and Mn - Synthesis, structures and bonding.

**UNIT IV: CHEMISTRY OF BINARY COMPOUNDS (10hrs)**  
Classification, preparation, properties and uses of hydrides, borides, carbides and nitrides

**UNIT V: CONCEPTS OF ACIDS AND BASES (8hrs)**  
Theories of acids and bases - Arrhenius theory, Bronsted - Lowry theory - basicity of an acid and acidity of a base - relative strengths of acids and bases, Cady - Esley concept - general theory of solvent system, Lux - Flood concept, Lewis concept - Lewis acids - bases concept in coordination chemistry - classification of Lewis acids, Usanovich concept. Concept of Hard and Soft Acids and Bases (HSAB).

- magnesium, ammonium
5. Analysis of a mixture containing two cations and two anions (of which one is interfering type)

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UNIT II: CHEMISTRY OF ORGANIC MAGNESIUM COMPOUNDS – Physical and Chemical properties – Uses – Chemistry  
 Introduction – Preparation of Organozinc compounds – Physical and Chemical properties.  
 Uses. Preparation of Organoaluminum compounds – Physical and Organoboron compounds  
 Preparation of OrganoCopper, OrganoLead, OrganoPhosphorus and Cyclopentadiene  
 of OrganoCopper, OrganoLead, OrganoPhosphorus and Cyclopentadiene

Organometallic compounds of alkenes, alkynes and cyclopentadiene

UNIT III: NUCLEAR CHEMISTRY (15 hrs)  
 Introduction – composition of nucleus – nuclear binding energies – structure of nucleus- nuclear  
 introduction – magic numbers – nuclear stability – theories of nuclear stability - i) nuclear binding  
 shell model – magic numbers – nuclear forces iii) nuclear fluid theory – isotopes, isobars,  
 energy theory ii) meson theory of nuclear forces iii) nuclear mass spectrograph separation of  
 isotones and nuclear isomers – detection of isotopes – Aston's mass spectrograph – atomic weights-  
 isotopes – electromagnetic method – the whole number rule and packing fraction – atomic weights-  
 isotopes – electromagnetic method (15 hrs)

UNIT IV: RADIOACTIVITY (15 hrs)  
 Radioactive Emanations, Alpha rays, Beta rays and Gamma rays, The Disintegration theory, Group  
 Displacement Law, Rate of disintegration and Half-life period. Radioactive disintegration series,  
 Displacement Law, Rate of disintegration, Induced radioactivity, Nuclear fission-Atom bomb,  
 The Geiger-Nuttall rule - Artificial radioactivity, Applications of Radioisotopes.

Nuclear fusion-hydrogen bomb. Hazards of radiation. Applications of Radioisotopes.

UNIT V: SOME SPECIAL TYPE OF COMPOUNDS (15 hrs)  
 Chlorates – examples and structures, interstitial and non-stoichiometric compounds – silicones –  
 composition, manufacture, structure, properties and uses – silanes, phosphazenes – their synthesis,  
 structure and uses – silicates and their polymers – classification into discrete anions – one, two, and  
 three dimensional structures with examples – composition and uses of beryl, asbestos, talc, mica,  
 zeolites and ultramarines.  
 Types of solvents: Protic and aprotic solvents-aqueous and non aqueous solvents-liquid ammonia  
 and liquid HF as solvents.

**TEXT BOOK**  
 Paul, B.R., Sharma L.R. and Kalia K.C., Principles of Inorganic Chemistry, 30<sup>th</sup> ed., Mile stone  
 publishers and distributors, 2009.

**BOOKS FOR REFERENCE**

1. Lee J.D., Concise Inorganic Chemistry, 5th ed., Blackwell Science, 2005.
2. Sharpe Alan G. Inorganic Chemistry, ELBS and Longman, 1981.
3. Miesler G. L. and Donald, A. Tarr, Inorganic Chemistry 4<sup>th</sup> ed., Pearson, 2010.
4. Malik, Wahid U., Tuli G.D. and Madan R.D., Selected Topics in Inorganic Chemistry, 7<sup>th</sup> ed.,  
 S. Chand & Company Ltd., 2007.
5. Gundeep Raj Chaturwal and Harish Mehre, Advanced Inorganic Chemistry, 7<sup>th</sup> ed., Goel Publishing  
 House, Meerut

**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE COURSE IN CHEMISTRY**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BCY-DSC03**

**CORE-III: MAJOR PRACTICALS - I**  
**(90 HOURS: I & II SEMESTERS 3 CREDITS)**

[The procedure for the practical examination will be given by the examiner] The following volumetric analyses are prescribed.

1. Estimation of HCl by NaOH using a standard oxalic acid solution
2. Estimation of Na<sub>2</sub>CO<sub>3</sub> by HCl using a standard Na<sub>2</sub>CO<sub>3</sub> solution

3. Estimation of oxalic acid by  $\text{KMnO}_4$  using a standard oxalic acid.
4. Estimation of Ferrous sulphate by  $\text{KMnO}_4$  using a standard Mohr's salt solution.
5. Estimation of  $\text{KMnO}_4$  by sodium thiosulphate using a standard  $\text{K}_2\text{Cr}_2\text{O}_7$  solution.
6. Estimation of iron by  $\text{K}_2\text{Cr}_2\text{O}_7$  solution using a standard Ferrous sulphate solution.
7. Estimation of Copper sulphate using a standard  $\text{K}_2\text{Cr}_2\text{O}_7$  solution.
8. Estimation of  $\text{Mg(II)}$  by EDTA solution using standard Zinc sulphate solution.
9. Estimation of  $\text{Zn(II)}$  by EDTA solution using standard Magnesium sulphate solution.
10. Estimation of total hardness of water.

The following inorganic preparations are prescribed

1. Preparation of Ferrous ammonium sulphate or Mohr's salt
2. Preparation of potash alum or potassium aluminium sulphate
3. Preparation of microcosmic salt
4. Preparation of tetrammine copper(II) sulphate

Learning outcomes

1. To understand about the origin and physical properties of Soil.
2. To understand the chemical properties of soil and methods of analysing.
3. To learn about the different types of plant nutrients and their importance.
4. To learn about the fertilizers and their uses.
5. To understand about the classification of various pesticides, fungicides and herbicides.

**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE COURSE IN CHEMISTRY**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BCY-DSC06**

**CORE-VI: MAJOR PRACTICAL - II**

Semester	Subject Title	Total Hours	Credit
III & IV	Semimicroinorganic Qualitative Analysis	90	3

**Semi-Micro Qualitative Analysis**

1. Analysis of simple acid radicals: carbonate, sulphate, chloride, bromide, iodide, nitrate
2. Analysis of interfering acid radicals: Fluoride, oxalate, borate, phosphate
3. Elimination of interfering acid radicals and Identifying the groups of basic radicals
4. Analysis of basic radicals (group-wise): Lead, copper, bismuth, cadmium, iron, aluminium, zinc, manganese, nickel, cobalt, calcium, strontium, barium, magnesium, ammonium
5. Analysis of a mixture containing two cations and two anions (of which one is interfering type) Each student is expected to do the analysis of at least 10 mixtures.

**Book for Reference**

1. Venkateswaran V, Veeraswamy R., Kulandivelu A.R., Basic Principles of Practical Chemistry, 2<sup>nd</sup> edition, New Delhi, Sultan Chand & Sons (1997)

**UNIVERSITY OF MADRAS**



- BOOKS TO REFER
1. Venkateswaran, V. Veeraswamy R. Kumar  
Chemistry, 2nd Edition, New Delhi, Sultan Chand & Sons, (1997)
  2. Jeffery G.H., Bassett J., Mendham J. And Denney R.C, Vogel's  
Chemical Analysis, 5<sup>th</sup> ed., John Wiley & Sons Inc., New York, 1996

## PAPER XI

Semester	Subject Title	Subject Code
V & VI	<b>ORGANIC ANALYSIS AND PREPARATION</b>	

### ORGANIC ANALYSIS

Analysis of simple organic compounds (a) characterization functional preparation of solids derivatives / characteristics colour reaction.

Note : 1. Mono - functional compounds are given for analysis. Incase students are required to report any one of the functional gro

2. Each student is expected to do the analysis of at least 15 different organic substances. Recommended to adopt micro scale technique of organic analysis

#### ORGANIC PREPARATIONS

Preparation of Organic compounds involving the following chemical conversions

1. Oxidation 2. Reduction 3. Esterification 4. Acetylation 5. Hydrolysis 6. Nitration 7. Bromination

Books for Reference

1. Venkateswarar V., Veerawamy R. and Kulandaivelu A.R., Basic Principles of Practical Chemistry, 2<sup>nd</sup> ed., New Delhi, Sultan Chand & Sons (1997)
2. Furniss, B. S., et al. Vogel's Textbook of Practical Organic Chemistry, 5<sup>th</sup> ed., Prentice Hall, 1989.

#### PAPER - XII

Semester V & VI	Subject Title	Subject Code	Total Hours	Credit
	PHYSICAL CHEMISTRY PRACTICAL		90	3

#### Physical Chemistry Experiments

1. Critical Solution Temperature
2. Effect of temperature on Critical solution temperature
3. Raoult method
4. Transition temperature
5. Heat of neutralization
6. Phase diagram ( Simple Eutectic )
7. Kinetics of iodination of acetone
8. Kinetics of ester hydrolysis
9. Kinetics of Persulphate - Iodide reaction.
10. Viscosity
11. Partition coefficient and Equilibrium constant of  $KI + I_2 \rightarrow KI_3$
12. Determination of cell constant, specific conductance and equivalent conductance of strong electrolyte.
13. Conductometric Acid - Base titration
14. Conductometric Precipitation titration.
15. Potentiometric Acid - Base titration
16. Potentiometric redox titration



## PAPER - XIV

Semester VI	Subject Title	Subject Code	Total Hours	Credit
	PAPER- XIV ORGANIC CHEMISTRY -II		75	5

**UNIT 1: CHEMISTRY OF CARBOHYDRATES (15 hrs)**

Carbohydrates – Definition and Classification of carbohydrates with examples. Mono saccharides: Explanation of enantiomers, diastereomers, epimers and anomers with examples. Mechanism mutarotation, osazone formation. Absolute configurations of glucose and fructose. Structural elucidation of glucose and fructose (includes cyclic and Haworth structure). Inter conversions, ascending and descending the sugar series. Disaccharide – Sucrose, Maltose – Structural elucidation. Polysaccharide – Starch and Cellulose (Elementary treatment).

**UNIT 2: CHEMISTRY OF PROTEINS AND VITAMINS (15 hrs)**

Amino acids – Classification, General methods of preparation and reactions, zwitter ion, isoelectric point. Peptides and proteins – Peptide linkage, Classification of proteins, primary structure, End group analysis – Sanger's method and Edman method, secondary structure, tertiary structure, denaturation.

Vitamins – Classification, biological importance of Vitamins.

Structural elucidation of Vitamin C. Structures of Vitamin A and Vitamin D.

**UNIT 3: CHEMISTRY OF ALKALOIDS AND TERPENOIDS (15 hrs)**

Chemistry of natural products – Alkaloids – Isolation, classification, general methods of elucidating structure. Structural elucidation of nicotine and piperine. Terpenes – classification, isoprene rule, isolation and structural elucidation of citral,  $\alpha$ -terpeniol and menthol.

**UNIT 4: MOLECULAR REARRANGEMENTS (10 hrs)**

Molecular rearrangements – Types of rearrangements, Mechanisms for the following rearrangements: pinacol – pinacolone, benzil – benzilic acid, benzidine, Favorskii, Claisen, Fries, Hofmann, Curtius, Schmidt and Beckmann.

**Unit-5: STEREOCHEMISTRY OF ORGANIC COMPOUNDS (20 hrs)**

Stereoisomerism - definition, classification into geometric and optical isomerism. Optical isomerism — Optical activity, asymmetric centre (chirality), symmetry elements ( $\sigma_n$ ,  $S_n$  and  $i$ ), meaning of (+) or d and (-) or l and D and L notations, concept of enantiomerism and diastereoisomerism; Racemisation – methods of Racemisation (by substitution and tautomerism). Resolution – methods of resolution (by mechanical, seeding and biochemical), Walden inversion. Projection formulae- Fischer, flying wedge, Sawhorse and Newmann projections, notation of optical isomerism:- Cahn-Ingold and Prelog rules, R and S notations for one and two chirality (stereogenic) centres, erythro and threo representations. Geometrical isomerism: cis – trans; syn – anti; E – Z descriptors. [3 D visualization through computers]

**TEXTBOOK**

Bahl B.S. and Arun Bahi, Advanced Organic Chemistry, 12<sup>th</sup> ed., Sultan Chand and Co., New Delhi, 1997.

**BOOKS FOR REFERENCE**

1. Finar I.L., Organic Chemistry, Vol. 1&2, 6<sup>th</sup> ed., Addison Wesley Longman Ltd., London, 1996.
2. Morrison R.T., Boyd R.N., Organic Chemistry, 4<sup>th</sup> ed., Allyn & Bacon Ltd., New York, 1976.
4. Pine S.H., Organic Chemistry, 4<sup>th</sup> ed., McGraw-Hill International Book Company, (1986)
5. Peter Sykes, A Guidebook to Mechanism in Organic Chemistry, 6<sup>th</sup> ed., Pearson Education, 2003.

- magnesium, ammonium
5. Analysis of a mixture containing two cations and two anions (of which one is interfering type)

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Application of coordination compounds - Estimation of nickel using DMG and aluminium using oxine, Estimation of hardness of water using EDTA. Biologically important coordination compounds - Chlorophyll, haemoglobin, vitamin - B<sub>12</sub>. (their structure and applications). Metal Carbonyls: Mono and Poly nuclear Carbonyls of Ni, Fe, Cr, Co and Mn - Synthesis, structures and bonding.

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Organometallic compounds of alkenes, alkynes and cyclopentadiene

UNIT III: NUCLEAR CHEMISTRY (15 hrs)

Introduction – composition of nucleus – nuclear binding energies – structure of nucleus – nuclear introduction – magic numbers – nuclear stability – theories of nuclear stability – i) nuclear binding shell model – magic numbers – nuclear forces ii) nuclear fluid theory – isotopes, isobars, energy theory iii) meson theory of nuclear forces iii) nuclear fluid theory – Aston's mass spectrograph separation of isotones and nuclear isomers – detection of isotopes – Aston's mass spectrograph – atomic weights. Isotopes – electromagnetic method – the whole number rule and packing fraction – atomic weights.

UNIT IV: RADIOACTIVITY (15 hrs)

Radioactive Emanations, Alpha rays, Beta rays and Gamma rays, The Disintegration theory. Group Displacement Law. Rate of disintegration and Half-life period. Radioactive disintegration series. The Geiger-Nuttall rule - Artificial radioactivity, Induced radioactivity, Nuclear fission-Atom bomb.

Nuclear fusion-hydrogen bomb. Hazards of radiation. Applications of Radioisotopes.

UNIT V: SOME SPECIAL TYPE OF COMPOUNDS (15 hrs)

Clathrates – examples and structures, interstitial and non-stoichiometric compounds – silicones – composition, manufacture, structure, properties and uses – silanes, phosphazenes – their synthesis, structure and uses – silicates and their polymers – classification into discrete anions – one, two, and three dimensional structures with examples – composition and uses of beryl, asbestos, talc, mica, zeolites and ultramarines.

Types of solvents: Protic and aprotic solvents-aqueous and non aqueous solvents-liquid ammonia and liquid HF as solvents.

**TEXT BOOK**

Puri, B.R., Sharma I.R. and Kalia K.C., Principles of Inorganic Chemistry, 30<sup>th</sup> ed., Mile stone publishers and distributors, 2009.

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1. Lee J.D., Concise Inorganic Chemistry, 5th ed., Blackwell Science, 2005.
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**BCY-DSC03**

**CORE-III: MAJOR PRACTICALS - I**  
**(90 HOURS: I & II SEMESTERS 3 CREDITS)**

[The procedure for the practical examination will be given by the examiner] The following volumetric analyses are prescribed.

1. Estimation of HCl by NaOH using a standard oxalic acid solution
2. Estimation of Na<sub>2</sub>CO<sub>3</sub> by HCl using a standard Na<sub>2</sub>CO<sub>3</sub> solution

3. Estimation of oxalic acid by  $\text{KMnO}_4$  using a standard oxalic acid.
4. Estimation of Ferrous sulphate by  $\text{KMnO}_4$  using a standard Mohr's salt solution.
5. Estimation of  $\text{KMnO}_4$  by sodium thiosulphate using a standard  $\text{K}_2\text{Cr}_2\text{O}_7$  solution.
6. Estimation of iron by  $\text{K}_2\text{Cr}_2\text{O}_7$  solution using a standard Ferrous sulphate solution.
7. Estimation of Copper sulphate using a standard  $\text{K}_2\text{Cr}_2\text{O}_7$  solution.
8. Estimation of  $\text{Mg(II)}$  by EDTA solution using standard Zinc sulphate solution.
9. Estimation of  $\text{Zn(II)}$  by EDTA solution using standard Magnesium sulphate solution.
10. Estimation of total hardness of water.

The following inorganic preparations are prescribed

1. Preparation of Ferrous ammonium sulphate or Mohr's salt
2. Preparation of potash alum or potassium aluminium sulphate
3. Preparation of microcosmic salt
4. Preparation of tetrammine copper(II) sulphate

Learning outcomes

1. To understand about the origin and physical properties of Soil.
2. To understand the chemical properties of soil and methods of analysing.
3. To learn about the different types of plant nutrients and their importance.
4. To learn about the fertilizers and their uses.
5. To understand about the classification of various pesticides, fungicides and herbicides.

**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE COURSE IN CHEMISTRY**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BCY-DSC06**

**CORE-VI: MAJOR PRACTICAL - II**

Semester	Subject Title	Total Hours	Credit
III & IV	Semimicroinorganic Qualitative Analysis	90	3

**Semi-Micro Qualitative Analysis**

1. Analysis of simple acid radicals: carbonate, sulphate, chloride, bromide, iodide, nitrate
2. Analysis of interfering acid radicals: Fluoride, oxalate, borate, phosphate
3. Elimination of interfering acid radicals and Identifying the groups of basic radicals
4. Analysis of basic radicals (group-wise): Lead, copper, bismuth, cadmium, iron, aluminium, zinc, manganese, nickel, cobalt, calcium, strontium, barium, magnesium, ammonium
5. Analysis of a mixture containing two cations and two anions (of which one is interfering type) Each student is expected to do the analysis of at least 10 mixtures.

**Book for Reference**

1. Venkateswaran V, Veeraswamy R., Kulandivelu A.R., Basic Principles of Practical Chemistry, 2<sup>nd</sup> edition, New Delhi, Sultan Chand & Sons (1997)



- BOOKS TO REFER
1. Venkateswaran, V. Veeraswamy R. Kumar  
Chemistry, 2nd Edition, New Delhi, Sultan Chand & Sons, (1997)
  2. Jeffery G.H., Bassett J., Mendham J. And Denney R.C, Vogel's  
Chemical Analysis, 5<sup>th</sup> ed., John Wiley & Sons Inc., New York, 1996

## PAPER XI

Semester	Subject Title	Subject Code
V & VI	<b>ORGANIC ANALYSIS AND PREPARATION</b>	

### ORGANIC ANALYSIS

Analysis of simple organic compounds (a) characterization functional preparation of solids derivatives / characteristics colour reaction.

Note : 1. Mono - functional compounds are given for analysis. Incase students are required to report any one of the functional gro

2. Each student is expected to do the analysis of at least 15 different organic substances. Recommended to adopt micro scale technique of organic analysis

#### ORGANIC PREPARATIONS

Preparation of Organic compounds involving the following chemical conversions

1. Oxidation 2. Reduction 3. Esterification 4. Acetylation 5. Hydrolysis 6. Nitration 7. Bromination

Books for Reference

1. Venkateswarar V., Veerawamy R. and Kulandaivelu A.R., Basic Principles of Practical Chemistry, 2<sup>nd</sup> ed., New Delhi, Sultan Chand & Sons (1997)
2. Furniss, B. S., et al. Vogel's Textbook of Practical Organic Chemistry, 5<sup>th</sup> ed., Prentice Hall, 1989.

#### PAPER - XII

Semester V & VI	Subject Title	Subject Code	Total Hours	Credit
	PHYSICAL CHEMISTRY PRACTICAL		90	3

#### Physical Chemistry Experiments

1. Critical Solution Temperature
2. Effect of temperature on Critical solution temperature
3. Raoult method
4. Transition temperature
5. Heat of neutralization
6. Phase diagram ( Simple Eutectic )
7. Kinetics of iodination of acetone
8. Kinetics of ester hydrolysis
9. Kinetics of Persulphate - Iodide reaction.
10. Viscosity
11. Partition coefficient and Equilibrium constant of  $KI + I_2 \rightarrow KI_3$
12. Determination of cell constant, specific conductance and equivalent conductance of strong electrolyte.
13. Conductometric Acid - Base titration
14. Conductometric Precipitation titration.
15. Potentiometric Acid - Base titration
16. Potentiometric redox titration

6. Kalsi, P.S., Stereochemistry of Organic Compounds: Principles and Applications, New Age International, 2011
7. Sujata V Bhat, Nagasampagi B.A., and Meenakshi Sivakumar, Chemistry of Natural Products, Springer, 2006.
8. Agarwal O.P., Organic Chemistry Reactions & Reagents, 49<sup>th</sup> ed., Goel Publishing House, 2011

### PAPER - XV

Semester	Subject Title	Subject Code	Total Hours	Credits
VI	PAPER-XV PHYSICAL CHEMISTRY- II		75	3

#### UNIT I: CHEMICAL KINETICS ( 20 hrs )

Rate of reaction- Average and instantaneous rates, factors influencing rate of reaction - molecularity of a reaction - rate equation - order of reaction, order and molecularity of simple and complex reactions, Rate laws - Rate constants - derivation of rate constants and characteristics for zero, first order, second and third order (equal initial concentration) - Derivation of time for half change with examples. Methods of determination of order of reactions - Experimental methods of determination of rate constant of a reaction - Volumetry, manometry and polarimetry.

Effect of temperature on reaction rate - temperature coefficient - concept of activation energy - energy barrier - Arrhenius equation. Theories of reaction rates - Collision theory - derivation of rate constant of bimolecular gaseous reaction - Failure of collision theory. Lindemann's theory of unimolecular reaction. Theory of absolute reaction rates - Derivation of rate constant for a bimolecular reaction - significance of entropy and free energy of activation. Comparison of collision theory and ARRT.

#### UNIT II: CATALYSIS AND ADSORPTION (15 hrs )

Catalysis - general characteristics of catalytic reactions, auto catalysis, promoters, negative catalysis, poisoning of a catalyst - theories of homogenous and heterogeneous catalysis - Kinetics of Acid - base and enzyme catalysis. Heterogeneous catalysis

Adsorption - Chemical and physical adsorption and their general characteristics - distinction between them Different types of isotherms - Freundlich and Langmuir Adsorption isotherms and their limitations - BET theory

#### UNIT III: PHOTOCHEMISTRY (10 hrs )

Laws of photo chemistry - Lambert - Beer, Grothaus - Draper and Stark - Einstein. Quantum efficiency. Photo chemical reactions - rate law - Kinetics of  $H_2-Cl_2$ ,  $H_2-Br_2$  and  $H_2-I_2$  reactions, comparison between thermal and photochemical reactions.

#### UNIT IV : GROUP THEORY (10 hrs)

Symmetry elements and symmetry operation symmetry operation of  $H_2O$  molecule, Illustration of mathematical rules for the group using symmetry operations of  $H_2O$  molecule. Construction of multiplication table, for  $H_2O$  molecule. Point group - Definition Elements (symmetry operations) of the following point groups  $C_n(C_2, C_3)$ ,  $C_{nv}(C_{2v}, C_{3v})$  and  $C_{nh}(C_{2h}, C_{3h})$

#### UNIT V: ELECTROCHEMICAL CELLS (20 hrs )

Electrolytic & Galvanic cells - Reversible and irreversible cells. Conventional representation of electrochemical cells. Electromotive force of a cell and its measurement computation of E.M.F. calculation of thermodynamic quantities of cell reactions ( $\Delta G, \Delta H, \Delta S$  and  $K_{eq}$ ). Application of Gibbs Helmholtz equation. Calculation of E.M.F Nernst equation. Types of reversible electrodes - Gas/metal ion-metal/metal ion; metal/insoluble salt/anion and Redox electrodes. Electrode reactions

- Nernst equation - Derivation of electrode - reference electrode - Electrochemical series and junction potential. Application of activity co-efficient. Potentiometry and glass electrodes and electrochemical cells

#### TEXT BOOKS

1. Puri B.R., Sharma, Publishing Company

2. Sharma K.K.

#### Books for Reference

1. Maron C.H.

2. Glasstone

3. Khetarpal

4. Jain D.N.

New Delhi

5. Bajaj

6. Negi

- Nernst equation - Derivation of cell E.M.F. and single electrode potential - standard hydrogen electrode - reference electrodes - standard electrode potentials - sign convention - Electrochemical series and its significance. Concentration cell with and without transport. Liquid junction potential. Application of EMF concentration cells. Valency of ion, solubility product and activity co-efficient. Potentiometric titrations. Determination of pH using Hydrogen, quinhydrone and glass electrodes. Determination of  $pK_a$  of acids by potentiometric method. Corrosion - general and electrochemical theory - passivity - prevention of corrosion.

### TEXT BOOKS

1. Puri B.R., Sharma L.R. and Pathania M.S., Principles of Physical Chemistry, 47<sup>th</sup> ed., Vishal Publishing Company, 2016.

2. Sharma K.K. and Sharma L.K., A Text Book of Physical Chemistry, 6<sup>th</sup> ed., S.Chand, 2016.

### Books for References

1. Maron S.H. and Lando J.B. Fundamentals of Physical Chemistry, Macmillan.

2. Glasstone S. and Lewis. D., Elements of Physical Chemistry, Macmillan

3. Khetarpal S.C. Pradeep Physical Chemistry, Volume I & II, Pradeep Publications Jalandhar, 2004.

4. Jain D.V.S. and Jainhar S.P., Physical Chemistry, Principles and Problems, Tata Mc Graw Hill, New Delhi, 1988.

5. Bajpai D.N., Advanced Physical Chemistry, S.Chand Publishing, 2001.

6. Negi A.S. and Anand S.C., A Textbook of Physical Chemistry, John Wiley & Sons Pvt. Ltd., 1986.

6. Kalsi, P.S., Stereochemistry of Organic Compounds: Principles and Applications, New Age International, 2011
7. Sujata V Bhat, Nagasampagi B.A., and Meenakshi Sivakumar, Chemistry of Natural Products, Springer, 2006.
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#### UNIT V: ELECTROCHEMICAL CELLS (20 hrs )

Electrolytic & Galvanic cells - Reversible and irreversible cells. Conventional representation of electrochemical cells. Electromotive force of a cell and its measurement computation of E.M.F. calculation of thermodynamic quantities of cell reactions ( $\Delta G, \Delta H, \Delta S$  and  $K_{eq}$ ). Application of Gibbs Helmholtz equation. Calculation of E.M.F Nernst equation. Types of reversible electrodes - Gas/metal ion-metal/metal ion; metal/insoluble salt/anion and Redox electrodes. Electrode reactions

- Nernst equation - Derivation of electrode - reference electrode - Electrochemical series and junction potential. Application of activity co-efficient. Potentiometry and glass electrodes and electrochemical cells

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  5. Bajaj
  6. Negi

- Nernst equation - Derivation of cell E.M.F. and single electrode potential - standard hydrogen electrode - reference electrodes - standard electrode potentials - sign convention - Electrochemical series and its significance. Concentration cell with and without transport. Liquid junction potential. Application of EMF concentration cells. Valency of ion, solubility product and activity co-efficient. Potentiometric titrations. Determination of pH using Hydrogen, quinhydrone and glass electrodes. Determination of  $pK_a$  of acids by potentiometric method. Corrosion - general and electrochemical theory - passivity - prevention of corrosion.

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2. Sharma K.K. and Sharma L.K., A Text Book of Physical Chemistry, 6<sup>th</sup> ed., S.Chand, 2016.

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3. Khetarpal S.C. Pradeep Physical Chemistry, Volume I & II, Pradeep Publications Jalandhar, 2004.
4. Jain D.V.S. and Jainhar S.P., Physical Chemistry, Principles and Problems, Tata Mc Graw Hill, New Delhi, 1988.
5. Bajpai D.N., Advanced Physical Chemistry, S.Chand Publishing, 2001.
6. Negi A.S. and Anand S.C., A Textbook of Physical Chemistry, John Wiley & Sons Pvt. Ltd., 1986.

Semester	Subject Title	Subject Code	Total Hours	Credits
V	b) INDUSTRIAL CHEMISTRY		60	5

**UNIT 1: INDUSTRIAL REQUIREMENTS (12 hrs)**

Requirements of an industry - location - water - industrial water treatment - safety measures. Fuels - types of fuels with examples - coal - carbonization of coal - coal for liquid fuels - gaseous fuels - selection of fuels - nuclear fuels. Energy - sources - renewable and non-renewable energies - non conventional energies.

**UNIT 2: PETROCHEMICAL INDUSTRIES (12 hrs)**

Crude oil - constitution and distillation - composition of different distillates - ignition point octane number - cracking - catalysts used in petroleum industries - structure, applications. Manufacture of synthetic petrol - Dergius and Fischer Tropsh processes - Manufacture of petrochemicals and petrochemical polymers - Manufacture of higher olefins, Acetic acid, Phenol, Carbon disulphide, Vinyl acetate, Butane diols, Xylenes.

**UNIT 3: FERTILIZERS AND SPECIALITY CHEMICALS (12hrs)**

Manufacture - Properties and industrial uses of solvents - DMF, DMSO, THF and Fertilizers - Raw materials, manufacture (flow chart - chemical process with examples) ammonium nitrate, ammonium sulphate, urea, calcium cyanamide, calcium ammonium nitrate, ammonium chloride, ammonium phosphate, super phosphate of fertilizers.

**UNIT 4: OILS, SOAPS AND DETERGENTS (12hrs)**

Oils - difference between oils and fats - manufacture of cotton seed oil and soy manufacture of soaps - toilet and transparent soaps - Detergents - synthetic detergents - active agents and their classification - manufacture of anionic, cationic and non ionic detergents and shampoo.

**UNIT 5: METALLURGY (12hrs)**

General methods of metallurgy - ores - types - methods of concentration of ores - hydrometallurgy - various of reduction process, refining of metals - extraction of Cr, Mn, U and Th. Environmental problems of chemical industries - methods of control - sewage and waste management. Man power in chemical industries - labour problems - Six concept only).



# University of Madras

**Chepauk, Chennai 600 020**

[Est. 1857, State University, NAAC 'A' Grade, CGPA 3.32, NIRF 2019 Rank: 20]

Website: [www.unom.ac.in](http://www.unom.ac.in), Tel. 044-2539 9000

**Undergraduate Programme**

**In**

**Books for Reference**

1. Sharma B.K., Industrial Chemistry, Goel Publishing House, Meerut, 2003.
2. Drydence C.E., Outlines of Chemical Technology, Gopala Rao, Eastwest Press, New Delhi.
3. Shreve R. V., Chemical Process Industries, Tata Mc Graw Hill publishing company, Mumbai.
4. Steines H., Introduction to Petrochemicals, Pergaman Press.
5. Alan Cottrel, An Introduction to Metallurgy, Orient Longman, 2000.
6. James A. Kent, Riegel's Handbook of Industrial Chemistry, Springer Science & Business Media, 2013.
7. Davis K.H., Handbook of Industrial Chemistry, Vol2, CBS Publishers & Distributors, 2004.

**ELECTIVE - II**

a) Nanomaterials and Green Chemistry OR b) Polymer Chemistry

	Subject Title	Subject Code	Total Hours	Credit
Semester	NANOMATERIALS AND GREEN		60	5



Semester	Subject Title	Subject Code	Total Hours	Credits
V	b) INDUSTRIAL CHEMISTRY		60	5

**UNIT 1: INDUSTRIAL REQUIREMENTS (12 hrs)**

Requirements of an industry - location - water - industrial water treatment - safety measures. Fuels - types of fuels with examples - coal - carbonization of coal - coal for liquid fuels - gaseous fuels - selection of fuels - nuclear fuels. Energy - sources - renewable and non-renewable energies - non conventional energies.

**UNIT 2: PETROCHEMICAL INDUSTRIES (12 hrs)**

Crude oil - constitution and distillation - composition of different distillates - ignition point octane number - cracking - catalysts used in petroleum industries - structure, applications. Manufacture of synthetic petrol - Dergius and Fischer Tropsh processes - Manufacture of petrochemicals and petrochemical polymers - Manufacture of higher olefins, Acetic acid, Phenol, Carbon disulphide, Vinyl acetate, Butane diols, Xylenes.

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- 1. Sharma B.K., Industrial Chemistry, Goel Publishing House, Meerut, 2003.
- 2. Drydse C.E., Outlines of Chemical Technology, Gopala Rao, Eastwest Press, New Delhi.
- 3. Shreve R. V., Chemical Process Industries, Tata Mc Graw Hill publishing company, Mumbai.
- 4. Steines H., Introduction to Petrochemicals, Pergaman Press.
- 5. Alan Cottrel, An Introduction to Metallurgy, Orient Longman, 2000.
- 6. James A. Kent, Riegel's Handbook of Industrial Chemistry, Springer Science & Business Media, 2013.
- 7. Davis K.H., Handbook of Industrial Chemistry, Vol2, CBS Publishers & Distributors, 2004.

**ELECTIVE - II**

a) Nanomaterials and Green Chemistry OR b) Polymer Chemistry

	Subject Title	Subject Code	Total Hours	Credit
Semester	NANOMATERIALS AND GREEN		60	5

**REFERENCES**

1. Anon. P.T. and Winter J.C. Green Chemistry, New Delhi.
2. Ahluwalia V.K. Green Chemistry, New Delhi.
3. Thomas J.M., Thomas M.L. John Principles and practice of heteroatom chemistry, A textbook of organometallic chemistry, 2nd ed., Butterworths, London, 1963.
4. Murray S. Shankar, Rajit, Rathil G., Murday J., nanotechnology, Springer Science and Business Media, 2013
5. Manoj Karkare, Nanotechnology: Fundamentals and Applications, I K International Publishing House, 2008.
6. Ahluwalia V.K., Kulwal, M., New trends in Green Chemistry, 1<sup>st</sup> ed., Ananaya Publications (Pvt), 2004.

Semester	Subject Title	Subject Code	Total Hours	Credit
V	D) POLYMER CHEMISTRY		60	5

**UNIT 1 (12 hrs)**

Introduction to polymers – general characteristics of polymers in comparison with common organic compounds. Basic concept of monomers and polymers. Classification of polymers – natural and synthetic polymers. Distinction between plastics, elastomers and fibres. Types of polymers: thermoplastics and thermosetting plastics. Geometrical structures of polymer molecules: microstructures – chemical structures – geometrical structures – Cross-linked polymers, stereoregular polymers.

Mechanism of polymerization: chain polymerization, free radical polymerization, ionic and coordination polymerization. Polyaddition and polycondensation polymerization, ring opening and group transfer polymerization.

**Unit 2 (12 hrs)**

Molecular weight of polymers – number average, weight average and viscosity average. Determination of polymer molecular weights – Osmometry (membrane, vapour phase), Viscometry, methods. Light scattering and ultra centrifugation methods. Molecular weight and degree of polymerization – practical significance of polymer molecular weight.

Glass transition temperature – transition and associated properties – factors affecting Glass transition temperature- importance - glass transition temperature of copolymers. Polymer crystallinity – crystallisability – effect of crystallinity on properties .

**Unit 3 (12 hrs)**

Industrially important polymers – preparation, properties and applications. Polyethylene, polypropylene, polyamides, polyvinylchloride, polymethylmethacrylate, polyesters, polycarbonates, polyurethanes, phenol – formaldehyde, melamine – formaldehyde, polysilanes, polyaniline

**Unit 4 (12 hrs)**

Degradation of polymers by thermal – oxidative, mechanical and photodegradation methods. Polymerisation techniques – bulk, solution, suspension, emulsion, polycondensation and interfacial polycondensation.

Polymer processing – compression moulding, casting, extrusion, fibre spinning, injection moulding, thermoforming, vulcanization of elastomers.

**Unit 5 (12 hrs)**

Polymer reactions – hydrolysis, Acidolysis, Aminolysis, hydrogenation, addition and substitution cyclisation reactions – crosslinking reactions.

Natural polymers - Rubber, Silk, Cellulose – structure and applications

Supramolecular polymers – introduction – properties – applications.

**REFERENCES**

1. Billmeyer, F.W. Textbook of polymer Science, 3<sup>rd</sup> ed., John Wiley and Sons, 1984.
2. Gowariker, V.R., Viswanathan, N.V. and Sreedhar, J., Polymer Science, 3<sup>rd</sup> ed., New Age International Publishers, New Delhi, 2015.
3. Sharma, B.K. Polymer Chemistry, Geel Publishing House, Meerut, 2014.
4. Odian, G., Principles of Polymerization, 4<sup>th</sup> ed., John Wiley, 2004.





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## **Undergraduate Programme In Computer Science**

**Syllabus for  
B.Sc Computer Science  
(With effect from the Academic Year 2020-21)**

**February 2020**

**Learning Outcome Based Curriculum Framework**

**Note: The Committee is designed Learning Outcome Based Curriculum Framework of Under Graduate Computer Science Programmes prescribed by UGC**

## **I Preamble**

Bachelor of Computer Science is a 3 – Year Under Graduate Programme spread over six semesters. The course is designed to achieve high degree of technical skills in Problem solving and application development. The course develops requisite professional skills and problem solving abilities for pursuing a successful career in software industry and forms the required basics for pursuing higher studies in Computer Science.

## **II Course Objectives**

- Acquisition of Knowledge and understanding of system, various programming languages and tools required for effective computation based problem solving.
- Utilize emerging technological tools learn, adapt and successfully rite effective procedural coding meeting the needs of technical and societal challenges
- Attain sufficient knowledge related to computer domains, possesses technical, soft and hard skills and apply them effectively in team work
- Empower the students with competencies in creative thinking and problem solving, inter-personal communication and managerial skills.

## **III Graduate Attributes**

- Computational Knowledge
- Problem analysis & Solving
- Design & Development of Solutions
- Modern tool usage
- Communication skills
- Innovation & Entrepreneurship
- Societal & environmental concern

## **IV Course Outcomes**

After Completion of the course, the students are expected to

- Understand the basic principles and concepts of Computer Science and integrate the knowledge gained in Computer Science domain with practical needs of the society and be an ethically and socially responsible Computer Science Professional
- Explore emerging technologies in diverse areas of Computer Science and inculcate skills for successful career, entrepreneurship and higher studies
- Apply the concepts of Computer and practices via emerging technologies and Software development tools

## **Course Structure**

# B.Sc COMPUTER SCIENCE

## SYLLABUS

**2020-21**

S.NO.	PART	SUBJECT NAME	CREDITS	MAXIMUM MARKS		
				EXTERNAL MARKS	INTERNAL MARKS	TOTAL
<b>SEMESTER I</b>						
1	I	Tamil/ Other languages – I	3	75	25	100
2	II	English - I	3	75	25	100
3	III	Core I : Problem Solving using Python	4	75	25	100
4	III	Practical I : Problem Solving using Python Lab	3	60	40	100
5	III	Allied I: Mathematics I	5	75	25	100
6	IV	Basic Tamil/Advanced Tamil/Non Major Elective I	2	75	25	100
7	IV	Soft Skill I	3	50	50	100
		<b>Total Credits</b>	<b>23</b>			
<b>SEMESTER II</b>						
8	I	Tamil/ Other languages – II	3	75	25	100
9	II	English - II	3	75	25	100
10	III	Core II : Computer Organization	4	75	25	100
11	III	Practical II : Computer Organization Lab	3	60	40	100
12	III	Allied II: Mathematics II	5	75	25	100
13	IV	Basic Tamil/Advanced Tamil/Non Major Elective II	2	75	25	100
14	IV	Soft Skill II	3	50	50	100
		<b>Total Credits</b>	<b>23</b>			
<b>SEMESTER III</b>						
15	I	Tamil/ Other languages – III	3	75	25	100
16	II	English - III	3	75	25	100
17	III	Core III : Java and Data Structures	4	75	25	100
18	III	Practical III : Data Structures using Java Lab	3	60	40	100
19	III	Allied III: Physics I / Statistics I	5	75	25	100
20	IV	Soft Skill III	3	50	50	100
21	IV	Environmental Studies		Examination will be held in Semester IV		
		<b>Total Credits</b>	<b>21</b>			
<b>SEMESTER IV</b>						
22	I	Tamil/ Other languages – IV	3	75	25	100
23	II	English - IV	3	75	25	100
24	III	Core IV : Web technology	4	75	25	100
25	III	Practical IV : Web Technology Lab	3	60	40	100
26	III	Allied IV: Physics II / Statistics II	5	75	25	100
27	IV	Soft Skill IV	3	50	50	100
28	IV	Environmental Studies	2	75	25	100

		<b>Total Credits</b>	<b>23</b>			
<b>SEMESTER V</b>			<b>CREDITS</b>	<b>EXTERNAL MARKS</b>	<b>INTERNAL MARKS</b>	<b>TC</b>
29	III	Core V: Computer Network	4	75	25	1
30	III	Core VI: Operating System	5	75	25	1
31	III	Core VII: Relational Database Management System	4	75	25	1
32	III	Practical V: Operating System Lab	3	60	40	1
33	III	Practical VI : PL/SQL Lab	3	60	40	1
34	III	Elective I	5	75	25	1
35	IV	Value Education	2			
		<b>Total Credits</b>	<b>26</b>			
<b>SEMESTER VI</b>			<b>CREDITS</b>	<b>EXTERNAL MARKS</b>	<b>INTERNAL MARKS</b>	<b>TC</b>
36	III	Core VIII: Software Engineering	4	75	25	1
37	III	Core IX: Introduction to Data Science	5	75	25	1
38	III	Core X: Introduction to Cloud Computing	4	75	25	1
39	III	Practical VII: CASE Tools and Testing tools Lab	3	60	40	1
40	III	Elective II	5	75	25	1
41	III	Practical VIII : Mini Project	5	60	40	1
42	V	Extension Activities	1			
		<b>Total Credits</b>	<b>27</b>			
		<b>Total credits ( Core, Elective, SBS)</b>	<b>143</b>			
<b>Non Major Elective I - I Semester</b>						
Web Application Office Automation HTML						
<b>Non Major Elective II – II Semester</b>						
Web Application Lab Office Automation Lab HTML Lab						
<b>Elective I</b>						
Artificial Intelligence and Expert System Graphics and Visualization Network Security						
<b>Elective II</b>						
Mobile Computing IOT and its Applications Block chain Technology						

## CORE - I

## PROBLEM SOLVING USING PYTHON

I YEAR / I SEM

### OBJECTIVES:

- Describe the core syntax and semantics of Python programming language.
- Discover the need for working with the strings and functions.
- Illustrate the process of structuring the data using lists, dictionaries, tuples and sets.
- Understand the usage of packages and Dictionaries.



## OUTCOMES:

- To Understand the principles of Python and acquire skills in programming in python
- To develop the emerging applications of relevant field using Python
- Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.
- Able to develop simple turtle graphics programs in Python

## UNIT – I

Introduction: The essence of computational problem solving – Limits of computational problem solving-Computer algorithms-Computer Hardware-Computer Software-The process of computational problem solving-Python programming language - Literals - Variables and Identifiers - Operators - Expressions and Data types.

## UNIT - II

Control Structures: Boolean Expressions - Selection Control - If Statement- Indentation in Python- Multi-Way Selection -- Iterative Control- While Statement- Infinite loops- Definite vs. Indefinite Loops- Boolean Flags and Indefinite Loops. Lists: List Structures - Lists in Python - Iterating over lists in Python.

## UNIT - III

Functions: Program Routines- Defining Functions- More on Functions: Calling Value-Returning Functions- Calling Non-Value-Returning Functions- Parameter Passing - Keyword Arguments in Python - Default Arguments in Python-Variable Scope. **UNIT - V**

Objects and their use: Software Objects - Turtle Graphics – Turtle attributes-Modular Design: Modules - TopDown Design - Python Modules - Text Files: Opening, reading and writing text files - String Processing - Exception Handling. **UNIT - V**

Dictionaries and Sets: Dictionary type in Python - Set Data type. Object Oriented Programming using Python: Encapsulation - Inheritance – Polymorphism. Recursion: Recursive Functions.

## TEXT BOOK:

1. Charles Dierbach, "Introduction to Computer Science using Python - A computational Problem solving Focus", Wiley India Edition, 2015.

## REFERENCE BOOKS:

1. Mark Lutz, "*Learning Python Powerful Object Oriented Programming*", O'reilly Media 2018, 5<sup>th</sup> Edition.
2. Timothy A. Budd, "*Exploring Python*", Tata MCGraw Hill Education Private Limited 2011, 1<sup>st</sup> Edition.
3. Allen Downey, Jeffrey Elkner, Chris Meyers, "*How to think like a computer scientist: learning with Python*", 2012.
4. Sheetal Taneja & Naveen kumar, "*Python Programming a Modular approach – A Modular approach with Graphics, Database, Mobile and Web applications*", Pearson, 2017.
5. Ch Satyanarayana M Radhika Mani, B N Jagadesh, "*Python programming*", Universities Press 2018.

## WEB REFERENCES

- <http://interactivepython.org/courselib/static/pythonds>
- <http://www.ibiblio.org/g2swap/byteofpython/read/>
- <http://www.diveintopython3.net/>
- <http://greenteapress.com/wp/think-python-2e/>

- NPTEL & MOOC courses titled Python programming
- [http://spoken-tutorial.org/tutorial-search/?search\\_foss=Python&search\\_language=English](http://spoken-tutorial.org/tutorial-search/?search_foss=Python&search_language=English) ➤
- <http://docs.python.org/3/tutorial/index.html>

# I PYTHON PROGRAMMING LAB

I YEAR / I SEM

- To implement the python programming features in practical applications.
- To write, test, and debug simple Python programs.
- To implement Python programs with conditionals and loops.
- Use functions for structuring Python programs.
- Represent compound data using Python lists, tuples, dictionaries , turtles, Files and modules.

## OUTCOMES:

- Understand the numeric or real life application problems and solve them.
- Apply a solution clearly and accurately in a program using Python.
- Apply the best features available in Python to solve the situational problems.

## LIST OF EXERCISES:

1. Program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. Program to calculate total marks, percentage and grade of a student. Marks obtained in each of the five subjects are to be input by user. Assign grades according to the following criteria:  
Grade A: Percentage  $\geq 80$       Grade B: Percentage  $\geq 70$  and  $< 80$   
Grade C: Percentage  $\geq 60$  and  $< 70$       Grade D: Percentage  $\geq 40$  and  $< 60$   
Grade E: Percentage  $< 40$
3. Program, to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
4. Program to display the first n terms of Fibonacci series.
5. Program to find factorial of the given number using recursive function.
6. Write a Python program to count the number of even and odd numbers from array of N numbers.
7. Python function that accepts a string and calculate the number of upper case letters and lower case letters.
8. Python program to reverse a given string and check whether the give string is palindrome or not.
9. Write a program to find sum of all items in a dictionary.
10. Write a Python program to construct the following pattern, using a nested loop 1  
22  
333  
4444  
55555  
666666  
7777777  
88888888  
999999999
11. Read a file content and copy only the contents at odd lines into a new file.
12. Create a Turtle graphics window with specific size.
13. Write a Python program for Towers of Hanoi using recursion
14. Create a menu driven Python program with a dictionary for words and their meanings.
15. Devise a Python program to implement the Hangman Game.

## **CORE - II**

## **COMPUTER ORGANIZATION**

**I YEAR / II SEM**

### **OBJECTIVES:**

- To understand the basic organization of computers and the working of each component and CPU
- To bring the programming features of 8085 Microprocessor and know the features of latest microprocessors.
- To understand the principles of Interfacing I/O devices and Direct Memory accesses

### **OUTCOMES:**

- Describe the major components of a computer system and state their function and purpose
- Describe the microstructure of a processor
- Demonstrate the ability to program a microprocessor in assembly language.
- Classify and describe the operation DMA and peripheral Interfaces.

### **UNIT - I**

Data representation: Data types – Complements- fixed point and floating point representation other binary codes. Register Transfer and Microoperations: Register transfer language- Register transfer- Bus and Memory transfers – Arithmetic, logic and shift micro operations.

### **UNIT - II**

Central processing unit: General register and stack organizations- instruction formats - Addressing modes- Data transfer and manipulation - program control- RISC - Pipelining - Arithmetic and instruction- RISC pipeline - Vector processing and Array processors.

### **UNIT - III**

Microprocessor Architecture and its Operations - 8085 MPU - 8085 Instruction Set and Classifications. Programming in 8085: Code conversion - BCD to Binary and Binary to BCD conversions - ASCII to BCD and BCD to ASCII conversions - Binary to ASCII and ASCII to Binary conversions.

### **UNIT - IV**

Programming in 8085:BCD Arithmetic - BCD addition and Subtraction - Multibyte Addition and Subtraction - Multiplication and Division. Interrupts: The 8085 Interrupt – 8085 Vectored Interrupts –

### **UNIT - V**

Direct Memory Access(DMA)and 8257 DMA controller - 8255A Programmable Peripheral Interface. Basic features of Advanced Microprocessors - Pentium - I3 , I5 and I7

### **TEXT BOOKS:**

1. M.M. Mano, "Computer System architecture". Pearson, Third Edition, 2007
2. R. S. Gaonkar- "Microprocessor Architecture- Programming and Applications with 8085"- 5<sup>th</sup> Edition- Penram- 2009.
3. Tripti Dodiya & Zakiya Malek, "Computer Organization and Advanced Microprocessors", Cengage Learning, 2012.

## REFERENCE BOOKS:

1. Mathur- "Introduction to Microprocessor"- 3<sup>rd</sup> Edition- Tata McGraw-Hill-1993.
2. P. K. Ghosh and P. R. Sridhar- "0000 to 8085: Introduction to Microprocessors for Engineers and Scientists"- 2<sup>nd</sup> Edition- PHI- 1995.
3. NagoorKani- "Microprocessor (8085) and its Applications"- 2<sup>nd</sup> Edition- RBA Publications- 2006.
4. V. Vijayendran- "Fundamentals of Microprocessors – 8085"- S. Viswanathan Pvt. Ltd.- 2008.

## WEB REFERENCES:

- NPTEL & MOOC courses titled Computer organization
- <https://nptel.ac.in/courses/106105163/>
- <https://nptel.ac.in/courses/106103068/>

## II COMPUTER ORGANIZATION LAB

I YEAR / II SEM

- To understand the programming features and operations of assembly language programs using 8085 microprocessor kit or Simulator

## OUTCOMES:

- Implement the arithmetic operations in assembly language programming
- Understand the programming logic of 8085 in various aspects

## LIST OF EXERCISES:

I : Addition and Subtraction

1. 8 - bit addition
2. 16 - bit addition
3. 8 - bit subtraction
4. BCD subtraction

II : Multiplication and Division

1. 8 - bit multiplication
2. BCD multiplication
3. 8 - bit division

III: Sorting and Searching

1. Searching for an element in an array.
2. Sorting in ascending order.
3. Finding largest and smallest elements from an array
4. Reversing array elements
5. Block move
6. Sorting in descending order

IV: Code Conversion

1. BCD to Hex and Hex to BCD
2. Binary to ASCII and ASCII to binary
3. ASCII to BCD and BCD to ASCII



### **TEXT BOOKS:**

1. E.Balagurusamy," *Programming with Java: A Primer*", Tata McGraw Hill 2014, 5th Edition.
2. Mark Allen Weiss, "*Data Structures and Algorithms Analysis in C++*", Person Education 2014, 4<sup>th</sup> Edition.

### **REFERENCES:**

1. Herbert Schildt, "*JAVA 2: The Complete Reference*", McGraw Hill 2018, 11th Edition.
2. Aho, Hopcroft and Ullman, "*Data Structures and Algorithms* ", Pearson Education 2003.
3. S. Sahni, "*Data Structures, Algorithms and Applications in JAVA*", Universities Press 2005, 2<sup>nd</sup> Edition

### **WEB REFERENCES:**

- NPTEL & MOOC courses titled Java and Data Structures
- <https://nptel.ac.in/courses/106106127/>
- <https://nptel.ac.in/courses/106105191/>

## **III DATA STRUCTURES USING JAVA LAB**

**II YEAR / III SEM**

- To implement linear and non-linear data structures
- To understand the different operations of search trees □ To implement graph traversal algorithms

### **OUTCOMES:**

- Write functions to implement linear and non-linear data structure operations.
- Suggest appropriate linear and non-linear data structure operations for solving a given problem.

### **LIST OF EXERCISES:**

1. Write a Java program to implement the Stack ADT using a singly linked list.
2. Write a Java program to implement the Queue ADT using a singly linked list.
3. Write a Java program for the implementation of circular Queue.
4. Write a Java program that reads an infix expression, converts into postfix form
5. Write a Java program to evaluate the postfix expression (use stack ADT).
6. Write a Java program to an Insert an element into a binary search tree.
7. Write a Java program to delete an element from a binary search tree.
8. Write a Java program to search for a key element in a binary search tree.
9. Write a Java program for the implementation of BFS for a given graph.

10. Write a Java program for the implementation of DFS for a given graph



# CORE - IV WEB TECHNOLOGY

II YEAR / IV SEM

## OBJECTIVES:

- To use PHP and MySQL to develop dynamic web sites for user on the Internet
- To develop web sites ranging from simple online information forms to complex e-commerce sites with MySQL database, building, connectivity, and maintenance

## OUTCOMES:

- Understand the general concepts of PHP scripting language for the development of Internet websites. □ Understand the basic functions of MySQL database program and XML concepts □ Learn the relationship between the client side and the server side scripts.

## UNIT - I

Introducing PHP – Basic development Concepts – Creating first PHP Scripts – Using Variable and Operators – Storing Data in variable – Understanding Data types – Setting and Checking variables Data types – Using Constants – Manipulating Variables with Operators.

## UNIT - II

Controlling Program Flow: Writing Simple Conditional Statements - Writing More Complex Conditional Statements – Repeating Action with Loops – Working with String and Numeric Functions.

## UNIT - III

Working with Arrays: Storing Data in Arrays – Processing Arrays with Loops and Iterations – Using Arrays with Forms - Working with Array Functions – Working with Dates and Times.

## UNIT - IV

Using Functions and Classes: Creating User-Defined Functions - Creating Classes – Using Advanced OOP Concepts. Working with Files and Directories: Reading Files-Writing Files- Processing Directories.

## UNIT - V

Working with Database and SQL : Introducing Database and SQL- Using MySQL-Adding and modifying DataHandling Errors – Using SQLite Extension and PDO Extension. Introduction XML - Simple XML and DOM Extension.

## TEXT BOOK:

1. VikramVaswani, *"PHP A Beginner's Guide"*, Tata McGraw Hill 2008.

## REFERENCE BOOKS:

1. Steven Holzner , *"The PHP Complete Reference"*, Tata McGraw Hill, 2007. 2. Steven Holzer , *"Spring into PHP"*, Tata McGraw Hill 2011, 5thEdition.

## WEB REFERENCES:

➤ <https://www.w3schools.com/php/>

## CORE - IV

- <https://www.phptpoint.com/php-tutorial-pdf/>
- <http://www.xmlsoftware.com/>

## IV

## WEB TECHNOLOGY LAB

II YEAR / IV SEM

### OBJECTIVES:

1. The objectives of this course are to have a practical understanding about how to write PHP code to solve problems.
2. Display and insert data using PHP and MySQL.
3. Test, debug, and deploy web pages containing PHP and MySQL.
4. It also aims to introduce practical session to develop simple applications using PHP and MySQL.

### OUTCOMES:

- On the completion of this laboratory course the students ought to □ Obtain knowledge and develop application programs using Python.
- Create dynamic Web applications such as content management, user registration, and e-commerce using PHP and to understand the ability to post and publish a PHP website.
- Develop a MySQL database and establish connectivity using MySQL.

### LIST OF PRACTICALS

1. Write a PHP program which adds up columns and rows of given table
2. Write a PHP program to compute the sum of first n given prime numbers
3. Write a PHP program to find valid an email address
4. Write a PHP program to convert a number written in words to digit.
5. Write a PHP script to delay the program execution for the given number of seconds.
6. Write a PHP script, which changes the colour of the first character of a word
7. Write a PHP program to find multiplication table of a number.
8. Write a PHP program to calculate Factorial of a number.
9. Write a PHP script to read a file, reverse its contents, and write the result back to a new file
10. Write a PHP script to look through the current directory and rename all the files with extension .txt to extension .xtx.
11. Write a PHP script to read the current directory and return a file list sorted by last modification time. (*using filemtime()*)
12. Write a PHP code to create a student mark sheet table. Insert, delete and modify records.
13. From a XML document (email.xml), write a program to retrieve and print all the e-mail addresses from the document using XML
14. From a XML document (tree.xml), suggest three different ways to retrieve the text value 'John' using the DOM:

## **CORE - V**

15. Write a program that connects to a MySQL database and retrieves the contents of any one of its tables as an XML file. Use the DOM

## **COMPUTER NETWORK**

**III YEAR / V SEM**

### **OBJECTIVES:**

- To understand the concept of Computer network
- To impart knowledge about networking and inter networking devices

### **OUTCOMES:**

- Analyze different network models
- Describe, analyze and compare a number of data link, network and transport layer
- Analysing key networking protocols and their hierarchical relationship in the conceptual model like TCP/IP and OSI

### **UNIT - I**

Introduction – Network Hardware - Software - Reference Models - OSI and TCP/IP Models - Example Networks: Internet, ATM, Ethernet and Wireless LANs - Physical Layer - Theoretical Basis for Data Communication - Guided Transmission Media.

### **UNIT - II**

Wireless Transmission - Communication Satellites - Telephone System: Structure, Local Loop, Trunks and Multiplexing and Switching. Data Link Layer: Design Issues - Error Detection and Correction.

### **UNIT - III**

Elementary Data Link Protocols - Sliding Window Protocols - Data Link Layer in the Internet - Medium Access Layer - Channel Allocation Problem - Multiple Access Protocols - Bluetooth.

### **UNIT - IV**

Network Layer - Design Issues - Routing Algorithms - Congestion Control Algorithms - IP Protocol - IP Addresses - Internet Control Protocols.

### **UNIT - V**

Transport Layer - Services - Connection Management - Addressing, Establishing and Releasing a Connection - Simple Transport Protocol - Internet Transport Protocols (ITP) - Network Security: Cryptography.

### **TEXT BOOK :**

1. A. S. Tanenbaum, "*Computer Networks*", Prentice-Hall of India 2008, 4<sup>th</sup> Edition.

### **REFERENCE BOOKS:**

## **CORE - VI**

1. Stallings, "*Data and Computer Communications*", Pearson Education 2012, 7<sup>th</sup> Edition.
2. B. A. Forouzan, "*Data Communications and Networking*", Tata McGraw Hill 2007, 4<sup>th</sup> Edition.
3. F. Halsall, "*Data Communications, Computer Networks and Open Systems*", Pearson Education 2008.
4. D. Bertsekas and R. Gallager, "*Data Networks*", PHI 2008, 2<sup>nd</sup> Edition.
5. Lamarca, "*Communication Networks*", Tata McGraw Hill 2002.

### **WEB REFERENCES:**

- NPTEL & MOOC courses titled Computer Networks
- <https://nptel.ac.in/courses/106106091/>

# OPERATING SYSTEM

III YEAR / V

## OBJECTIVES:

- To understand the fundamental concepts and role of Operating System.
- To learn the Process Management and Scheduling Algorithms
- To understand the Memory Management policies
- To gain insight on I/O and File management techniques

## OUTCOMES:

- Understand the structure and functions of Operating System
- Compare the performance of Scheduling Algorithms
- Analyze resource management techniques

## UNIT - I

Introduction: Views - Types of System - OS Structure – Operations - Services – Interface- System Calls- System Structure - System Design and Implementation. Process Management: Process - Process Scheduling - Inter-process Communication. CPU Scheduling: CPU Schedulers - Scheduling Criteria - Scheduling Algorithms.

## UNIT - II

Process Synchronization: Critical- Section Problem - Synchronization Hardware Semaphores - Classical Problems of Synchronization - Monitors. Deadlocks: Characterization - Methods for Handling Deadlocks - Deadlock Prevention - Avoidance - Detection - Recovery.

## UNIT - III

Memory Management: Hardware - Address Binding – Address Space - Dynamic Loading and Linking – Swapping – Contiguous Allocation - Segmentation - Paging – Structure of the Page Table.

## UNIT - IV

Virtual Memory Management: Demand Paging - Page Replacement Algorithms - Thrashing. File System: File Concept -. Access Methods - Directory and Disk Structure - Protection - File System Structures - Allocation Methods - Free Space Management.

## UNIT - V

I/O Systems: Overview - I/O Hardware - Application I/O Interface - Kernel I/O Subsystem - Transforming I/O Requests to Hardware Operations - Performance. System Protection: Goals - Domain - Access matrix. System Security: The Security Problem - Threats – Encryption- User Authentication.

## TEXT BOOK:

1. Abraham Silberschatz, Peter B Galvin, Greg Gagne, *“Operating System Concepts”*, Wiley India Pvt. Ltd 2018, 9<sup>th</sup> Edition,.

## REFERENCES:

1. William Stallings, *“Operating Systems Internals and Design Principles”*, Pearson, 2018, 9<sup>th</sup> Edition.
2. Andrew S. Tanenbaum, Herbert Bos, *“Modern Operating Systems”*, Pearson 2014, 4<sup>th</sup> Edition.

## CORE - VIII

### WEB REFERENCES:

- NPTEL & MOOC courses titled Operating Systems
- <https://nptel.ac.in/courses/106106144/>

# RELATIONAL DATABASE MANAGEMENT SYSTEM

III YEAR / V SEM

### OBJECTIVES:

- Gain a good understanding of the architecture and functioning of Database Management Systems □ Understand the use of Structured Query Language (SQL) and its syntax.
- Apply Normalization techniques to normalize a database.
- Understand the need of transaction processing and learn techniques for controlling the consequences of concurrent data access.

### OUTCOMES:

- Describe basic concepts of database system
- Design a Data model and Schemas in RDBMS
- Competent in use of SQL
- Analyze functional dependencies for designing robust Database

### UNIT - I

Introduction to DBMS– Data and Information - Database – Database Management System – Objectives - Advantages – Components - Architecture. ER Model: Building blocks of ER Diagram – Relationship Degree – Classification – ER diagram to Tables – ISA relationship – Constraints – Aggregation and Composition – Advantages

### UNIT - II

Relational Model: CODD's Rule- Relational Data Model - Key - Integrity – Relational Algebra Operations – Advantages and limitations – Relational Calculus – Domain Relational Calculus - QBE.

### UNIT - III

Structure of Relational Database. Introduction to Relational Database Design - Objectives – Tools – Redundancy and Data Anomaly – Functional Dependency - Normalization – 1NF – 2NF – 3NF – BCNF. Transaction Processing – Database Security.

### UNIT - IV

SQL: Commands – Data types – DDL - Selection, Projection, Join and Set Operations – Aggregate Functions – DML – Modification - Truncation - Constraints – Subquery.

### UNIT - V

PL/SQL: Structure - Elements – Operators Precedence – Control Structure – Iterative Control - Cursors - Procedure - Function - Packages – Exceptional Handling - Triggers.

### TEXT BOOK:

1. S. Sumathi, S. Esakkirajan, “*Fundamentals of Relational Database Management System*”, Springer International Edition 2007.

## **CORE - IX**

### **REFERENCE BOOKS:**

1. Abraham Silberchatz, Henry F. Korth, S. Sudarshan, *"Database System Concepts"*, McGrawHill 2019, 7<sup>th</sup> Edition.
2. Alexis Leon & Mathews Leon, *"Fundamentals of DBMS"*, Vijay Nicole Publications 2014, 2<sup>nd</sup> Edition.

### **WEB REFERENCES:**

- NPTEL & MOOC courses titled Relational Database Management Systems
- <https://nptel.ac.in/courses/106106093/>
- <https://nptel.ac.in/courses/106106095/>

## **PRACTICAL V OPERATING SYSTEM LAB**

**III YEAR / V**

### **OBJECTIVES:**

- To learn Process management and scheduling.
- To understand the concepts and implementation of memory management policies.
- To understand the various issues in Inter Process Communication.

### **OUTCOMES:**

- Understand the process management policies and scheduling process by CPU.
- Analyze the memory management and its allocation policies.
- To evaluate the requirement for process synchronization.

### **PROGRAM LIST:**

1. Basic I/O programming.  
To implement CPU Scheduling Algorithms:
2. Shortest Job First Algorithm.
3. First Come First Served Algorithm.
4. Round Robin and Priority Scheduling Algorithms.
5. To implement reader/writer problem using semaphore.
6. To implement Banker's algorithm for Deadlock avoidance. Program for page replacement algorithms:
7. First In First Out Algorithm.
8. Least Recently Used Algorithm.
9. To implement first fit, best fit and worst fit algorithm for memory management.
10. Program for Inter-process Communication.

**CORE - X**



## **PRACTICAL - VI**

## **PL/SQL LAB**

### **III YEAR / V SEM OBJECTIVES:**

- Learn the various DDL and DML commands
- Understand queries in SQL to retrieve information from data base
- Understand PL/SQL statements: Exception Handling, Cursors, and Triggers. □ Develop database applications using front-end and back-end tools.□

### **OUTCOMES:**

- Implement the DDL , DML Commands and Constraints
- Create, Update and query on the database.□
- Design and Implement simple project with Front End and Back End.□

### **LIST OF EXERCISES**

- 1) DDL commands with constraints.
- 2) DML Commands with constraints.
- 3) SQL Queries: Queries, sub queries, Aggregate function
- 4) PL/SQL : Exceptional Handling
- 5) PL/SQL : Cursor
- 6) PL/SQL : Trigger
- 7) PL/SQL : Packages
- 8) Design and Develop Application for Library Management
- 9) Design and Develop Application for Student Mark Sheet Processing 10) Design and Develop Application for Pay Roll Processing

## **CORE - VIII SOFTWARE ENGINEERING**

### **III YEAR / VI**

### **OBJECTIVES:**

- To introduce the software development life cycles
- To introduce concepts related to structured and object oriented analysis & design co
- To provide an insight into UML and software testing techniques

### **OUTCOMES:**

- The students should be able to specify software requirements, design the software using tools □ To write test cases using different testing techniques.

### **UNIT- I**

Introduction – Evolution – Software Development projects – Emergence of Software Engineering.

Software Life cycle models – Waterfall model – Rapid Application Development – Agile Model – Spiral Model

## **UNIT- II**

Requirement Analysis and Specification – Gathering and Analysis – SRS – Formal System Specification

## **UNIT- III**

Software Design – Overview – Characteristics – Cohesion & Coupling – Layered design – Approaches Function Oriented

Design – Structured Analysis – DFD – Structured Design – Detailed design

## **UNIT- IV**

Object Modeling using UML – OO concepts – UML – Diagrams – Use case, Class, Interaction, Activity, State Chart – Postscript

## **UNIT- V**

Coding & Testing – coding – Review – Documentation – Testing – Black-box, White-box, Integration, OO Testing, Smoke testing.

### **TEXT BOOK:**

1. Rajib Mall, "*Fundamentals of Software Engineering*", PHI 2018, 5th Edition.

### **REFERENCE BOOKS:**

1. Roger S. Pressman, "*Software Engineering - A Practitioner's Approach*", McGraw Hill 2010, 7th Edition.
2. Pankaj Jalote, "*An Integrated Approach to Software Engineering*", Narosa Publishing House 2011, 3rd Edition.

### **WEB REFERENCES:**

- NPTEL online course – Software Engineering - <https://nptel.ac.in/courses/106105182/>

## **CORE IX INTRODUCTION TO DATA SCIENCE**

**III YEAR / VI SEM**

### **OBJECTIVES:**

- To introduce the concepts, techniques and tools with respect to the various facets of data science practice, including data collection and integration, exploratory data analysis, predictive modeling, descriptive modeling and effective communication.

#### **OUTCOMES:**

- To describe what Data Science is, what Statistical Inference means, identify probability distributions, fit a model to data and use tools for basic analysis and communication

#### **UNIT-I**

Introduction to Data Science – Benefits and uses – Facets of data – Data science process – Big data ecosystem and data science

#### **UNIT-II**

The Data science process – Overview – research goals - retrieving data - transformation – Exploratory Data Analysis – Model building

#### **UNIT-III**

Algorithms - Machine learning algorithms – Modeling process – Types – Supervised – Unsupervised - Semi-supervised

#### **UNIT-IV**

Introduction to Hadoop – framework – Spark – replacing MapReduce– NoSQL – ACID – CAP – BASE – types

#### **UNIT-V**

Case Study – Prediction of Disease - Setting research goals - Data retrieval – preparation - exploration - Disease profiling - presentation and automation

#### **TEXT BOOK**

1. Davy Cielen, Arno D. B. Meysman, Mohamed Ali, *“Introducing Data Science”*, manning publications 2016.

#### **REFERENCE BOOKS**

1. Roger Peng, *“The Art of Data Science”*, lulu.com 2016.
2. MurtazaHaider, *“Getting Started with Data Science – Making Sense of Data with Analytics”*, IBM press, E-book.
3. Davy Cielen, Arno D.B. Meysman, Mohamed Ali, *“Introducing Data Science: Big Data, Machine Learning, and More, Using Python Tools”*, Dreamtech Press 2016.
4. Annalyn Ng, Kenneth Soo, *“Numsense! Data Science for the Layman: No Math Added”*, 2017, 1st Edition.
5. Cathy O'Neil, Rachel Schutt, *“Doing Data Science Straight Talk from the Frontline”*, O'Reilly Media 2013.
6. Lillian Pierson, *“Data Science for Dummies”*, 2017, 2<sup>nd</sup> Edition.

#### **WEB REFERENCES**

- NPTEL online course– Data Science for Engineers - <https://nptel.ac.in/courses/106106179/>



## CORE - X

## INTRODUCTION TO CLOUD COMPUTING

III YEAR / V I SEM

### OBJECTIVES:

- To understand the concepts in Cloud Computing and its Security
- To understand the evolving computer model caned cloud computing.
- To introduce the various levels of services that can be achieved by cloud.

### OUTCOMES:

- To explain and apply levels of services of Cloud □ To describe the security aspects in cloud.

### UNIT - I

Cloud Computing Foundation: Introduction to Cloud Computing – Move to Cloud Computing – Types of Cloud – Working of Cloud Computing

### UNIT - II

Cloud Computing Architecture : Cloud Computing Technology – Cloud Architecture – Cloud Modeling and Design - Virtualization : Foundation – Grid, Cloud and Virtualization – Virtualization and Cloud Computing

### UNIT - III

Data Storage and Cloud Computing : Data Storage – Cloud Storage – Cloud Storage from LANs to WANs – Cloud Computing Services : Cloud Services – Cloud Computing at Work

### UNIT - IV

Cloud Computing and Security : Risks in Cloud Computing – Data Security in Cloud – Cloud Security Services – Cloud Computing Tools : Tools and Technologies for Cloud – Cloud Mashaps – Apache Hadoop – Cloud Tools

### UNIT - V

Cloud Applications – Moving Applications to the Cloud – Microsoft Cloud Services – Google Cloud Applications – Amazon Cloud Services – Cloud Applications

### TEXT BOOK:u

1. A.Srinivasan and J.Suresh, *“Cloud Computing – A Practical Approach for Learning and Implementation”*, Pearson India Publications 2014.

### REFERENCE BOOK:

1. Rajkumar Buyya, James Broberg, Andrzej , *“Cloud Computing: Principles and Paradigms”*, Wiley India Publications 2011.

2. Arshdeep Bahga and Vijay Madiseti ,*“Cloud Computing – A Hands on Approach”*, Universities Press (India) Pvt Ltd. 2014.

#### **WEB REFERENCES:**

- NPTEL & MOOC courses titled Cloud computing
- <https://nptel.ac.in/courses/106105167/>

### **PRACTICAL - VII**

### **CASE TOOLS AND TESTING**

**III YEAR / VI SEM**

#### **OBJECTIVES:**

- To get familiarized to the usage of UML tool kit.
- To understand the requirements of the software and to map them appropriately to subsequent phases of the software development
- To develop the ability to verify and validate their designs

#### **OUTCOMES:**

- Students must be able to analyze and design the problem at hand.
- Students should be able to use UML tools for the designing the software and test the correctness and soundness of their software through testing tools.

#### **LIST OF EXERCISES:**

1. Using UML tools produce analysis and design models for
  - a. Library Management System
  - b. Automatic Teller Machine
  - c. Student Information Management
  - d. Matrimony Service
  - e. Stock Management System
2. Study of Open source testing tools (eg. Selenium, WATIS, Apache JMeter, TestNG )

**OBJECTIVES:**

The aim of the mini project is that the student has to understand the real time software development environment. The student should gain a thorough knowledge in the problem, he/she has selected and the language / software, he/she is using.

**Project planning:**

B.Sc (Computer Science / Software Application)/BCA Major Project is an involved exercise, which has to be planned well in advance. The topic should be chosen in the beginning of final year itself. Related reading training and discussions of first internal project viva voce should be completed in the first term of final year.

**I Selection of the project work**

Project work could be of three types.

**a) Developing solution for real life problem**

In this case a requirement for developing a computer-based solution already exists and the different stages of system development life cycle is to be implemented successfully. Examples are accounting software for particular organization, computerization of administrative function of an organization, web based commerce etc. **b) System Software Project**

Projects based on system level implementation. An example is a Tamil language editor with spell checker, compiler design.

**b) Research level project**

These are projects which involve research and development and may not be as structured and clear cut as in the above case. Examples are Tamil character recognition, neural net based speech recognizer etc. This type of projects provides more challenging opportunities to students.

**II Selection of team**

To meet the stated objectives, it is imperative that major project is done through a team effort. Though it would be ideal to select the team members at random and this should be strongly recommended, due to practical consideration students may also be given the choice of forming themselves into teams with three members. A team leader shall be selected. Team shall maintain the minutes of meeting of the team members and ensure that tasks have been assigned to every team member in writing. Team meeting minutes shall form a part of the project report. Even if students are doing project as groups, each one must independently take different modules of the work and must submit the report.

**III Selection of Tools**

No restrictions shall be placed on the students in the choice of platform/tools/languages to be utilized for their project work, though open source is strongly recommended, wherever possible. No value shall be placed on the use of tools in the evaluation of the project.

**IV Project management**

Head of the Department / Principal of the college should publish the list of student's project topic, internal guide and external organization and teams agreed before the end of July. Changes in this list may be permitted for valid reasons and shall be considered favorably by the Head of the department / Principal of the college any time before commencement of the project. Students should submit a fortnightly report of the progress, which could be indication of percentage of completion of the project work. The students should ideally keep a daily activity book. Team meeting should be documented and same should be submitted at the end of the project work.

**V Documentation**

Three copies of the project report must be submitted by each student (one for department library, one for the organization where the project is done and one for the student himself/herself). The final outer dimensions of the project report shall be 21cm X 30 cm. The color of the flap cover shall be light blue. Only hard binding should be done. The text of the report should be set in 12 pt, Times New Roman, 1.5 spaced.

Headings should be set as follows: CHAPTER HEADINGS 16 pt, Arial, Bold, All caps, Centered.

1. Section Headings 14 pt Bookman old style, Bold, Left adjusted.

1.1 Section Sub-heading 12 pt, Bookman old style.

Title of figures tables etc are done in 12 point, Times New Roman, Italics, centered.

Content of the Project should be relevant and specify particularly with reference to the work. The report should contain the requirement specification of the work, Analysis, Design, Coding, testing and Implementation strategies done.

- Organizational overview (of the client organization, where applicable)
- Description of the present system
- Limitations of the present system
- The Proposed system - Its advantages and features
- Context diagram of the proposed system
- Top level DFD of the proposed system with at least one additional level of expansion
- Program List (Sample code of major functions used)
- Files or tables (for DBMS projects) list. List of fields or attributes (for DBMS projects) in each file or table.
- Program – File table that shows the files/tables used by each program and the files are read, written to, updated, queried or reports were produced from them.
- Screen layouts for each data entry screen.
- Report formats for each report.

**Some general guidelines on documentation are:**

1. Certificate should be in the format: **”Certified that this report titled.....is a bonafide record of the project work done by Sri/ Kum .....under our supervision and guidance, towards partial fulfillment of the requirement for award of the Degree of B.Sc Computer Science/BCA of XXX College”** with dated signature of internal guide, external guide and also Head of the Department/ College.
2. If the project is done in an external organization, another certificate on the letterhead of the organization is required: **“Certified that his/her report titled .....is a bonafide record of the project work done by Sri/Kum.....under my supervision and guidance, at the .....department of..... (Organization) towards partial fulfillment of the requirement for the award of the Degree of B.Sc (Computer Science) / BCA of XXX College.**
3. Page numbers shall be set at right hand bottom, paragraph indent shall be set as 3.
4. Only 1.5 space need be left above a section or subsection heading and no space may be left after them.
5. References shall be IEEE format (see any IEEE magazine for detail) While doing the project keep note of all books you refer, in the correct format and include them in alphabetical order in your reference list.

## **VI Project Evaluation:**

### **Internal Assessment**

There shall be six components that will be considered in assessing a project work with weightage as indicated.

1. Timely completion of assigned tasks as evidenced by team meeting minutes 20%
2. Individual involvement, team work and adoption of industry work culture 10%
3. Quality of project documentation (Precision, stylistics etc) 10%



4. Achievement of project deliverables 20%
- 5 Effective technical presentation of project work 10%
6. Viva 30%

Based on the above 6 components internal mark (40) can be awarded.

### **External Assessment**

Dissertation/Project submitted at the end of third year shall be valued by two examiners appointed by the Controller for the conduct of practical exam. The board of examiners shall award 40 marks based on the following components.

1. Achievement of project deliverables - 20 Marks
2. Effective technical presentation of project work - 20 Marks
3. Project Viva - 20 Marks

There shall be a common written examination conducted for all the candidates in each group together for a minimum of 10 minutes.

- (i) Requirement Specification of Project
- (ii) Design of Project
- (iii) Testing and Implementation of Project

## **I WEB APPLICATION**

### **OBJECTIVES:**

- This course introduces the tools and menus to master PHOTOSHOP and Dream Weaver

### **OUTCOMES:**

- To design interactive Web pages
- To design small Web pages using PHOTOSHOP and Dream Weaver

### **UNIT I:**

Basics of Adobe Photoshop – Getting started with Photoshop – title bar – Menu bar - option bar – tool box – screen modes.

### **UNIT II:**

Introduction to digital Image editing , Create your own painted images – Edited scanned images – import rendered visuals – Working with images and colors

### **UNIT III:**

Using tools and palettes – selection tools, Painting and editing tools – menu commands – creating type – change the type settings – styles

### **UNIT IV:**

Methods and Techniques of Adobe Photoshop - Layers – working with layers – merging layers –linking layers – transforming layers and layer effects- filters

### **UNIT V:**

Getting started with Dreamweaver – creating web applications with Dreamweaver.

### **BOOKS FOR REFERENCE :**

1. Greenberg, *“Photoshop – The Complete reference”*, TMH.
2. *“Dream Weaver – Complete reference.*

## **NON MAJOR ELECTIVE -**

**I YEAR / I SEM**

### **WEB REFERENCE:**

- NPTEL & MOOC courses titled web application.
- <https://www.coursera.org/courses?query=web%20application>

## **I OFFICE AUTOMATION**

### **OBJECTIVES:**

- The major objective in introducing the Computer Skills course is to impart training for students in Microsoft Office which has different components like MS Word, MS Excel and Power point. The course is highly practice oriented rather than regular class room teaching.

### **OUTCOMES:**

- To perform documentation
- To perform accounting operations
- To perform presentation skills

### **UNIT - I**

Introductory concepts: History - Generation - Classification - Block diagram - Memory unit – CPU.

### **UNIT - II**

Input Devices: Key board, Mouse and Scanner. Output devices: Monitor, Printer. Introduction to Operating systems & its features: DOS – UNIX – Windows. Introduction to Programming Languages: C, C++ and its features.

### **UNIT - III**

Word Processing: Open, Save and close word document; Editing text – tools, formatting, bullets; Spell Checker - Document formatting – Paragraph alignment, indentation, headers and footers, numbering; printing – Preview, options, merge .

### **UNIT - IV**

Spreadsheets: Excel – opening, entering text and data, formatting, navigating; Formulas – entering, handling and copying; Charts – creating, formatting and printing.

### **UNIT - V**

Power point: Introduction to Power point - Features – Understanding slide types – creating & viewing slides – creating slide shows. Applying special object – including objects & pictures – Slide transition – Animation effects.

# NON MAJOR ELECTIVE -

I YEAR / I SEM

## TEXT BOOKS:

1. Alexis Leon and Mathews Leon, "*Fundamentals of information technology*", Leon Press 1999, 2nd Edition.
2. Peter Norton, "*Introduction to Computers*", Tata McGraw Hill.

## REFERENCE BOOK:

1. Jennifer Ackerman Kettel, Guy Hat-Davis and Curt Simmons, "*Microsoft 2003*", Tata McGraw Hill.

## WEB REFERENCE:

- NPTEL & MOOC courses titled Office Automation.
- [https://www.livewireindia.com/microsoftoffice\\_automation\\_software\\_training.php](https://www.livewireindia.com/microsoftoffice_automation_software_training.php)

## I HTML

### OBJECTIVE:

- This course introduces to the tags used in HTML

### OUTCOMES:

- To use Knowledge of HTML and the basic tools that every Web page coder needs to know
  - To implement modern Web pages with HTML

### UNIT I:

Introduction :Web Basics: What is Internet – Web browsers – What is Web page – HTML Basics: Understanding tags.

### UNIT II:

Tags for Document structure( HTML, Head, Body Tag). Block level text elements: Headings paragraph(<p> tag) – Font style elements: (bold, italic, font, small, strong, strike, big tags)

### UNIT III:

Lists: Types of lists: Ordered, Unordered – Nesting Lists – Other tags: Marquee, HR, BR- Using Images – Creating Hyperlinks.

### UNIT IV:

Tables: Creating basic Table, Table elements, Caption – Table and cell alignment – Rowspan, Colspan – Cell padding.

### UNIT V:

Frames: Frameset – Targeted Links – No frame – Forms : Input, Textarea, Select, Option.

## **NON MAJOR ELECTIVE -**

**I YEAR / I SEM**

### **RECOMMENDED TEXTS:**

1. Laura Lemay, "*HTML Complete Reference, Teach Yourself Web Publishing with HTML*".

### **REFERENCE BOOKS:**

1. E Stephen Mack, Janan Platt, "*HTML*".

### **WEB REFERENCE:**

- NPTEL & MOOC courses titled HTML.
- <https://www.codecademy.com/learn/learn-html>

## **NON MAJOR ELECTIVE - II**

## **WEB APPLICATION LAB**

**I YEAR / II SEM**

### **OBJECTIVE:**

- This course introduces the techniques used in Photoshop

### **OUTCOMES:**

- To build web applications targeting with single codebase.
- To use various features to build hybrid web application.

### **LIST OF EXERCISES:**

1. Working with the clone stamp tool
2. Drawing Watch using custom shapes
3. Testing lab mode
4. Using multichannel mode
5. Using the sponge Tool
6. Antique framing
7. Creating a supernova 8. Adding an arrowhead.
9. Isolating a Complex Image
10. Removing an element from an image
11. Captain kirk myopia effect
12. Adjusting the focus
13. Creating an edge mask
14. Applying Transformations
15. Correcting brightness and contrast.

## **NON MAJOR ELECTIVE - II**

## **OFFICE AUTOMATION LAB**

**II SEM**

### **OBJECTIVE:**

- To acquire knowledge on editor, spread sheet and presentation software.

### **OUTCOME:**

- To demonstrate the ability to apply application software in an office environment.

### **LIST OF EXERCISES:**

#### **MS-WORD**

1. Text Manipulation: Write a paragraph about your institution and Change the font size and type, Spell check, Aligning and justification of Text
2. Bio data: Prepare a Bio-data.

3. Find and Replace: Write a paragraph about yourself and do the following. Find and Replace - Use Numbering Bullets, Footer and Headers.
4. Tables and manipulation: Creation, Insertion, Deletion (Columns and Rows). Create a mark sheet.
5. Mail Merge: Prepare an invitation to invite your friends to your birthday party. Prepare at least five letters.

**MS-EXCEL**

1. Data sorting-Ascending and Descending (both numbers and alphabets) 2.

Mark list preparation for a student

3. Individual Pay Bill preparation.
4. Invoice Report preparation.
5. Drawing Graphs. Take your own table.

**MS-POWERPOINT**

1. Create a slide show presentation for a seminar.
2. Preparation of Organization Charts
3. Create a slide show presentation to display percentage of marks in each semester for all students
  1. Use bar chart(X-axis: Semester, Y-axis: % marks).
  2. Use different presentation template different transition effect for each slide.

**NON MAJOR ELECTIVE - II****HTML LAB****II SEM****OBJECTIVE:**

- This course introduces to the programming in HTML

**OUTCOME:**

- To implement modern Web pages with HTML

**LIST OF EXERCISES:**

1. Write a script to create an array of 10 elements and display its contents.
2. Create a simple calculator using form fields. Have two fields for number entry and one field for the result. Allow the user to be able to use plus, minus, multiply and divide.
3. Create a document and add a link to it. When the user moves the mouse over the link, it should load the linked document on its own. (user is not required to click on the link)
4. Create a document which opens a new window without a toolbar, address bar or a status bar that unloads itself after one minute.
5. Design an HTML page that includes document structure tags, title, line break, multiple headings and link to e-mail address.
6. Create an HTML file which is the main page with an image and some text messages along with hyperlinks which is linked to various pages. The navigation should be such that the links take you to the appropriate page and then back to the main page.
7. Create a HTML page to demonstrate the usage of Frames. Choose the content of the page on your own.

8. Design an application for pay slip through HTML forms.



## ELECTIVE

III YEAR / V SEM

# I ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEM

### OBJECTIVES:

- To Acquire Knowledge on various AI Techniques and Expert Systems
- To have enriched knowledge regarding heuristic search, Knowledge representation and Expert systems

### OUTCOMES:

- Gain a working knowledge of the foundations of and modern applications in, artificial intelligence heuristic search, knowledge representation and logic.

### UNIT - I

Introduction: AI Problems – AI techniques – Criteria for success. Problems, Problem Spaces, Search: State space search – Production Systems – Problem Characteristics – Issues in design of Search.

### UNIT - II

Heuristic Search techniques: Generate and Test – Hill Climbing – Best-First, Problem Reduction, Constraint Satisfaction, Means-end analysis.

### UNIT- III

Knowledge representation issues: Representations and mappings – Approaches to Knowledge representations – Issues in Knowledge representations – Frame Problem.

### UNIT - IV

Using Predicate Logic: Representing simple facts in logic – Representing Instance and Isa relationships – Computable functions and predicates – Resolution – Natural deduction.

### UNIT - V

Representing knowledge using rules: Procedural Vs Declarative knowledge – Logic programming – Forward Vs Backward reasoning – Matching – Control knowledge Brief explanation of Expert Systems-Definition- Characteristics-architecture- Knowledge Engineering- Expert System Life Cycle-Knowledge Acquisition Strategies- Expert System Tools.

### TEXT BOOK:

1. Elaine Rich and Kevin Knight, Shiva Shankar Nair, "*Artificial Intelligence*", McGraw-Hill Companies, 3rd edition.

### REFERENCE BOOKS:

1. Stuart Russell & Peter Norvig, "*Artificial Intelligence A Modern Approach*", Pearson, 2<sup>nd</sup> Edition.
2. George F Luger, "*Artificial Intelligence*", Pearson 2002, 4<sup>th</sup> Edition.
3. V S Janaki Raman, K Sarukesi, P Gopalakrishnan, "*Foundations of Artificial Intelligent and Expert Systems*", MacMillan India limited.

### WEB REFERENCES:

- NPTEL & MOOC courses titled Artificial Intelligence and Expert Systems
- <https://nptel.ac.in/courses/106106140/>
- <https://nptel.ac.in/courses/106106126/>

**I GRAPHICS AND VISUALIZATION****OBJECTIVES:**

- To introduce theoretical concepts behind computer graphics
- Overview of interactive computer Graphics
- Learn about two and three dimensional graphics
- Understand the concept of clipping and windowing
- To introduce the algorithms, tools and techniques for implementing the same.

**OUTCOMES:**

- Know the principles of Display devices
- Understand various algorithms to scan, convert and basic geometrical primitives, transformations, Area filling and clipping.
- Capture the significances of viewing and projections.
- Define the fundamentals of 2D, 3D and color models.

**UNIT - I**

Introduction – Display devices – Hard copy devices – Interactive input devices – display processors -graphics software – O/P primitives – line drawing algorithm – DDA- Bresenham's – anti aliasing of lines – line command – circle drawing algorithm.

**UNIT - II**

Attributes of output primitives – line style – color and intensity- Character attributes – Two dimensional transformations - basic and composite transformation – matrix representation – other transformation.

**UNIT - III**

Windowing and Clipping: windowing concepts – window to view port transformation – Clipping – line – polygon clipping

**UNIT - IV**

Interactive Input methods - Physical input devices – Logical classification of input devices – Interactive picture construction techniques – Input functions

**UNIT - V**

Three dimensional concepts – Display methods – Three dimensional Geometric and Modeling transformations – Other transformations – 3D viewing – Projections – animation-Visible surface detection methods-classification of visible-surface detection Algorithms-Blackface detection-Depth buffer method-Scan line method-Color models and Color Applications.

**TEXT BOOK:**

1. Donald Hearn and M. Pauline Baker, Warren Carithers, "*Computer Graphics With Open GL*", Pearson Education 2010, 4<sup>th</sup> Edition.

## ELECTIVE -

III YEAR / V SEM

### REFERENCE BOOKS:

1. W. M. New Man and R. F. Sproull, "*Principles of interactive Computer Graphics*". McGraw Hill International Edition. 1979.
2. Jeffrey McConnell, "*Computer Graphics: Theory into Practice*", Jones and Bartlett Publishers 2006.
3. Hill F S Jr., "*Computer Graphics*", Maxwell Macmillan 1990.

### WEB REFERENCES:

- NPTEL and MOOC courses titled Computer Graphics
- <https://nptel.ac.in/courses/106106090/>
- <https://nptel.ac.in/courses/106102065/>
- <https://nptel.ac.in/courses/106102063/>

## I

## NETWORK SECURITY

To Understand OSI security architecture and to acquire fundamental knowledge on the concepts of finite fields and number theory

- To Understand various block cipher and stream cipher models and the principles of symmetric & public key cryptosystems
- To learn the system security practices.

### OUTCOMES:

- Compare various Cryptographic Techniques
- Design Secure applications

### UNIT I

OSI Security Architecture – Security attacks, services and mechanisms – Network security Model – Classical encryption techniques: Symmetric cipher model, Substitution techniques – Transposition techniques – Rotor machines – Steganography

### UNIT II

Number theory and finite fields: The Euclidean algorithm – Modular arithmetic - Groups, Rings and Fields – Finite fields of the Form  $GF(p)$  – Polynomial arithmetic – prime numbers – Fermat's and eulers theorems

### UNIT III

Block Ciphers and Data Encryption Standard: Traditional block cipher structure – Data Encryption – Strengths of DES – Block Cipher Design Principles – Advanced Encryption Standard – AES structure – AES transformation functions – AES Key expansion – implementation

### UNIT IV

Public Key Cryptography and RSA – Principles of Public-key Crypto systems – RSA algorithm - Diffie – Hellman Key exchange - Elgamal Cryptographic System

### UNIT V

## **ELECTIVE -**

**III YEAR / V SEM**

Hash functions – Applications – two simple hash functions – Hash functions based on Cipher block chaining - Secure Hash Algorithm (SHA)

### **TEXT BOOK:**

1. William Stallings, *“Cryptography and Network Security: Principles and Practice”*, Pearson Education 2013, 6<sup>th</sup> Edition.

### **REFERENCE BOOKS:**

1. Behrouz A. Ferouzan, *“Cryptography & Network Security”*, Tata McGraw Hill 2007.
2. Man Young Rhee, *“Internet Security: Cryptographic Principles, Algorithms and Protocols”*, Wiley Publications 2003.
3. Charles Pfleeger, *“Security in Computing”*, Prentice Hall of India 2006, 4<sup>th</sup> Edition.
4. Ulysess Black, *“Internet Security Protocols”*, Pearson Education Asia 2000.
5. Charlie Kaufman and Radia Perlman, Mike Speciner, *“Network Security, Private Communication in Public World”*, PHI 2002, 2<sup>nd</sup> Edition.

### **WEB REFERENCES:**

- NPTEL & MOOC courses titled Network Security ➤  
<https://nptel.ac.in/courses/106105031/>

**II MOBILE COMPUTING**

To make the student understand the concepts of mobile computing and familiar with the network protocol stack □ To be exposed to Ad-Hoc networks Gain knowledge about different mobile platforms and application development.

**OUTCOMES:**

- Explain the basics of mobile telecommunication system.
- Choose the required functionality at each layer for given application.
- Use simulator tools and design Ad hoc networks and develop a mobile application.

**UNIT - I**

Introduction-Mobile Computing – Mobile Computing Vs wireless Networking – Mobile Computing Applications – Characteristics of Mobile computing – Structure of Mobile Computing Application. MAC Protocols – Wireless MAC Issues – Fixed Assignment Schemes – Random Assignment Schemes – Reservation Based Schemes.

**UNIT - II**

Mobile Internet Protocol and Transport Layer-Overview of Mobile IP – Features of Mobile IP – Key Mechanism in Mobile IP – route Optimization. Overview of TCP/IP – Architecture of TCP/IP- Adaptation of TCP Window – Improvement in TCP Performance.

**UNIT - III**

Mobile Telecommunication System-Global System for Mobile Communication (GSM) – General Packet Radio Service (GPRS) – Universal Mobile Tele communication System (UMTS).

**UNIT - IV**

Mobile Ad-Hoc Networks-Ad-Hoc Basic Concepts – Characteristics – Applications – Design Issues – Routing – Essential of Traditional Routing Protocols –Popular Routing Protocols – Vehicular Ad Hoc networks ( VANET) – MANET Vs VANET –Security.

**UNIT - V**

Mobile Platforms and Applications-Mobile Device Operating Systems – Special Constrains & Requirements – Commercial Mobile Operating Systems – Software Development Kit: iOS, Android, BlackBerry, Windows Phone – M-Commerce – Structure– Pros & Cons – Mobile Payment System – Security Issues.

**TEXT BOOK:**

1. Prasant Kumar Pattnaik, Rajib Mall, "*Fundamentals of Mobile Computing*", PHI Learning Pvt. Ltd, New Delhi 2012.

**REFERENCES:**

1. Jochen H. Schiller, "*Mobile Communications*", Pearson Education, New Delhi, 2007, 2<sup>nd</sup> Edition.
2. Dharma Prakash Agarval, Qing and An Zeng, "*Introduction to Wireless and Mobile systems*", Thomson Asia Pvt Ltd. 2005.
3. Uwe Hansmann, LotharMerk, Martin S. Nicklons and Thomas Stober, "*Principles of Mobile Computing*", Springer 2003.

**WEB REFERENCES:**

- NPTEL & MOOC courses titled Mobile Computing

## **ELECTIVE -**

**III YEAR / V SEM**

- <https://www.smartworld.com/notes/mobile-computing-pdf-notes-mc-notes-pdf/>
- <https://www.vidyarthiplus.com/vp/Thread-IT6601-Mobile-Computing-Lecture-Notes-All-Uni>
- <https://nptel.ac.in/courses/106106147/>

## **II IOT AND ITS APPLICATIONS**

**VI**

To understand the concepts of Internet of Things and the application of IoT.

- To Determine the Market perspective of IoT.
- To Understand the vision of IoT from a global context

### **OUTCOMES:**

- Use of Devices, Gateways and Data Management in IoT.
- Design IoT applications in different domain and be able to analyze their performance □ Implement basic IoT applications on embedded platform.

### **UNIT – I**

IoT & Web Technology, The Internet of Things Today, Time for Convergence, Towards the IoT Universe, Internet of

Things Vision, IoT Strategic Research and Innovation Directions, IoT Applications, Future Internet Technologies, Infrastructure, Networks and Communication, Processes, Data Management, Security, Privacy & Trust, Device Level Energy Issues, IoT Related Standardization, Recommendations on Research Topics.

### **UNIT - II**

M2M to IoT – A Basic Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. M2M to IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.

### **UNIT - III**

IoT Architecture -State of the Art – Introduction, State of the art, Architecture. Reference Model- Introduction, Reference Model and architecture, IoT reference Model, IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views.

### **UNIT - IV**

IoT Applications for Value Creations Introduction, IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, Value Creation from Big Data and Serialization, IoT for Retailing Industry, IoT For Oil and Gas Industry, Opinions on IoT Application and Value for Industry, Home Management, eHealth.

### **UNIT - V**

Internet of Things Privacy, Security and Governance Introduction, Overview of Governance, Privacy and Security Issues,

Contribution from FP7 Projects, Security, Privacy and Trust in IoT-Data-Platforms for Smart Cities, First Steps Towards a Secure Platform, Smartie Approach. Data Aggregation for the IoT in Smart Cities, Security

### **TEXT BOOK:**

## **ELECTIVE -**

**III YEAR / V SEM**

1. Vijay Madiseti and ArshdeepBahga, "*Internet of Things: (A Hands-on Approach)*", Universities Press (INDIA) Private Limited 2014, 1<sup>st</sup> Edition.

### **REFERENCE BOOKS:**

1. Michael Miller, "*The Internet of Things: How Smart TVs, Smart Cars, Smart Homes, and Smart Cities Are Changing the World*", Pearson Education 2015.
2. Francis da Costa, "*Rethinking the Internet of Things: A Scalable Approach to Connecting Everything*", Apress Publications 2013, 1<sup>st</sup> Edition.
3. Waltenequs Dargie, Christian Poellabauer, "*Fundamentals of Wireless Sensor Networks: Theory and Practice*", Wiley 2014.
4. CunoPfister, "*Getting Started with the Internet of Things*", O'Reilly Media 2011.

### **WEB REFERENCES:**

- <https://github.com/connectIOT/iottoolkit>
- <https://www.arduino.cc/>
- <http://www.zettajs.org/>

## **ELECTIVE - II                      BLOCK CHAIN TECHNOLOGY**

**III YEAR / VI SEM**

### **OBJECTIVES:**

- To understand the concepts of block chain technology
- To understand the consensus and hyper ledger fabric in block chain technology.

### **OUTCOMES:**

- State the basic concepts of block chain
- Paraphrase the list of consensus and Demonstrate and Interpret working of Hyper ledger Fabric
- Implement SDK composer tool and explain the Digital identity for government

### **UNIT - I**

History: Digital Money to Distributed Ledgers -Design Primitives: Protocols, Security, Consensus, Permissions, Privacy- : Block chain Architecture and Design-Basic crypto primitives: Hash, Signature-Hash chain to Block chain-Basic consensus mechanisms.

### **UNIT - II**

Requirements for the consensus protocols-Proof of Work (PoW)-Scalability aspects of Block chain consensus protocols: Permissioned Block chains-Design goals-Consensus protocols for Permissioned Block chains.

### **UNIT - III**

Decomposing the consensus process-Hyper ledger fabric components-Chain code Design and Implementation: Hyper ledger Fabric II:-Beyond Chain code: fabric SDK and Front End-Hyper ledger composer tool.

### **UNIT - IV**

Block chain in Financial Software and Systems (FSS): -Settlements, -KYC, -Capital markets-Insurance- Block chain in trade/supply chain: Provenance of goods, visibility, trade/supply chain finance, invoice management/discounting.

### **UNIT - V**

Block chain for Government: Digital identity, land records and other kinds of record keeping between government entities, public distribution system / social welfare systems: Block chain Cryptography: Privacy and Security on Block chain.

### **TEXT BOOKS:**

## **ELECTIVE -**

**III YEAR / V SEM**

1. Mark Gates, *“Block chain: Ultimate guide to understanding block chain, bit coin, crypto currencies, smart contracts and the future of money”*, Wise Fox Publishing and Mark Gates 2017.
2. Salman Baset, Luc Desrosiers, Nitin Gaur, Petr Novotny, Anthony O'Dowd, Venkatraman Ramakrishna, *“Hands-On Block chain with Hyper ledger: Building decentralized applications with Hyperledger Fabric and Composer”*, 2018.
3. Bahga, Vijay Madiseti, *“Block chain Applications: A Hands-On Approach”*, Arshdeep Bahga, Vijay Madiseti publishers 2017.

### **REFERENCE BOOKS :**

1. Andreas Antonopoulos, *“Mastering Bitcoin: Unlocking Digital Crypto currencies”*, O'Reilly Media, Inc. 2014.
2. Melanie Swa, *“Block chain ”*, O'Reilly Media 2014.

### **WEB REFERENCES:**

- NPTEL & MOOC courses titled blockchain technology
- [blockgeeks.com/guide/what-is-block-chain-technology](http://blockgeeks.com/guide/what-is-block-chain-technology)
- <https://nptel.ac.in/courses/106105184/>



**UNIVERSITY OF MADRAS**  
**INSTITUTE OF DISTANCE EDUCATION**  
**BCOM – General**  
**Under Choice Based Credit System**  
**(With effect from the academic year 2018 – 2019)**

**SCHEME OF EXAMINATION**

<b>SEMESTER I</b>		<b>SUBJECTS</b>	<b>CREDIT</b>	<b>Max Marks</b>		<b>TOTAL</b>
<b>COURSE COMPONENT</b>				<b>INT</b>	<b>EXT</b>	
Part I	Paper-I			Tamil/Other Languages	3	
Part II	Paper-I	English	3	25	75	100
Part III	Core Paper-I	Financial Accounting	4	25	75	100
	Core Paper-II	Business Communication	4	25	75	100
	Allied Paper- I	Business Economics	3	25	75	100

<b>SEMESTER II</b>		<b>SUBJECTS</b>	<b>CREDIT</b>	<b>Max Marks</b>		<b>TOTAL</b>
<b>COURSE COMPONENT</b>				<b>INT</b>	<b>EXT</b>	
Part I	Paper-II			Tamil/Other Languages	3	
Part II	Paper-II	English	3	25	75	100
Part III	Core Paper-III	Advanced Financial Accounting	4	25	75	100
	Core Paper-IV	Principles of Management	4	25	75	100
	Allied Paper-II	Indian Economy	3	25	75	100

<b>SEMESTER III</b>		<b>SUBJECTS</b>	<b>CREDIT</b>	<b>Max Marks</b>		<b>TOTAL</b>
<b>COURSE COMPONENT</b>				<b>INT</b>	<b>EXT</b>	
Part III	Core Paper-V			Corporate Accounting -I	4	
	Core Paper-VI	Business Laws	4	25	75	100
	Core Paper-VII	Banking Theory, Law & Practice	4	25	75	100
	Allied Paper-III	Business Statistics & Operation Research I	3	25	75	100
Part IV	NME-I	Indian Constitution	2	25	75	100

<b>SEMESTER IV</b>		<b>SUBJECTS</b>	<b>CREDIT</b>	<b>Max Marks</b>		<b>TOTAL</b>
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**ELECTIVE -****III YEAR / V SEM**

COURSE COMPONENT			INT	EXT		
Part III	Core Paper-VIII	Corporate Accounting – II	4	25	75	100
	Core Paper-IX	Company Law	4	25	75	100
	Core Paper-X	Financial Services	4	25	75	100
	Core Elective-I	Business Statistics & Operation Research II	3	25	75	100
Part IV	NME-II	Basics of Psychology	2	25	75	100

SEMESTER V		SUBJECTS	CREDIT	Max Marks		TOTAL
COURSE COMPONENT				INT	EXT	
Part III	Core Paper-XI	Cost Accounting	4	25	75	100
	Core Paper-XII	Practical Auditing	4	25	75	100
	Core Paper-XIII	Financial Management	4	25	75	100
	Core Elective-II	Marketing Management	3	25	75	100
Part IV		Environmental Studies	2	25	75	100

SEMESTER VI		SUBJECTS	CREDIT	Max Marks		TOTAL
COURSE COMPONENT				INT	EXT	
Part III	Core Paper-XIV	Management Accounting	4	25	75	100
	Core Paper-XV	Business Taxation	4	25	75	100
	Core Paper-XVI	Entrepreneurial Development	4	25	75	100
	Core Elective-III	Portfolio Management	3	25	75	100
Part IV		Value Education	2	25	75	100

**CREDIT DISTRIBUTION**

Course component		No. of paper x Credit(s)	Total	
Part I	Language Paper(2)	2x3	06	
Part II	English(2)	2x3	06	
Part III	Core paper(16)	16x4	64	
	Allied(3)	3x3	09	
Part IV	Elective(3),	3x3	09	
	NME(2),EVS(1),VE(1)	4x2	08	<b>102</b>

**BCOM – General**  
**Under Choice Based Credit System**  
**(With effect from the academic year 2018 – 2019)**  
**SYLLABUS**  
**SEMESTER – I**

**CORE PAPER I – FINANCIAL ACCOUNTING****UNIT I**

Preparation of Final Accounts of a Sole Trading Concern – Adjustments – Closing Stock, Outstanding and Prepaid items, Depreciation, Provision for Bad Debts, Provision for Discount on Debtors, Interest on Capital and Drawings .

**UNIT II**

Preparation of Receipt and Payments Accounts – Income and Expenditure Account and Balance Sheet of Non Trading Organizations.

**UNIT III**

Account Current – Average Due Date – Sale or Return Account.

**UNIT IV**

Depreciation – Meaning, Causes, Types – Straight-Line Method – Written Down Value Method – Insurance Claims – Average Clause (Loss of Stock only).

**UNIT V**

Single Entry – Meaning, Features, Defects, Differences between Single Entry and Double Entry System – Statement of Affairs Method – Conversion Method.

**REFERENCE BOOKS:**

1. R.L. Gupta & V.K Gupta – Advanced Accounting
2. T.S. Reddy & A.Murthy – Financial Account
3. Shukla & Grewal – Advanced Accounting
4. Jain & Narang – Financial Accounting
5. P.C.Tulsian – Financial Accounting
6. S.Parthasarathy & A.Jaffarulla – Financial Accounting
7. R.L Gupta & Radhaswamy – Advanced Accounting – Volume I

## **ELECTIVE -**

**III YEAR / V SEM**

### **CORE PAPER II - BUSINESS COMMUNICATION**

#### **UNIT I**

Communication- Definition - Methods - Types - Principles of Effective Communication - Barriers to Communication - Business letters - lay out.

#### **UNIT II**

Business Letters- Meaning - Kinds of Business Letters - Application for a situation - Interview - Appointment letter - Acknowledgement - Promotion - Enquiries - Reply Letter to Enquiries - Orders - Sales Letter - Circular Letter - Complaints Letter.

#### **UNIT III**

Bank Correspondence - Insurance Correspondence - Agency Correspondence - Correspondence with Share Holders & Directors.

#### **UNIT IV**

Reports - Meaning - Writing of Reports - Meetings - Agenda - Minutes - Memorandum - Office order - Circular Notes.

#### **UNIT V**

Modern forms of communication - Fax - email - video conference - internet - websites - uses of the various forms of communication.

#### **SUGGESTED READINGS :**

1. Rajendra Paul & Korlahalli, J.S. Essentials of Business Communication, Sultan Chand & Sons, New Delhi.
2. Shirley Taylor, Communication for Business, Pearson Publications, New Delhi.
3. Bovee, Thill, Schatzman, Business Communication Today - Peason Education Private Ltd - New Delhi.
4. Penrose, Rasbery, Myers, Advanced Business Communication, Bangalore.
5. Simon Collin, Doing Business on the Internet, Kogan Page Ltd, London.
6. Mary Ellen Guffey, Business Communication - Process and Product, International Thomson Publishing, Ohio.
7. Sundar, K. A, Business Communication, Vijay Nicole Imprints Pvt. Ltd., Chennai.

**UNIT 1**

Introduction to Economics – Wealth, Welfare and Scarcity Views on Economics – Positive and Normative Economics -Definition – Scope and Importance of Business Economics

Concepts: Production Possibility frontiers – Opportunity Cost – Accounting Profit and

Economic Profit – Incremental and Marginal Concepts – Time and Discounting Principles – Concept of Efficiency

**UNIT II**

Demand and Supply Functions - Meaning of Demand – Determinants and Distinctions of demand – Law of Demand – Elasticity of Demand – Demand Forecasting – Supply concept and Equilibrium

**UNIT III**

Consumer Behaviour: Law of Diminishing Marginal utility – Equimarginal Utility –

Indifference Curve – Definition, Properties and equilibrium

**UNIT IV**

Production: Law of Variable Proportion – Laws of Returns to Scale – Producer's equilibrium

– Economies of Scale - Cost Classification – Break Even Analysis

**UNIT V**

Product Pricing: Price and Output Determination under Perfect Competition, Monopoly – Discrimination monopoly – Monopolistic Competition – Oligopoly – Pricing objectives and Methods

**Recommended Texts**

1. S.Shankaran, Business Economics - Margham Publications - Ch -17
2. P.L. Mehta, Managerial Economics – Analysis Problems & Cases - Sultan Chand & Sons - New Delhi – 02.
3. Francis Cherunilam, Business Environment - Himalaya Publishing House -Mumbai – 04.
4. Peter Mitchelson and Andrew Mann, Economics for Business - Thomas Nelson Australia - Can - 004603454.
5. C.M.Chaudhary, Business Economics - RBSA Publishers - Jaipur - 03.
6. H.L. Ahuja, Business Economics – Micro & Macro - Sultan Chand & Sons - New Delhi – 55.

**SEMESTER – II**

**CORE PAPER III – ADVANCED FINANCIAL ACCOUNTING**

**UNIT I**

Branch accounts – Dependent Branches – Stock & Debtors System

**UNIT II**

Departmental Accounts – Basis for allocation of expenses – Interdepartmental transfer at cost or selling price – Treatment of expenses which cannot be allocated.

**UNIT III**

Hire-purchase and Instalment System – Default and Repossession – Instalment Purchase System.

**UNIT IV**

Partnership Accounts – Admission of a Partner – Retirement of a Partner – Death of a Partner.

**UNIT V**

Dissolution of partnership – Insolvency of a partner (application of Indian Partnership Act, 1932) – Insolvency of all partners – Gradual realization of asset and Piece – meal distribution.

**Reference books**

1. R.K Gupta – Financial Accounting.
2. T.S. Reddy & A.Murthy – Financial Accounting
3. Jain & Naran – Financial Accounting
4. R.K. Gupta & Redhaswamy – Advanced Accounting
5. S.N. Maheswari – Financial Accounting
6. T.S. Shukla & Grewal – Advanced Accounting
7. S.Parthasarathy, & A.Jaffarulla – Financial Accounting.

## **ELECTIVE -**

**III YEAR / V SEM**

### **UNIT-I: Introduction**

Definition - Importance - Nature and Scope of Management - Process of Management - Role and functions of Managers - Levels of Management - Scientific Management -

Contributions to Management by different Schools of thought.

### **UNIT-II: Planning**

Nature - Importance - Types of Planning - Steps in planning - Objectives of Planning - Policies - Decision making Process - Types of Decisions.

### **UNIT-III: Organisation**

Meaning and Types of organisations - Principles - Formal and Informal organisation -

Organisation Structure - Span of Control - Departmentalization - Basis - Meaning and Importance of Departmentalization - Policies - Meaning and Types - Procedures - Forecasting.

### **UNIT IV: Authority and Responsibility**

Authority - Definition - Sources - Limitations - Difference between Authority and Responsibility - Delegation of Authority - Meaning - Principles and importance - Centralisation Vs Decentralisation.

### **UNIT V: Direction Co-ordination & Control**

Direction - Nature - Purpose. Co-ordination - Need - Types and Techniques - Requisites for Excellent Co-ordination. Controlling - Meaning - Importance - Control Process.

### **SUGGESTED READINGS:**

1. Gupta, C.B. Management Theory & Practice, Sulthan Chand & Sons, New Delhi.
2. Prasad, L.M. Principles & Practice of Management, Sultan Chand & Sons, New Delhi.
3. Tripathi, P.C. & Reddy, P.N. Principles of Managements, Tata Mac. Graw Hill, New Delhi.
4. Wehrich and Koontz, Management - A Global Perspective.
5. N. Premavathy, Principles of Management, Sri Vishnu Publications, Chennai.
6. Jayasankar, J. Business Management , Margham Publication, Chennai.
7. Sundar, K. Principles of Management, Vijay Nicole Imprints Pvt. Ltd., Chennai.

## **ELECTIVE -**

**III YEAR / V SEM**

### **UNIT I**

Economic growth and economic Development-Features of economic development-Indicators of economic development-National Income - Basic concepts and computation of National Income

### **UNIT II**

Major problems of Indian Economy-Poverty-Inequalities-Unemployment-Population. Transport & Foreign Trade

### **UNIT III**

Agriculture –Contribution to economic development-Green Revolution-Irrigation-Minor, Medium, Major irrigation works. Land Reforms-Food policy and Public Distribution System

### **UNIT IV**

Industry-Role of industries in economic development-Large and Small scale Industries-New Economic Policy 1991- Liberalization, Privatization and Globalization (LPG)- Demonetization- Issues and Benefits of Demonetization- Make in India – Benefits and Limitations.

### **UNIT V**

Five Year plans in India-Achievements and failures-Economic development under Five Year Plans

### **Recommended Texts**

1. I.C. Dingra, Indian Economy
2. Ruddar Datt & K.P.M. Sundharam, Indian Economy - S.Chand & Sons - New Delhi.
3. K.N. Agarwal, Indian Economy – Problem of Development of Planing - Wishwa Prakasan - New Age of International Ltd.
4. S.K.Misra & V.K.Puri, Indian Economy – Its Development - Himalaya Publishing House - Mumbai.

## **SEMESTER III**

### **CORE PAPER V - CORPORATE ACCOUNTING – I**

#### **UNIT I**

Issue of Shares and Debentures – various kinds – Forfeiture – Re-issue – Underwriting of Shares and Debentures.

#### **UNIT II**



## **ELECTIVE -**

**III YEAR / V SEM**

Redemption of Preference Shares and Debentures – Purchase of Business – Profits prior to Incorporation.

### **UNIT III**

Preparation of Company Final Accounts – Company Balance Sheet preparation – Computation of Managerial Remuneration.- Schedule III for Financial Statements.

### **UNIT IV**

Valuation of Goodwill and Shares.

### **UNIT V**

Alteration of Share Capital – Internal Reconstruction and Reduction of Capital

### **REFERENCE BOOKS**

1. R.L.Gupta – Corporate Accounting
2. T.S.Reddy & A.Murthy – Corporate Accounting
3. Shukla & Grewal – Advanced Accounting
4. Jain & Narang – Company Accounts
5. Chakraborty – Advanced Accountancy

## **CORE PAPER VI - BUSINESS LAWS**

### **UNIT I: Formation of Contract**

Indian Contract Act - Formation - Nature and Elements of Contract - Classification of Contracts - Contract Vs Agreement.

### **UNIT II: Offer, Acceptance and Consideration**

Offer - Definition - Forms of Offer - Requirements of a Valid Offer. Acceptance - Meaning - Legal rules as to a Valid Acceptance. Consideration - Definition - Types - Essentials.

### **UNIT III: Other Elements of Valid Contract**

## **ELECTIVE -**

**III YEAR / V SEM**

Capacity of Parties - Definition - Persons Competent to contract. Free consent – Coercion - Undue Influence - Fraud - Misrepresentation - Mistake. Legality of object - Void agreements - Unlawful Agreements.

### **UNIT IV: Performance of Contract**

Performance of Contracts - Actual Performance - Attempted Performance - Tender. Quasi Contract - Definition and Essentials. Discharge of Contract - Modes of Discharge - Breach of Contract - Remedies available for Breach of Contract.

### **UNIT V: Sale of Goods Act**

Sale - Contract of Sale - Sale Vs Agreement to Sell - Meaning of Goods - Conditions and

Warranty - Caveat Emptor - Exceptions of Caveat Emptor - Buyer and Seller of Goods - Unpaid Seller - Definition - Rights of an Unpaid Seller.

### **SUGGESTED READINGS**

1. Kapoor, N.D. Business Laws, Sultan Chand and Sons.
2. Sreenivasan, M.R. Business Laws, Margam Publications.
3. Dhandapani, M.V. Business Laws, Sultan Chand and Sons.
4. Badre Alam, S. & Saravanel, P. Mercantile Law
5. Pillai, R.S.N. & Chand, S, Business Law, S Chand & Co, Delhi
6. Ramaswamy, K.N., Business Law, S Chand & Co, Delhi
7. Shukla, M.C, Business Law, S. Chand & Co.
8. Balachandran. V & Thothadri.S, Business Law, Vijay Nicole Imprints Pvt. Ltd. Chennai **CORE PAPER VII - BANKING THEORY, LAW AND PRACTICE**

### **UNIT I**

Origin of Banks - Banking Regulation Act 1949 (Definition of Banking, Licensing, opening of Branches, functions of Banks, Inspection) - Role of Banks and Economic Development - Central Banking and role of RBI and their functions.

### **UNIT II**

Commercial Banks - Functions- accepting Deposits - lending of Funds, E-Banking - ATM cards - Debit Cards - Personal Identification Number - Online Enquiry and update facility – Electronic Fund Transfer – Electronic Clearing System.

### **UNIT III**

Opening of an Account, Types of Deposit Account - Types of Customers (Individuals, Firms, Trust and Companies) - Importance of Customer Relations - Customer Grievances, Customer Redressal - Ombudsman.

## **ELECTIVE -**

**III YEAR / V SEM**

### **UNIT IV**

Principles of Lending - Types of Borrowings - Pre-cautions to be taken by a Banker.

### **UNIT V**

Negotiable Instruments (Promissory Note, Bill of Exchange, Cheque, Draft) Definitions – Features – Crossings – Endorsement - Material Alteration - Paying Banker - Rights and Duties, Statutory Protection – Dishonour of Cheques - Role of Collecting Banker.

### **REFERENCE BOOKS**

1. Sundaram & Varshney- Banking, law, theory and practice (SULTAN CHAND Co.)
2. B.Santhanam- Banking & Financial systems(MARGHAM PUBLISHERS)
3. S.N.Maheshwari Banking theory, law and practice (KALYANI PUBLICATIONS)
4. Parameswaran- Indian Banking (S. CHAND &Co.)
5. Tandon-Banking law theory & practice
6. Sherlaker & Sherlaker - Banking law theory and practice.

## **ALLIED PAPER III – BUSINESS STATISTICS & OPERATION RESEARCH I**

### **UNIT I**

Introduction – Classification and tabulation of statistical data – Diagrammatic and graphical representation of data.

### **UNIT II**

Measures of Central tendency – Mean , median and mode – Dispersion, Range, Quartile deviation, Mean Deviation , Standard Deviation – Measures of Skewness.

### **UNIT III**

Correlation – Karl Pearson’s Coefficient of Correlation – Spearman’s Rank Correlation – Regression Lines and Coefficients.

### **UNIT IV**

Time Series Analysis – Trend – Seasonal Variation.

## **ELECTIVE -**

**III YEAR / V SEM**

### **UNIT V**

Introduction to OR – Linear Programming – Graphical and Algebraic Solution  
(maximization and minimization)

### **REFERENCE BOOKS**

1. Statistical Methods – S.P. Gupta
2. Introduction to Operations Research – Dr. P.R. Vittal
3. Statistics – Elhance
4. Operations Research – Hira and Gupta, S. Chand.
5. Operations Research – Handy and A. Taha.

## **NON-MAJOR ELECTIVE I: INDIAN CONSTITUTION**

### **UNIT I: Introduction**

Salient features of the constitution – preamble – Federal systems – Fundamental Rights and Duties – Directive Principles of State Policy – Amendment procedure

### **UNIT II: Union Executive**

Union Executive – President – Elections – Powers – Legislative – Executive – Judiciary and Emergency – Vice President – Prime Minister – Cabinet

### **UNIT III: Parliament**

Union Parliament – Rajya Sabha – Chairman – Lok Sabha – Speaker – Powers and functions

### **UNIT IV: Judiciary**

## **ELECTIVE -**

**III YEAR / V SEM**

Supreme Court – Appointment and Removal of Judges – Constitutional Remedies – Independence of Judiciary – Original – appellate – Advisory power – Judicial Review

### **UNIT V: State Government**

State government – governor – Appointment – Removal – Powers – Executive – Legislative – Judicial and Discretionary – Chief Minister – Cabinet – State legislatures – High Court.

### **BOOKS RECOMMENDED FOR STUDY**

1. Basu D.D.,- Introduction to the Consitution of India , Prentice Hall of India.
2. Pylee.M.V.,- An Introduction to the Constitution of India, Vikas Publishing House.
3. Siwach.J.R,- Dynamics of Indian Government and Politics Sterling Publishing House.

## **SEMESTER IV**

### **CORE PAPER VIII – CORPORATE ACCOUNTING – II**

#### **UNIT I**

Human Resource Accounting – Accounting Standards - Financial Reporting practice  
– Accounting for price level changes – (Theory Only)

#### **UNIT II**

Final Accounts of insurance companies including balance sheet

#### **UNIT III**

Final accounts of banking companies including balance sheet

#### **UNIT IV**

Amalgamation – Absorption and external reconstruction of a company –  
(intercompany investments excluded) Concept of Hostile Takeover (Theory only)

#### **UNIT V**

Liquidation – Calculation of Liquidator’s Remuneration - Liquidator’s final statement of receipts and payments.

### **REFERENCE BOOKS:**

## **ELECTIVE -**

**III YEAR / V SEM**

1. R.L.Gupta – Corporate Accounting
2. T.S.Reddy & A.Murthy – Corporate Accounting
3. Shukla & Grewal – Advanced Accounting
4. Jain & Narang – Company Accounts
5. Chakraborty – Advanced Accountancy

## **CORE PAPER IX – COMPANY LAWS**

### **UNIT I: Joint Stock Company**

Meaning - Kinds of Companies (Special Provisions with respect to Private Company, Public Company, One Person Company, Small Company, Dormant Company) - Formation - Memorandum of Association - Contents - Restriction on “Other Objects” - Doctrine of Ultra Vires - Articles of Association - Contents - Prospectus - Contents - Types (Statement in Lieu of Prospectus, shelf Prospectus, Red Herring Prospectus) – Underwriting – Book Building Process - Green Shoe Option - E-Filing - Dematerialization.

### **UNIT II: Share Capital and Debentures**

Meaning of Shares - Kinds of Shares - Voting rights - Issue of shares at a Premium and Discount - Partly paid shares - Bonus Shares - Rights shares - Sweat Equity Shares.  
Debentures - Meaning - Types.

### **UNIT III: Managerial Personnel**

Directors - Women Directors - Independent Directors - Director Identification Number - Other Key Managerial Personnel - Related Party Transactions.

### **UNIT IV: Meetings and Resolutions**

Meeting - Statutory Meeting - Annual General Meeting - Extraordinary General Meeting - Notice of Meeting - Quorum - Proxy - Board of Directors Meeting - Committee - Types of Committee - Audit Committee - Stake Holders Relationship Committee - Corporate

## **ELECTIVE -**

**III YEAR / V SEM**

Social Responsibility Committee. Resolutions - Ordinary Resolution - Special Resolution

- Resolution requiring special notice.

### **UNIT V: Winding up of Company**

Modes of Winding up - Winding up by the Court - Voluntary Winding up - Types - Members Voluntary Winding up - Creditors Voluntary Winding up. National Company Law Appellate

Tribunal.

### **SUGGESTED READINGS**

1. Kapoor, N.D., Business Laws, Sulthan Chand and Sons, New Delhi.
2. Sreenivasan, M.R. Business Laws, Margam Publications, Chennai.
3. Dhandapani, M.V. Business Laws, Sultan Chand and Sons, New Delhi.
4. Avatar Singh, Company Law, Eastern Book Company
5. Shukla, M.C. & Gulshan, S.S., Principles of Company Law
6. Badri Alam, S & Saravanavel, Company Law, Himalaya Publications
7. Gogna, P.P.S., Text Book of Company Law, S. Chand & Co.
8. Gaffor & Thothadri, Company Law, Vijay Nicole Imprints Pvt. Ltd. Chennai

## **CORE PAPER X – FINANCIAL SERVICES**

### **UNIT I: Introduction**

Financial Services - Concept - Objectives - Functions - Characteristics - Financial Services Market

- Concept - Constituents - Growth of Financial Services in India - Financial Services Sector Problems - Financial Services Environment - The Forces - Players in Financial Markets - Interest Rate Determination - Macro Economic Aggregates in India.

### **UNIT II: Merchant Banking and Public Issue Management**

Definition - Functions - Merchant Bankers Code of Conduct - Public Issue Management-

Concept - Functions - Categories of Securities Issue - Mechanics of Public Issue Management - Issue Manager - Role of Issue Manager - Marketing of Issue - New Issues Market Vs Secondary Market - Underwriting - Types - Benefits Functions.

### **UNIT III: Money Market and Stock Exchange**

Characteristics - Functions - Indian Capital Market - Constituents of Indian Capital Market

- New Financial Institutions and Instruments - Investor Protection - Stock Exchange Functions - Services - Features - Role - Stock Exchange Traders - Regulations of Stock Exchanges - Depository - SEBI - Functions and Working.

## **ELECTIVE -**

**III YEAR / V SEM**

### **UNIT IV: Leasing**

Characteristics - Types - Participants - Myths about Leasing - Hire Purchase - Lease

Financing Vs Hire Purchase Financing - Factoring - Mechanism - Functions of a Factor -

Factoring - Players - Types - Operational Profile of Indian Factoring - Operational

Problems in Indian Factoring - Factoring Vs bills Discounting - Consumer Finance - Mechanics - Sources - Modes - Demand for Consumer Finance - Factors - Consumer Finance Insurance.

### **UNIT V: Venture Capital**

Origin and Growth of Venture Capital - Investment Nurturing Methods - Mutual Funds -

Portfolio Management Process in Mutual Funds - Credit Rating System - Growth Factors -

Credit Rating Process - Global and Domestic Credit Rating agencies - Principles of

Insurance - Life and Non - Life Insurance - IRDA - Powers - Pension Fund - Objectives - Functions - Features - Types - Chilean Model - Pension Investment Policy - Pension Financing.

### **SUGGESTED READINGS:**

1. Gurusamy S, Essentials of Financial Services, Vijay Nicole Imprints, Chennai, 2014
2. Gomez Clifford, Prentice Hall of India, Financial Markets, Institutions and Financial Services, 2008
3. Meir Kohn, Financial Institutions and Markets, Oxford University Press 4. Rajesh Kothari, Financial Services in India: Concept and Application, Sage publications, 2012, New Delhi.
5. Madhu Vij & Swati Dhawan, Merchant Banking and Financial Services, Jain Book Agency, 2000, Mumbai
6. Vasant Desai, Financial Markets and Financial Services, Himalayan Publishing House Pvt Ltd, 2000, Mumbai
7. Santhanam B, Financial Services, Margam Publications

## **CORE ELECTIVE I - BUSINESS STATISTICS & OPERATION RESEARCH II**

### **UNIT I**

Index Numbers – Aggregative and relative Index – Chain and Fixed Index – Wholesale Index – Cost of Living Index.

### **UNIT II**

Probability – Addition and Multiplication Theorem – Conditional Probability – Baye’s Theorem (without proof) – Simple Problems.

### **UNIT III**

Sampling Techniques – Types of Sample and Sampling Procedures – Tests of Significance – Normal, t, F, chi-square- Simple problems.

### **UNIT IV**



## **ELECTIVE -**

**III YEAR / V SEM**

Assignment and Transportation Problems.

### **UNIT V**

Network Analysis – PERT and CPM (no crashing)

### **REFERENCE BOOKS**

1. Statistical Methods – S.P. Gupta
2. Introduction to Operations Research – Dr. P.R. Vittal
3. Statistics – Elhance
4. Operations Research – Hira and Gupta, S. Chand.
5. Operations Research – Handy and A. Taha.

## **NON-MAJOR ELECTIVE –II: BASICS OF PSYCHOLOGY**

### **UNIT I**

Introduction – Definition psychology as Science . A brief history of Psychology – Structuralism, Functionalism, Behaviorism, Gestalt Psychology , Psychoanalytic psychology, Humanistic Psychology. Approaches to Psychology – Behavioral , Psychodynamic Approach, cognitive Approach, Behavioral Neuroscience, Evolutionary psychology, Sociocultural approach, humanistic movement, positive psychology.

### **UNIT II**

Methods of psychology – Introduction to the Scientific Method, Research Methods: Descriptive Research – Observation, Surveys and Interviews, Standardized tests, Case Studies, Correlational Research, Experimental Research.

### **UNIT III**

Sensation and Attention Sensation – Definition, Sensory receptors and brain, Thresholds – absolute threshold, difference threshold, Subliminal perception, sensory adaptation, Sensory Gating, Selective Attention, Determinants of attention.

## **ELECTIVE -**

**III YEAR / V SEM**

### **UNIT IV**

Perception – definition, Perceptual constancy, Perceptual organization, Depth perception, Motion perception , Perceptual learning, Motives and perception, Perceptual expectancy, Extra Sensory perception.

### **UNIT V**

Learning – The nature of Learning, Classical Conditioning – Principles and

Applications, Operant Conditioning – Principles and Applications, Observational learning, Cognitive factors in learning – Latent learning , Insight learning.

### **REFERENCES:**

1. Santrock, J.W. (2006). Psychology Essentials (Updated 2<sup>nd</sup> ed.). new Delhi: tata McGraw Hill.
2. Coon, D., & Mitterer, J.O.(2007). Introduction to Psychology (11<sup>th</sup> ed.). New Delhi: Cengage Learning India Pvt Ltd.

## **SEMESTER V**

### **CORE PAPER XI – COST ACCOUNTING**

#### **UNIT I**

Definition, meaning and objectives- Advantages and Importance- Distinction between Cost and Financial Accounting - Elements of Cost and Preparation of Cost Sheets and Tenders.

#### **UNIT II**

##### **MATERIALS**

Stores record- purchase records- purchase order- Goods received note- Bin card- Stores Ledger - Inventory Control- ABC Analysis – Economic Ordering Quantity – Maximum, Minimum and Reordering levels – Methods of Pricing Issues - Perpetual Inventory System.

#### **UNIT III**

##### **LABOUR**

Importance of Labour Cost Control- Various Methods of Wage Payments - Calculation of Wages - Methods of Incentives (Bonus) Schemes - Recording Labour time- Treatment of “OVER TIME” and “IDLE TIME”- Labour Turn Over (L.T.O) **UNIT IV**

#### **OVERHEADS: (Factory, Administration, Selling and Distribution)**

Definition and Meaning of Overheads – Classification – Apportionment of Overheads –

Redistribution (Secondary Distribution) – Absorption of Overheads including “Machine Hour Rate” .

## **ELECTIVE -**

**III YEAR / V SEM**

### **UNIT V**

#### **Methods of Costing**

Unit Costing – Job Costing ( Excluding Contract Costing )– Process Costing – Simple Process Accounts ( Excluding Inter Process Profits and Equivalent Production, Joint Product ) – Operation and Operating Costing.

#### **REFERENCE BOOKS**

- 1 *B.K.Bhar – Cost Accounts*
- 2 *Jain & Narang – Cost and Management Accounts*
- 3 *S.N.Maheshwari – Cost & Management Accounts*
- 4 *S.P.Iyengar – Cost and Management Accounting*
- 5 *T.S. Reddy and Y. Hari Prasad Reddy – Cost Accounting*

### **CORE PAPER XII – PRACTICAL AUDITING**

#### **UNIT I: Introduction**

Meaning and Definition of Auditing - Distinction between Auditing and Accounting -

Objectives - Advantages and Limitations of Audit - Scope of Audit - Classifications of

Audit - Audit Planning - Meaning. Audit programme - Meaning - Objectives and Contents - Audit Note Book, - contents, Usefulness of Audit Note Book - Audit working papers - Meaning. Ownership and Custody - Test checking and Routine checking - Meaning.

Internal control - Meaning - Definition - Objectives - Technique for evaluation of Internal Control System.

Internal check - Meaning - Objectives difference between Internal control, Internal check and Internal Audit .

#### **UNIT II: Vouching and Verification**

Vouching - Meaning and Definitions - Objectives. Trading Transactions - Audit of Ledger- Scrutinizing of ledgers - Vouching of cash Receipts and Payments - Vouching of outstanding Assets and Liabilities - Verification - Meaning - Objectives and Process - Valuation of Assets and liabilities - Distinction between Verification and Valuation.

#### **UNIT III: Audit and Accounting Standards**

Types of Audit - Statutory Audit - Concurrent Audit - Stock Audit - Cost Audit - Secretarial

Audit - CAG Audit - Management Audit. Accounting Standards - Standards on Auditing - Standards on Internal Audit - Penal Provisions - Role of National Financial Reporting Authority (NFRA)

#### **UNIT IV: Auditors and Audit Report**

Appointment - Procedures - Eligibility and Qualifications - Powers and Duties - Rotation and Removal of Auditors - Resignation of Auditors - Remuneration of Auditors - Audit report - Preparation and presentation. Auditor's Responsibilities and liabilities towards Shareholders, Board and Audit Committee. Restriction on other Services.

#### **UNITV: Recent Trends in Auditing**

## **ELECTIVE -**

**III YEAR / V SEM**

EDP Audit - Meaning - Division of auditing in EDP environment. Impact of Computerization on Audit Approach - Online Computer System Audit - Types of Online Computer System Audit - Audit around with the Computers - Procedure of Audit under EDP system.

### **SUGGESTED READINGS:**

1. Auditing, D.P. Jain Konark Publishers Pvt. Ltd.
2. Auditing, Principles and Practice, Ravinder Kumar and Virender Sharma, Eastern Economy Edition.
3. Practical Auditing, B.N. Tandon, Sultan Chand and Co., New Delhi.
4. Contemporary Auditing, Kamal Gupta, Tata Mc Graw Hill.
5. Practical Auditing, Dinkar Pagare, Sultan Chand & Sons
6. Sundar. K & Paari. K, Practical Auditing, Vijay Nicole Imprints Pvt. Ltd. Chennai

### **CORE PAPER XIII – FINANCIAL MANAGEMENT**

#### **UNIT I: Introduction**

Meaning and Objectives of Financial Management - Functions of Financial Management.

Finance - Importance of Finance - Sources of Finance - Role of Financial Manager in Financial Management.

#### **UNIT II: Capital Structure**

Meaning - Factors affecting Capital Structure - Planning - Theories of Capital Structure - Determining Debt Equity Proportion - Leverage Concept.

#### **UNIT III : Cost of Capital**

Definition - Cost of Equity Capital - Cost of Preference Capital - Cost of Debt - Cost of Retained Earnings - Weighted Average (or) Composite cost of capital (WACC)

#### **UNIT IV : Dividend**

Meaning - Dividend Policies - Factors affecting Dividend Payment - Provisions on Dividend Payment in Company Law - Dividend Models - Walter's Model - Gordon's Model

- M.M. Model - Hypothesis Model.

#### **UNIT V : Working Capital**

Working Capital - Meaning and importance - Factors Influencing Working Capital - Determining (or) Forecasting of Working Capital requirements - Working Capital Operating cycle.

### **SUGGESTED READINGS:**

1. I.M. Pandey, Financial Management, Vikas Publishing House
2. Prasanna Chandra, Financial Management, Tata McGraw Hill Publications
3. S.N. Maheswari, Financial Management, Sultan Chand & Sons
4. Y. Khan and Jain, Financial Management, Sultan Chand & Sons
5. P. Periyasamy.P, Financial Management, Vijay Nicole Imprints Pvt. Ltd. Chennai

## **ELECTIVE -**

**III YEAR / V SEM**

6. Murthy A, Financial Management, Margam Publications, Chennai 7. Srivatsava, Financial Management, Himalaya Publications

### **CORE ELECTIVE II – MARKETING MANAGEMENT**

#### **UNIT I : Introduction**

Marketing – Meaning – Definition and Functions of Marketing – Marketing Orientation – Role and Importance of Marketing – Classification of Markets.

#### **UNIT II : Market Segmentation and Consumer Behaviour**

Market Segmentation – Concept – Benefits – Basis and Levels. Introduction to Consumer Behavior – Need for study – Consumer Buying Decision Process – Buying Motives. Marketing Research – MIS – Meaning and Differences.

#### **UNIT III : Marketing Mix and Product Policy**

Marketing Mix – Meaning – Product – Introduction – Product Policy – Product Planning – Stages of New Product Development – Introduction to PLC – Packaging – Branding – labelling – Product Mix – Price – Pricing Policies and Methods.

#### **UNIT IV : Channels of Distribution**

Channels of Distribution – Levels – Channel Members – Promotion – Communication Mix – Basics of Advertising, Sales Promotion and Personal Selling.

#### **UNIT V : Recent Trends in Marketing**

E – Marketing – Online Retailing – Shopping Malls – Consumer Protection Act \_ Salient Features – Consumerisation – Consumer Rights, Consumer Grievance Redressal Forums- Role of Social Media in Marketing.

#### **SUGGESTED READINGS:**

1. Rajan Nair, Marketing, Sulthan Chand & Sons, New Delhi
2. Varshney, Marketing Management, Sulthan Chand & Sons, New Delhi
3. Chandrasekar K S, Marketing Management: Text and Cases, Vijay Nicole Imprints,

## **ELECTIVE -**

**III YEAR / V SEM**

Chennai, 2014

4. Gandhi, J.c, Marketing, Himalaya Publications.
5. Radha, Marketing, Prasanna Publications, Chennai.
6. Santhanam, Marketing, Margham Publications, Chennai.

## **SEMESTER VI**

### **CORE PAPER XIV – MANAGEMENT ACCOUNTING**

#### **UNIT I**

Management Accounting – Meaning, Scope, Importance and Limitations - Management Accounting vs. Cost Accounting - Management Accounting vs. Financial Accounting.

#### **UNIT II**

Analysis and interpretation of Financial Statements, nature, objectives, and tools – methods - Comparative Statements, Common Size Statement and Trend Analysis.

#### **UNIT III**

Ratio analysis - interpretation, benefits and limitations. Classifications of ratios - liquidity, profitability, turnover, capital structure and leverage.

#### **UNIT IV**

Fund Flow & Cash Flow Statements - Budget and budgetary control- meaning, objectives, merits and demerits - types of budgets- production, cash and flexible budgets.

#### **UNIT V**

Marginal Costing (excluding Decision-Making) - Absorption Costing and Marginal Costing - CVP Analysis - Break-Even Analysis - Break Even Chart.

### **REFERENCE BOOKS**

1. Dr. Maheswari S.N.- Management Accounting

## **ELECTIVE -**

**III YEAR / V SEM**

2. Chadwick- The Essence of Management Accounting
3. Charles T. Horngren and Gary N. Sundem- Introduction to management accounting
4. Sharma and Shashi K.Gupta- Management accounting
5. T.S. Reddy & Y. Hari Prasad Reddy.
6. Hansen/ Mowen- Cost management accounting and control.

## **CORE PAPER XV – BUSINESS TAXATION**

### **UNIT I**

Objectives of Taxation - Canons of Taxation - Tax system in India - Direct and Indirect

Taxes - Meaning and Types.

### **UNIT II**

Customs Duty - Meaning - Levy and Collection of Customs Duty - Organisation of the Customs

Department - Officers of the Customs - Powers - Appellate Machinery - Infringement of the law - Offences and Penalties - Exemption from customs Duty - Customs Duty Drawback - Duty Free Zones.

### **UNIT III**

GST (Goods and Service Tax), Background behind implementing GST- Problems with exiting systems – Centre Vs State pressure- Need for GST- Taxes covered by GST – Definition – Scope and Coverage – Scope of Supply – Levy of Tax- Taxable Event-

Returns- Refunds- Input tax credit- Business Impact- Benefits of GST

### **UNIT IV**

Administrative Structure of GST – Officers as per CGST Act - Officers as per SGST Act – Jurisdiction – Appointment- Powers.

### **UNIT V**

Assessment and Audit under GST – Refunds, Demands and Recovery, Appeals and revision – Advance ruling- Offences and Penalties- Transitional Provisions under GST- GST in Tamilnadu.

## **SUGGESTED READINGS**

1. Indirect Taxation, Sultan Chand & Sons - V. Balachandran

## **ELECTIVE -**

**III YEAR / V SEM**

2. GST Law & Practice, Taxman Publishers- Shweta Jain
3. GST in India, New Century Publications
4. Students Guide to Income Tax, Taxman Publications, Vinod K.Singhania and Monica Singhania
5. Layman's Guide on GST, Taxman Publications-. Datta, D C,

### **CORE PAPER XVI – ENTREPRENEURIAL DEVELOPMENT**

#### **UNIT I : Concept of Entrepreneurship**

Entrepreneurship - Meaning - Types - Qualities of an Entrepreneur - Classification of Entrepreneurs - Factors influencing Entrepreneurship - Functions of Entrepreneurs.

#### **UNIT II : Entrepreneurial Development Agencies.**

Commercial Banks - District Industries Centre - National Small Industries Corporation -

Small Industries Development Organisation - Small Industries Service Institute. All India Financial Institutions. SIPCOT and its objectives. MSME Sector and its coverage-

Objectives of Ministry of MSME. Role and Functions of MICRO Small and Medium

Enterprises - Development Organisation (MSME - DO) - Objectives of SIDCO - Functions of Tamil Nadu SIDCO - IRBI and its Role. NABARD and its role in the Rural Development of India - Introduction to Micro Units Development Refinance Agency (MUDRA).

#### **UNIT III : Project Management**

Business idea generation techniques - Identification of Business opportunities - Feasibility study - Marketing, Finance, Technology & Legal Formalities - Preparation of Project Report - Tools of Appraisal.

#### **UNIT IV - Entrepreneurial Development Programmes**

Entrepreneurial Development Programmes (EDP) - Role, relevance and achievements - Role of Government in organizing EDPs- Critical evaluation.

#### **UNIT V - Economic development and Entrepreneurial growth**

Role of Entrepreneur in Economic growth - Strategic approaches in the changing Economic scenario for small scale Entrepreneurs - Networking, Niche play, Geographic Concentration, Franchising / Dealership - Development of Women Entrepreneurship. Self-help groups and empowerment of Women in India - Financing SHG and their role in Micro-financing. Financial inclusion and its penetration in india, Challenges and Government role in Financial inclusion - Pradhan Mantri Jan-Dhan Yojana - Six Pillars of Its Mission objectives

#### **SUGGESTED READINGS :**

1. Saravanavel, P. Entrepreneurial Development, Principles, Policies and Programmes, Ess Pee Kay Publishing House - 1997, Chennai.



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**III YEAR / V SEM**

2. Tulsian, P.C & Vishal Pandey, Business Organization and Management, Pearson Education India, 2002, Delhi.
3. Janakiram, B, and Rizwana, M, Entrepreneurship Development, Text and Cases, Excel Books India, 2011, Delhi.
4. Arun Mittal & Gupta, S.L - Entrepreneurship Development, International Book House Pvt. Ltd, 2011, Mumbai.
5. Anil Kumar, S, Poornima, S, Abraham, K, Jayashree, K - Entrepreneurship Development, New age International (P) Ltd, 2012, Delhi
6. Gupta C B and Srinivasan NP, Entrepreneurial Development, Sultan Chand & Sons
7. Raj Shankar, Entrepreneurship, Vijay Nicole Imprints Pvt. Ltd. Chennai

### **CORE ELECTIVE III – PORTOFOLIO MANAGEMENT**

#### **UNIT I: Introduction**

Portfolio - Meaning - Objectives - Terms relating to Portfolio - Securities - Risk - Return - Introduction to Portfolio Management - Role of Portfolio Managers.

#### **UNIT II: Value of Money**

Time value - Computation of Present Value Interest Factor (PVIF), Future Value Interest Factor (FVIF), Present Value Interest Factor at an Annuity (PVIF A) - Future Value Interest Factor at an Annuity (FVIF A) Simple Problems relating to it.

#### **UNIT III: Portfolio Analysis**

Planning - Selection - Evaluation - Revision - Various Steps involved in Portfolio Development - Theories relating to Portfolio Analysis.

#### **UNIT IV: Risk & Return**

Interpretation of Risk & Return - Mean - Variance Analysis - B (Beta) Measures. Portfolio Diversification - Bond Valuation.

#### **UNIT V: Need and Importance of Portfolio Management**

Portfolio Management Vs Wealth Management - Introduction to Derivatives - Futures Options - Swaps - SEBI Regulations relating to Portfolio Operations.

#### **SUGGESTED READINGS:**

1. Francis - Management of Investments, McGraw Hill
2. V.K. Bhalla - Investment Management, S Chand & Co
3. GURUSAMY S, Security Analysis and Portfolio Management, Vijay Nicole Imprints, Chennai
4. Fisher & Jordan - Security Analysis & Portfolio Management, prentice Hall
5. Punithaathi Pandian- Security Analysis & Portfolio Management, Vikas Publishing House

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**ELECTIVE -**

**III YEAR / V SEM**