SYLLABUS

FOR

M.Sc. Chemistry

Semester (Ist, IInd ,IIIrd and IVth)

(CBCS- Based)

Effective from session 2018 -20 Onwards

University Department of Chemistry
B. R. Ambedkar Bihar University,
Muzaffarpur-842001

CBCS-based syllabus for M.Sc Chemistry (2 years) Programme

General Information:

(1) It is two years Master Degree Programme

(2) There shall be four semester to complete programme i.e. 1st, 2nd, 3rd and 4th semester

(3) Each semester shall consist of 15 weeks of academic work equivalent to 90 actual teaching days.

(4) This programme will have three types of courses, i.e. Compulsory Courses, Core courses and Elective courses.

Core course – The core courses are those courses whose knowledge is deemed essential for the students registered for a particular Master's degree programme.

Elective course – The elective course can be chosen from a pool of papers in 3rd and 4th semester.

(5) Each course will have 100 marks in full and divided as 70 marks for End-Semester Exam and 30 marks for Internal Assessment Work except in AEC, AECC-1, AECC-2 and practical papers. Internal assessment will be in two internal exams of 10 marks each, 5 marks for seminar/tutorial project and 5 marks for attendance/discipline.

(6) In practical papers the distribution of marks in CIA will be same as prescribed formerly end semester practical papers.

(7) A student in fourth semester can choose a generic paper or CC-3 paper of any other subject of the faculty as DSE.

Credits: Atom to which the course work is measured. It determines the number of hours of instruction required per week. One credit is equivalent to one hour of teaching (lecture or tutorial) or two hours of practical work/field work per week.

M. Sc. Chemistry (Two years Course)
CHOICE BASED CREDIT SYSTEM
Course Structure
M.Sc. 1st Semester

Serial No.	Courses	Code	Description	Credits	Max. Marks (100)
1	Core Course I	MSCHE CC-1	Inorganic Chemistry-I	5	100
2	Core Course II	MSCHE CC-2	Physical Chemistry -I	5	100
3	Core Course III	MSCHE CC-3	Organic Chemistry -I	5	100
4	Core Course IV	MSCHE CC-4	Practical (Physical)	3	50+50
5	AECC-1		Environmental Sustainability and Sustainable Planet Services Activities	3+2	50+50

M.Sc. IInd Semester

Serial No.	Courses	Code	Description	Credits	Max. Marks (100)
6	Core Course V	MSCHE CC-5	Advanced in Chemistry	5	100
7	Core Course VI	MSCHE CC-6	Inorganic Chemistry-II	5	100
8	Core Course VII	MSCHE CC-7	Physical Chemistry-II	5	100
9	Core Course VIII	MSCHE CC-8	Organic Chemistry-II	5	100
10	Core Course IX	MSCHE CC-9	Practical (Organic)	3	50+50
11	AEC-1			3	50+50

M.Sc. III rd Semester

Serial No.	Courses	Code	Description	Credits	Max. Marks (100)
12	Core Course X	MSCCHE CC-10	Applications of Spectroscopy	5	100
13	Core Course XI	MSCCHE CC-11	Bio inorganic Chemistry	5	100
14	Core Course XII	MSCCHE CC-12	Environmental Chemistry and Green Chemistry	5	100
15	Core Course XIII	MSCCHE CC-13	Bio Organic Chemistry	5	100
16	Core Course XIV	MSCCHE CC-14	Practical (Inorganic Chemistry)	5	50+50
17	MOOC-2		Human values and professional ethics & gender sensitization	3+2	50+50

M.Sc. IV th Semester

Serial No.	Courses	Code	Description	Credits	Max. Marks (100)
18	Elective Course-1	MSCCHE EC-1a	Inorganic Chemistry Special	5	100
19	Elective Course-1	MSCCHE EC-1b	Physical Chemistry Special	5	100
20	Elective Course-1	MSCCHE EC-1c	Organic Chemistry Special	5	100
21	Elective Course-2	MSCCHE EC-2a	Inorganic Chemistry Special Practical	5	50+50
22	Elective Course-2	MSCCHE EC-2b	Physical Chemistry Special Practical	5	50+50
23	Elective Course-2	MSCCHE EC-2c	Organic Chemistry Special Practical	5	50+50
24	DSE-1 or GE-1			5	100

Candidates should choose one among the following groups: 1a & 2a or 1b & 2b or 1c & 2c

Semester –I

Core Course –I

Inorganic I

Full Marks -70 **Credits-5**

I Bonding and Electro chemistry

Unit-I (a) VSEPR theory, Walsh diagram (triatomic molecules), dπ –pπ bonding, Bent rule and energetic of hybridization.

(b) M.O. diagram for hetero- nuclear di- and triatomic molecules Bonding in Boranes, carboranes, Wades rule Anti ferromagnetic coupling.

Unit-II Magneto chemistry

e-e interaction, Term Symbols, spin orbit coupling Quenching of orbital contribution in metal complexes, Derivation of expression with small and large multiple width. Anomalous magnetic moments, magnetic properties of inner transition elements.

Unit-III Metal- Ligand Equilibria in Solution

Stepwise and overall formation constants and their interaction, trends in stepwise constants, Factors affecting the stability of metal complexes with reference to the nature of metal ion and ligand, chelate effect and its thermodynamic origin. Determination of formation constants by pH metery and spectrophotometry.

Unit-IV Reaction Mechanism of Transition metal complexes:

Inert and labile complexes, kinetic application of VBT and CFT, kinetics of octahedral substitution, acid hydrolysis, base hydrolysis, CB mechanism, evidences of CB mechanism, Anation reaction, reaction without M-L bond cleavage, substitution reactions in square planar complexes, The trans-effect, Theories of trans-effect, Electron transfer reactions inner and outer sphere mechanism, Marcus-Hush theory.

Isopoly and Heteropoly

Unit-V Isopoly and Heteropoly Acids and salts, Isopoly and Heteropoly acids and salts of Mo and W, structure of isopoly and heteropoly anions.

ARC
29/3/19

Books Recommended :

1. Concise Inorganic Chemistry- J.D. Lee
2. Inorganic Chemistry- T. Moeller
3. Modern Aspects of Inorganic chemistry- H.J. Emeleus and A.G. Sharpe
4. Introduction to ligand field- B.N. Figgis
5. Inorganic Reaction Mechanism- Basolo and Pearson
6. Chemical bonding- O.P. Agrawal/ Cotton
7. Structural Principles in Inorganic Chemistry-W.E. Addison
8. Introduction the Magneto Chemistry- A. Earnshaw
9. Principle of Inorganic Chemistry- James Huhey.

Semester-I
Core Course –II
Physical Chemistry-I

Full Marks-50 **Credits-5**

Unit-I **Macromolecules**

Types of polymers. Kinetics and mechanisms of polymerization. Molecular mass-number and mass average molecular mass, determination of molecular mass by osmometry, viscosity and light scattering method.

Unit-II **Electro Chemistry**

(i) Electrode potential in terms of chemical Potential and activity.

(ii) Debye Huckel theory of conductance of electrolytic solution, its application and limitation.

(iii) Quantitative treatment of Debye Huckle Limiting law and its modification for finite size ions, effect of ion solvent interaction on activity coefficient, Debye Huckle Onsager equation.

(iv) Butle-Volmer equation under equilibrium and non equilibrium Exchange current density, Tafel Plot.

Unit-III **Chemical Dynamics**

[a] Mechanism and Dynamics of consecutive and opposing reactions.

[b] Activated complex theory of Uni-molecular reaction.

[c] Mechanism and Dynamics of photolysis of acetaldehyde and photo dimerization of Anthracene, Polymerization and Auto oxidation reaction.

Unit-IV **Chemical Thermodynamics**

[a] Partial molar properties in ideal mixture, Chemical Potential, its determination and variation with temperature and pressure, Gibbs Duhem equation.

[b] Fugacity and activity, variation with 'T' and 'P', determination of Fugacity of a gas mixture, Duhem- Margules equation and its application.

Unit-V **Statistical Thermodynamics**

Ensembles, Thermodynamic probability, Boltzman Distribution Law, Boltzman Planck Equation, Partition function and its significance, Relationship with thermodynamic functions. Translational, Rotational, Vibrational and Electronic partition function, Its application in the case of monatomic and diatomic molecules, Sakure-Tetrode Equation.

Books Suggested:

1. Physical Chemistry — P.W. Atkins[ELBS]
2. Comprehensive Physical Chemistry — Hemant Snehi
3. Theoretical Physical Chemistry — Glasstone
4. Physical Chemistry — M.G. Barrow.
5. Modern Electrochemistry — J.O'M Bokris and A.K.N. Reddy
6. Text Book of Polymer Science — F.W. Billmayer jr.
7. Advanced Physical Chemistry — Gurdeep Raj

Semester-I
Core Course -III
Organic Chemistry-I

Full Marks -75 **Credits-5**

Unit-I **Nature of Bonding in Organic Molecules**

Delocalized chemical bonding-conjugation, cross conjugation resonance, hyperconjugation, tautomerism. Aromaticity in benzenoid and non- benzenoid compounds, alternant and non-alternant hydrocarbons, Huckel's rule, energy level of molecular orbitals, annulenes, antiaromaticity, homo- aromaticity, PMO approach.

Unit-II **Stereochemistry:**

Chirality, elements of symmetry, molecules with more than one chiral centre, diastereomerism. Determination of relative and absolute configuration. Methods of resolution, optical purity, prochirality, enantiotopic and diastereotopic atoms, groups and faces, asymmetric synthesis. conformational analysis of cycloalkanes (six membered ring) decalins. Effect of conformation on reactivity, optical activity in absence of chiral carbon(biphenyls, allenes and spiranes), chirality due to helical shape. stereospecific and stereoselective synthesis. stability and reactivity of carbocations.

Unit-III **Reaction Mechanism: Structure and Reactivity:**

Types of reactions, kinetic and thermodynamic control, Hammond's postulate, Curtin-H ammett principle. Potential energy diagrams, transition states and intermediates, methods of determining mechanisms, isotope effects. Generation, structure,carbanions, free radicals, carbenes and nitrenes. Effect of structure on reactivity. The Hammett equation and linear free energy relationship, substituent and reaction constants, Taft equation.

Unit-IV **Aliphatic Nucleophilic Substitution:**

The S_N2, S_Ni, mixed S_N2 and S_Ni, S_N1 and SET mechanisms. The neighbouring group mechanism, neighbouring group participation by π and σ bonds anchimeric assistance. Classical and nonclassical carbocations, phenonium ions, Reactivity- effects of substrate structure, attacking nucleophile, leaving group and reaction medium. Ambident nucleophiles and regioselectivity. Nucleophilic substitution at an allylic, aliphatic trigonal and a vinylic carbon.

Aromatic Nucleophilic Substitution: The ArS_NAr, ArS_N1, ArS_N2, benzyne and SRN_1 mechanisms, Reactivity-effect of substrate structure, leaving group and attacking nucleophile. The Von Richter, Sommelet – Hauser, and Smiles rearrangements.

Unit-V **Aliphatic Electrophilic Substitution:**

Bimolecular mechanisms – S_E2 and S_Ei. Electrophilic substitution accompanied by double bond shifts. Effect of substrates, leaving group and the solvent polarity on the reactivity.

Elimination Reactions: Mechanism and orientation in pyrolytic elimination. Mechanism and application of Cope elimination. Chugaev reaction. Peterson reaction.

Books Recommendation:

1. Advanced Organic Chemistry- Reactions Mechanism and Structure by Jerry March.
2. A guide Book to Mechanism in Organic Chemistry by Peter Sykes.
3. Organic Chemistry by R.T. Morrison and R.N. Boyd.
4. Advanced Organic Chemistry by Jagdamba Singh and L.D.S. Yadav.
5. Reaction Mechanism in Organic Chemistry by S.M. Mukherji and S.P. Singh.
6. Stereochemistry of Organic Compounds by D. Nasipuri.
7. Stereochemistry of Organic Compounds by P.S. Kalsi.
8. Advanced Organic Chemistry by F.A. Carey and R.J. Sundberg.
9. Organic Synthesis by Jagdamba Singh, L.D.S. Yadav and Jaya singh.

Semester-I

Practical (Physical Chemistry)

(Core Course –IV)

Full Marks -50 **Duration of Exam 6 hrs.** **Credits-5**

Any one experiment- **30 Marks**

1. Water equivalent of calorimeter and determination of
   (i) Heat of solution of potassium nitrate
   (ii) Heat of neutralization of strong acid and strong base.
   (iii) Basicity of polybasic acids.
2. Determination of rate constant of hydrolysis of methyl acetate in acid medium.
3. The study of saponification of ethyl acetate by sodium hydroxide and determination of rate constant.
4. To determine the distribution coefficient of
   (i) Acetic acid in
   (ii) Benzoic acid between water and benzene by partition method.
5. Determination of specific and molar rotation of sucrose in different concentrations and to determine the concentration of given solution.
6. Determination of rate constant of inversion of cane sugar using polarimeter.
7. i) Determination of Dissociation constant of acetic acid by conductometric titration.
   ii) Solubility product of sparingly soluble salt.

Viva-voce:15

Note books-5

Semester-I

AECC-1

Environmental Sustainability and Swachchha Bharat Abhiyan Activities

Semester-II
Core Course-V
Advances in Chemistry

Full Marks -70 **Credits-5**

Unit-I **Nuclear Chemistry**

(a) Shell model, Liquid drop Model, Nuclear Reactions and their Types, Nuclear Reactions Cross-section.

(b) Application of radio isotopes, tracer techniques, Neutron activation analysis, isotope dilution method.

Unit-II **Chemistry of Nanomaterials**

Definition, sources, examples, Bottom-up Method of synthesis, Characterization, and applications.

Unit-III **Solid state Chemistry**

Conductor, Semiconductor, and superconductor; Theory and Application

Unit-IV **Industrial Application of Chemistry**

Chemistry of Cement, Paper and Pulp, and Petroleum

Unit-V **Waste Management**

Nuclear waste management.

e-waste management

Recycling of plastic: [sorting, washing, shredding, identification and classification, recycling] (3 marks)

Semester-II
Core Course-VI
Inorganic Chemistry II

Full Marks -70 **Credits-5**

Unit-I **Bonding in coordination Compounds:** Effect of distortion on d- orbital energy level. John Teller effect,spectro chemical series. Thermodynamic effect of crystal field Theory. Site selection in Normal and inverse spinal structure. Calculation of hydration energy and lattice energy of complexes. Evidences in support of covalent bonding in Transition metal complexes. M.O. Theory of ML_6 with σ and π -bonding ligands using symmetry arguments. Magnetic properties and charge transfer spectra on the basis of M.O. model.

Unit-II **Electronic Spectra of Transition Metal Complexes.**
Spectroscopic ground states, correlation and spin-orbit coupling in free ions for 1st series of transition metals. Orgel and Tanabe-Sugano diagrams for transition metal complexes (d^2-d^8 states), calculation of Dq, B and β parameters. Structural evidence from electronic spectrum. Spectrochemical and nephelauxetic series, charge transfer spectra, electronic spectra of molecular addition compounds.

Unit-III **Symmetry in Chemistry.**
Symmetry elements and symmetry operations, definition of groups, subgroup, conjugate and class. Point symmetry group. Requirements of a mathematical group, multiplication table for C_{2v}, C_{3v}.

Unit-IV **Group theory in Chemistry.**
Representation of group by matrices. Working out representation of C_{2v}, C_{3v} point groups. Character of a representation. The great orthogonality theorem (without proof) and its importance in derivation of character table. Construction of character table for C_{2v} and C_{3v} point group.

Unit-V **Metal π-complexes.**
Metal carbonyls, structure and bonding, vibrational spectra of metal carbonyls for bonding and structural elucidation. Preparation, bonding, Structure and important reaction of transition metal nitrosyls.

Dinitrogen, tertiary phosphines as ligands. Metal Carbonyl clusters- Low Nuclear Carbonyl clusters Total electron count (TEC)

Books Recommended

1. Advanced Inorganic Chemistry- F.A. Cotton and G. Wilkinson
2. Inorganic Chemistry- Principles of Structure and reactivity – J.E. Huheey
3. Concise Inorganic Chemistry- J.D. Lee
4. Group Theory and its chemical applications- P.K. Cotton
5. Group Theory and its chemical applications- P.K. Bhattacharya

Semester-II
Core Course-VII
Physical Chemistry II

Full Marks :70 **Credits-5**

Unit-I **Introduction to quantum mechanics.**

(i) Postulates of quantum mechanics. Angular momentum and Linear Operator.

(ii) Hermitian operators, properties of operators.

(iii) Theorems of operators.

Unit-II **Exactly soluble system.**

(i) Linear Harmonic oscillator, Harmonic Vibration Hermite differential equation and its solution through recursion relation polynomial.

(ii) H-like atoms, separation of r,θ, φ equation. Laguerre and associated Laguerre Polynomial. Legendre polynomial equation and their solution.

Unit-III **Approximate Method.**

Variation method. Secular equation. Slater determinant. Perturbation method, first order perturbation. Application to He-atom. Symmetric and antisymmetric wave functions.

Unit-IV **Huckel Molecular Orbital Theory.**

Huckel theory of conjugated systems, bond order and charge density ns calculation. Application to ethylene, butadiene, allyl and benzene.

Unit-V **Chemical Bonding**

LCAO-MO theory, application of LCAO-MO theory to H_2^+ ion and H_2 molecule.

Recommended

Book Suggested:

1. Quantum chemistry : I.R. Lavine Prentice Hall
2. Quantum chemistry : Pillar
3. Quantum chemistry : R.K. Prasad
4. Quantum chemistry : Satya Prakashdiwan Sahajn
5. Solid State Chemistry : D.K. Chakrabarty, New Age International
6. New Direction Solid State Chemistry : C.N.R. Rao & J. Gopal
7. Introduction to quantum Chemistry : A.K. Chandra, Tata

Semester-II
Core Course-VIII
Organic Chemistry II

Full Marks-70 Credits-5

Unit-I **Addition to Carbon-Carbon Multiple Bonds**

Mechanistic and stereochemical aspects of addition reactions involving electrophiles, nucleophiles and free radicals, regio- and chemoselectivity, orientation and reactivity. Addition to cyclopropane ring. Hydroboration. Michael reaction. Sharpless asymmetric epoxidation.

Free Radical Reactions

Allylic halogenations (NBS), oxidation of aldehydes to carboxylic acids, auto-oxidation, coupling of alkynes. Free radical rearrangement. Borodincker reaction.

Unit-II **Photochemistry of carbonyl compounds**

Photochemistry of enones, hydrogen abstraction, Rearrangements of α,β unsaturated ketones and cyclohexadienones, photochemistry of β- hexafluoroacetone.

Photochemistry of unsaturated system

Olefins, cis-trans isomerization, dimerization, hydrogen abstraction and additions. Acetylenes-dimerization, dienes-photochemistry of 1, 3-butadiene (2+2) addition leading to cage structures, photochemistry of cyclohexadienes, photochemistry of aromatic compounds-excited state of benzene and its 1,2 and 1,3-diradicals, Photo-Fries rearrangement, Photo-Fries reaction of anilides, photosubstitution reaction of benzene derivatives, Photolysis of nitrite esters and Barton reaction.

Unit-III **Pericyclic Reactions**

Molecular orbital symmetry, frontier orbitals of ethylene, 1, 3-butadiene, 1,3,5-hexatriene and allyl system, Classification of pericyclic reactions, Woodward-Hoffmann correlation diagrams, FMO and PMO approach. Electrocyclic reactions-conrotatory and disrotatory motions, 4n, 4n+2 and allyl systems. Cycloadditions-antrafacial and suprafacial additions, 4n and 4n+2 systems, 2+2 addition of ketones, 1,3-dipolar cycloadditions and chelotropic reactions.

Sigmatropic rearrangement

Suprafacial and antarafacial shift of H, sigmatropic shifts involving carbon moieties, migration and inversion of configuration, (3,3) and (5,5) sigmatropic rearrangements detailed treatment of Claisen and Cope rearrangements. Aza-Cope rearrangements. Introduction to Ene reaction. Simple problems on pericyclic reactions.

Unit-IV Carbohydrate

Conformation of monosaccharides and important derivatives of monosaccharide- glycosides, deoxysugar, aminosugar. Structure determination and chemical synthesis of sucrose and trehlose.

Unit-V Amino acids, peptides and proteins

Chemical and enzymatic hydrolysis of proteins, amino acid sequencing. Secondary structure of protein, force responsible for secondary structure of protein, α- helix, β-sheet. Super secondary structure, tertiary structure of proteins folding.

Semester-II

Core Course - IX

Practical (Organic Chemistry)

Full Marks-50 Duration of Exam 6 hrs. Credits-5

1. **Quantitative Analysis**

Separation and identification of organic compounds in binary mixtures by chemical tests and preparation of their derivatives. 15Marks

2. **Organic Synthesis via two steps preparation** 15 Marks

   a. β-Nitroaniline from acetanilide.
   b. β-Bromoaniline from acetanilide
   c. β-Anthranilic acid from phthalic anhydride
   d. β-Bromoacetanilide from aniline.
   e. β-Nitroacetanilide from aniline.
   f. β-Aminoazo benzene from aniline.

3. Viva Voce 15 Marks
4. Note Book 05 Marks

Books Recommendation:

1. Advanced Practical Chemistry by Jagdamba Singh, L.D.S Yadav and Jaya Singh
2. Systematic Qualitative Organic Analysis by H. Middleton.
3. Handbook of Organic Analysis-Qualitative and Quantitative by H. Clark.
4. Vogel's Textbook of Practical Organic Chemistry by A.R. Tatchell.

Semester-II
AEC-1

Semester –III

Core Course-X

Principles & Applications of Spectroscopy

Full Marks-70 Credits-5

Unit-I Rotational Spectroscopy

Quantization of rotational energy and interactions of radiation with rotators. Classification of rotators: rigid rotator and Non-rigid rotator linear, symmetric and asymmetric rotators, isotopic effect, stark effect, effect of nuclear spin, and electron spin on rotational spectra. Bond length calculations.

Unit-II [A] Vibrational Spectroscopy

Harmonic oscillator model, harmonic and anharmonic vibration, Normal vibration, Factors affecting vibration frequencies, vibrating rotators, P,Q,R Branches, overtones, anharmonicity constant, Raman effect, stokes and antistokes lines, selection rules for IR and Raman spectra, Principal of mutual exclusion, Polarization of Raman Lines.

Unit-III Photoelectron Spectroscopy

Basic principles of photoelectric effect, ionization process, Adiabatic and vertical ionization energy,PES(UPS[UV-PES] and PESIS [XPES or ESCA), Chemical shift in ESCA, Chemical information from ESCA, Instrument and Techniques of Photoelectron Spectroscopy. Atomic electron spectra of inert gases. Comparison of Photo-electron spectra of Ar, Kr, Xe. Photo-electron spectra of H_2, O_2, N_2 and NO, HBr . XPES orESCA of Furan, Pyrrole and Thiophene. Zero kinetic energy , Photoelectron Spectroscopy; Auger Spectroscopy(AES), Scanning Auger Microprobes(SAM); Microscopic Technique : SEM, TEM, STEM,Focus ion beam Spectroscopy(FIB). Electron Microscope Koopman's theorem.

Unit-IV Magnetic Resonance Spectroscopy

Nuclear magnetic resonance, chemical shift of factors controlling its value spin-spin interaction and factors affecting its value. Spin Lattice relaxation and quantitative treatment of relaxation, selection rule and relative intensities of line. Principle of ESR spectroscopy, presentation of spectrum, theory of hyperfine, interaction, Isotropic g and A values.

Nuclear quadrupole resonance spectroscopy. Basic Concepts of NQR. Electric field gradient. NQR frequency for $I^{3/2}$ (I=1) B^{11} (I =3/2); Al^{27} (I= 5/2). Nuclear quadrupole coupling constant.

Unit-V Applications of Spectroscopy

(A) UV-Visible Spectroscopy

Spectra of carbonyl compounds and conjugated polyenes, Woodward-Fisher rules, aromatic and heterocyclic compounds and steric effect in diphenyls, quantitative determinations.

(B) Vibrational Spectroscopy

Organic effect of conjugation, resonance inductive effect, ring strain and hydrogen bonding on group frequencies and band shapes.

Inorganic: Changes with vibrational frequencies upon co-ordination, cases of linkage isomers, I.R. and Raman active form of vibrational geometry of AB_2, AB_3, AB_4, and AB_5. Hydrogen bonding.

(C) PMR and CMR Spectroscopy

Chemical shifts values and correlation for protons bonded with carbon. Effect of chemical exchange on line width, coupling constants, Interpretation of PMR and CMR spectra of organic compounds. Double resonance application of ^{19}F and ^{31}P spectra of inorganic compounds.

(D) Mass Spectrometry Ion production and Fragmentation, molecular ion peak, Metastable peak, Mc. Lafferty rearrangement. Examples of mass spectra of organic compounds.

Book Suggested:

1. Physical Methods for Chemistry by R.S. Drago, Saunders Company.
2. Structural Methods in Inorganic Chemistry by E.A.V. Ebsworth, D.W.H. Rankin and S. Cradock, ELBS.
3. Infrared and Raman Spectra: Inorganic and Co-ordination ponuds by K. Nakamoto, Wiley.
4. Progress in Inorganic Chemistry Vol.8. ed by F.A. Cotton, Vol. 15. ed. S.J. Lipard, Wiley.
5. Inorganic Electronic Spectroscopy by A.P.B. Lever, Elsevier.
6. Organic Spectroscopy by Jagdamba Singh and Jaya Singh
7. Spectroscopy of Organic Compounds by P.S Kalsi.
8. Spectrometric identification of organic compounds by Silverstein.

Semester -III
Core Course-XI
Bio-Inorganic Chemistry

Full Marks-70 **Credits-5**

Unit-I **Metal Ions in Biological Systems**

Essential and trace metals. Na^+/K^+ Pump. Role of metal ions in biological processes Toxicity of heavy metals and their detoxification, role of Selenium in Biological systems with reference to its essentiality and toxicity, mechanism of metal ion induced toxicity, interaction between orally administered drugs and metal ions in gut.

Unit-II **Bioenergetics and ATP Cycle**

DNA polymerisation, glucose storage, metal complexes in transmission of energy, chloroplyls, photosystem-I and photosystem-II in cleavage of water, Model system.

Unit-III **Transport and Storage of Dioxygen**

Redox proteins and oxygen uptake, structure and function of haemoglobin, myoglobin, hemocyanin and hemerythrin, model synthetic complexes of iron, cobalt and copper.

Unit-IV **Electron Transfer in Biology**

Structure and function of metalloproteins in electron transport processes- cytochromes and iron-sulphur proteins, synthetic models.

Nitrogenase

Biological nitrogen fixation, molybdenum nitrogenase, spectroscopic and other evidence, other nitrogenases model system.

Unit-V **Metals in Enzyme and Medicine**

The biochemistry of zinc, cobalt, nickel and molybdenum: Transport of Zinc, carbonic anhydrase, carboxypeptidase, alcohol dehydrogenase,Adenosyl cobalamine as a coenzyme, Ribonucleoside reductase ,Methylcobalamine and cyano cobalamine as a co-factor, Nickel in urease, Hydrogenase, Molybdenum hydroxylase, Xanthine oxidase, Sulphite oxidase, nitrate reductase.

Biochemical basis of essential metal deficient diseases. Iron copper and Zinc deficiency and their therapies, Carcinogens and carcinostatic agent, Zinc in tumors growth and inhibitial anticancer activity and Mechanism of platinum, Rhodium, copper and Gold complexes.

Books Recommend:

1. Principles of Bio-inorganic Chemistry – SJ Lippard and JM Berg. University Science Books.
2. Bio-inorganic Chemistry: I. Bertini, H.B. Gray, S.J. Lippard and J.S. Valentine University Science Books
3. Progress in Inorganic Chemistry, Vols 18 and 38 Ed. JJ. – Lippard. Wiley

Semester-III
Core Course-XII
(Environmental Chemistry and Green Chemistry)

Full Marks-70 **Credits-5**

Unit-I Environment

Introduction, Composition of atmosphere, vertical temperature, heat budget of the earth atmosphere system, vertical stability atmosphere. Biogeochemical cycles of C, N, P, S and O, bio distribution of elements.

Unit-II Hydrosphere

Chemicals composition of water bodies-lakes, streams, rivers, and wet lands etc. hydrological cycle. Aquatic Pollution – inorganic, organic, pesticide, agricultural, industrial and sewage, detergents, oil spills and oil pollutants. Water quality parameters – dissolved oxygen, biochemical oxygen demand (BOD), Solids, metals, content of chloride, sulphate, phosphate, nitrate and microorganism. Water quality standards.

Analytical methods for measuring BOD, DO, COD, F, Oils, Metals (As, Cd, Cr, Hg, Pd, Se, etc.). Residual chloride and chlorine demand. Purification and treatment of waste water.

Unit-III Atmosphere

Chemical composition of atmosphere-particles, ions and radical and their formation. Chemical and photochemical reactions in atmosphere, ozone formation, oxides of N, C, S, O and their effects, pollution by chemicals, petroleum, minerals, chlorofluorocarbons (CFC's), Greenhouse effect, acid rain, air pollution controls and their chemistry. Analytical methods for measuring air pollutants. Continuous monitoring instruments.

Unit-IV Green Chemistry: Definition and Objective

The twelve principles of Green Chemistry, atom economy in chemical synthesis, important techniques employed in practice of Green Chemistry. Application of microwave irradiation and ultrasound in chemical reactions, use of renewable raw materials and, biosynthesis, organic waste management, use of safer reagents, green solvents and green catalysts.

Unit-V Green Chemistry: Real Applications

Replacement of CFC and hydrocarbon blowing agents with environmental friendly blowing agent CO_2 in the production of polystyrene, Replacement of Ozone depleting and Smog producing solvents by surfactant assisted liquid or supercritical carbon dioxide for cleaning in manufacture of ICs and Computer chips.

Books Suggested

1. Environmental Chemistry and Green Chemistry, Asim K. Das, Books and Allied (P) Ltd. Kolkata.
2. Environmental Chemistry, B. Kaur, Pragati Prakashan.
3. Environmental Chemistry S.E. Manahan, Lewis Publishers
4. Environmental Chemistry, A.K. Dey, Wiley Eastern.
5. Environmental Chemistry, C. Baird, W.H. Freeman.

Semester-III
Core Course-XIII
(Bio- Organic Chemistry)

Full Marks-70 **Credits-5**

Unit-I Enzymes

Basic considerations, Proximity effects and Molecular adaption. Introduction and historical perspective, Chemical and biological catalysis, remarkable properties of enzymes like catalytic power, specificity extraction and purification. Fischer's lock and key and Koshland's induced fit hypothesis, concept and identification of active site by the use of inhibitors, Affinity labeling and enzyme modification by site-directed mutagenesis. Enzyme kinetics, Michaelis-Menten and Lineweaver- Burk plots, Reversible and irreversible inhibition.

Unit-II Mechanism of Enzyme Action

Transition-state theory, orientation and steric effect, acid-base catalysis, covalent catalysis, strain or distortion. Examples of some typical enzyme mechanisms for chymotrypsin, lysozyme and carboxypeptidase A.

Unit-III Reactions Catalysed by Enzymes

Nucleophilic displacement on phosphorus atom, multiple displacement reactions and the coupling of ATP cleavage to endergonic processes. Transfer of sulphate, addition and elimination reaction. Enolic intermediates in isomerization reactions, P-cleavage and condensation, some isomerization and rearrangement reactions. Enzyme catalysed carboxylation and decarboxylation.

Unit-IV Co-Enzyme Chemistry

Cofactors as derived from vitamins, coenzymes, prosthetic groups, apoenzymes. Structure and biological functions of coenzyme A, thiamine pyrophosphate, pyridoxal phosphate, NAD, NADH, FMN,

FAD, Lipoic acid, vitamin B12. Mechanisms of reactions catalyzed by the above cofactors.

Unit-V Bioenergetics and Protein Metabolism

Free energy and entropy change in biochemical reactions. Synthesis of ATP. ATP as biological currency. Calvin cycle, krebs cycle, glycolysis and glycogenesis. Amino acid metabolism, urea cycle. Chemical basis of heredity. Replication of DNA. Translation and Transcription.

Books Recommend:

1. Understanding Enzymes- Trevor Palmer, Prentice Hall
2. Enzyme Chemistry - Impact and Application, Ed- Colin J. Suckling, Chapma and Hall
3. Enzyme Mechanisms Ed- M.I. Page and A. Williams, Royal Society of Chemistry
4. Fundamentals of Enzymology- N.C. Price and L. Stevens, Oxford University Press.
5. Immobilized Enzymes- An Introduction and Applications in Biotechnology, Michael D. Trevan, John Wiley.
6. Enzymatic Reaction Mechanisms- C. Walsh, W.H. Freeman.
7. Enzyme structure and Mechanism- A. Fersht, W.H. Freeman.

Semester-III
Core Course-XIV
Practical (Inorganic Chemistry)

Full Marks-50 **Duration of Exam 6 hrs.** **Credits-5**

1. Quantitative analysis of two constituent ions of the following
   (a) Cu, Zn, (b) Fe, Ni (c) Ca, Mg (d)[Mg the cations Mg^{2+} Ca^{2+} and Al^{3+} can be estimated using EDTA. 15
2. Green methods of preparation of the following complexes and their study by IR, electronic spectra and T.G.A.
   15
   (a) Potassium ferrate (III)
   (b) Potassium chromate(III)
   (c) Chromium Acetate
   (d) $Hg[Co(SCN)_4]$
   (e) Hexa ammine Ni (II) chloride
3. Qualitative analysis of inorganic mixture containing six radicals including interfering radicals 15
4. Viva-voce 5
5. Note Book

Books Recommend:

1. A text Book of Quantitative Inorganic Analysis- A.I. Vogel
2. Applied Analytical chemistry- O.P. Vermani

Semester-III
AECC-2
Human values and professional ethics & gender sensitization

Semester-IV
Elective Course-1=
Inorganic Chemistry Special

Credits-5

Full Marks-70

Unit-I (A) Alkyls and aryls transition metals

Types, routes of synthesis, stability and decomposition pathways.

Organocopper in organic synthesis.

(B) Compounds of transition metal-carbon multiple bonds.

Alkylidenes, alkylidynes, low valent carbenes and carbynes synthesis, nature of bond, structural characteristics, Nucleophilic and electrophilic reactions on the ligands. Roles in organic synthesis. Fluxional organometallic compounds. Fluxionality and dynamic equilibria.

Unit-II Transition metal π- complexes.

Transition metal π complexes with unsaturated organic molecules alkenes, alkynes, allyl, dienyl, dienyl, arene trienyl complexes, their structural features and important nucleophilic and electrophilic reactions.

Unit-III Homogeneous Catalysis

Stoichiometric reactions for catalysis, homogeneous catalytic hydrogenation, Zeigler Natta polymerization of olefins, catalytic reactions involving CO, (e.g. hydro-carboxylation of olefins, (oxo reaction)), oxidation reactions, activation of C-H bond.

Unit-IV (A)SupramolecularChemistry

Introduction, Non covalent interactions, self-assembly in supramolecular chemistry. Reactivity and catalysis design and synthesis, transport processes and carrier design, supramolecular devices.

(B) Photo chemistry of metal complexes.

Basis of photochemistry, properties of excited states, excited states of metal complexes and their comparison with organic compounds.

Photo- substitution, photo-oxidation and photo-reduction. Excited electron transfer. Reaction of 2, 2-bipyridines and 1, 10 phenanthroline complexes, metal complexes sensitizers. Application of photochemical reactions of ru- ordinance compounds.

Unit-V **(A) Molecular rearrangement**

D and A process, reactions of geometrical and optical isomers, optical inversion, isomerisation and racemization of octahedral complexes, intermolecular and intramolecular rearrangement.

(B) Spectroscopic Application: Application of Mossbauer and ESR spectroscopy in elucidation of structure of inorganic molecule.

Books Recommend:

1. Organometallic Chemistry- Ayodhya Singh and Ramesh Singh
2. Organometallic Chemistry- RC Mehrotr and A. Singh
3. The Organometallic Chemistry of transition metals- Robert H. Crabtree
4. Organometallic Compounds- Indrajeet Kumar.
5. Supramolecular chemistry- concept and perspective- J.M. Lehn
6. Introduction to Supramolecular chemistry- Hickma- Ondrizek
7. Supramolecular chemistry Narendra N. Ghosh.
8. Photochemistry- Carle E. Wayne and Richard P. Wayne
9. Inorganic chemistry- Gary Wahlberg
10. Inorganic chemistry- J. E. Huhey, A. Keiter, L. Keiter, D.R. Methi
11. Inorganic Chemistry G.L. Miessler and D.A. Tarr
12. Advanced Inorganic chemistry- Cotton and Wilkinson T.

Semester-IV
Elective Course-1b
Physical Chemistry Special

Full Marks-70 Credits-5

Unit-I (A) Hartree Fock Theory:

Born oppenheimer approximation, Salter-Condon rule, Hartree-Fock equation, Koopman theory

(B) Semi Empirical Theories

HMO Theory of π systems. Bond order, Free valence and charge density, and its calculation. Extended Huckle theory.

Unit-II Catalysis and Oscillatory Behaviour

Kinetics of catalytic reaction, Arrhenius intermediates, rate-Half intermediates. Theory of acid-base catalyst, Bronsted catalysis law, Hammet equation,Oscillatory reactions.

Unit-III (A) Kinetics of condensed phase Reaction.

Factors determining reaction rate in solution. Transition state theory in solution, kinetics of ionic reaction. Dependence of rate constant on ionic strength and dielectric constant of the medium. Bronsted Bjerrum equation.

(B) Study of Fast reactions.

Flash Photolysis, relaxation techniques, Molecular beam and shock Tube kinetics, stop flow method.

Unit- IV Kinetics of Electrode reactions.

Faradic and non-faradic current rate law in faradic process, current density, factors affecting electrode-reaction. Effect of double layer structure on electrode reaction rates.

Unit-V (A) Corrosion

Scope and economic of corrosion, causes and types of corrosion, electrochemical theories of corrosion, Method of protecting the corrosion

(B) Thermodynamics of solids

Specific heat of solids, Einstein heat capacity equation Debye theory of specific heat.

Books Suggested.

1. Physical chemistry	:	P.W. Atkins
2. Advance Physical chemistry	:	Gurdeep Raj
3. Chemical Kinetics	:	Keith J. Laidler
4. Introduction to chemical Thermodynamics	:	R.P.Rastogi & R.R. Mishra

Semester-IV
Elective Course-1c
Organic Chemistry Special

Full Marks-70 Credits-5

Unit-I Terpenoids

Introduction, classification, isoprene rule and special isoprene rule. Structural determination, stereochemistry and synthesis of citral, α-Terpineol, camphor, santonin

Unit-II Alkaloids

Introduction, classification, general method of structure determination. Structure and synthesis of the following compounds: Papaverine, Nicotine, Atropine and Morphine.

Unit-III Drug Design

(a) Introduction, classification of drugs. Development of new drugs. Procedures followed in drug design. Structure activity relationship. Receptor. Theories of drug activity with emphasis on Drug-receptor interactions.

(b) Application of Mass, IR, UV-Visible, NMR (^1H & ^{13}C) in elucidation of structure of organic molecules.

Unit-IV Drugs

1. **Antineoplastic Agents**: Introduction, Cancer chemotherapy, role of alkylating agents, antimetabolites, natural products and hormones in treatment of cancer. Synthesis of mechlorethamine, cyclophosphamide, uracil-mustards, 6- mercaptopurine, melphalan.
2. **Cardiovascular Drugs**: Cardiovascular diseases, drug inhibition of peripheral sympathetic function, direct acting arterioles dilators. Synthesis of amyl nitrate, hydralazine verapamil, diazoxide propanol, sorbitrate, quinidine, Methyldopa, atenolol and propranolol.
3. **Anti-tubercular Drugs**: PAS, Isoniazid, Ethambutol Thiosemicarbazone Rifampicin

Unit-V Heterocyclic Compounds:

1. **Benzofused five membered heterocyclic compounds:** Classification, nomenclature of aromatic heteroatoms: Synthesis and reaction of benzopyrrole, benzofuran, benzothiophene.

2. **Five and Six membered Heterocycles1 with two or more heteroatoms:** Synthesis and reaction of oxazole, isoxazole, pyrazole, imidazole, thiazole, diazine and triazines.
3. **Seven and large membered Heterocycles with two or more heteroatoms:** Synthesis and reaction of azepines, oxepines, diazepines, azocines and thiapines.

Books Recommend:

1. Natural Products-Chemistry and Biological Significance by J. Mann, R.S. Davidson, J.B. Hobbs, D.V. Banthrope and J.B. Harborne.
2. Organic Chemistry by I.L. Finar
3. Reddi Chemistry of Carbon Compounds by S.Coffey.
4. Natural Products Chemistry by Jagdamba Singh and Jaya singh.
5. The Chemistry of Natural Products by P.S. Kalsi
6. Chemistry of Natural Products by Nakanishi.
7. An Introduction to Medicinal Chemistry by Graham L. Patrick.
8. Textbook of Organic Medicinal and pharmaceutical Chemistry by Charles O. Wilson, Ole Gisvold& Robert F. Doerge.
9. Principles of Medicinal Chemistry by Wilam O. Foye, Thomas L. Lemice and David A. Williams.
10. Burger's Medicinal Chemistry and Drug Discovery by M.E. Wolff.
11. Heterocyclic Chemistry by RR. Gupta, M. Kumar and V.Gupta.
12. Heterocyclic Chemistry by T.L. Gilchrist.
13. Organic Chemistry by I.L. Finar.

Semester-IV
Elective Course (P) 2e
Practical (Inorganic Chemistry Special)

Full Marks - 50 **Duration of Exam 12 hrs.** **Credit - 5**

1. Qualitative analysis of inorganic mixture containing six radicals including Mo, V, W, Ce — 15
2. Analysis of atleast two metal ions in alloys and minerals
   (a) Dolomite (b) Brass (c) Solder (d) Bauxite — 15

OR

Spectrophotometric determination of Fe, Ni, Mn, Cr, V, Ti, F^-, NO_3^- and PO_4^{3-} etc.

3. Viva-Voce — 15
4. Record File — 5

Books Recommended:

1. Quantative Analysis – A. I. Vogel
2. Quantitative Analysis – A. I. Vogel

Semester – IV

Elective Course (P) 2b

Practical (Physical Chemistry Special)

Full Marks - 50 **Duration of Exam 12 hrs.** **Credits- 5**

(Marks 30)

Two experiments have to be set.

1. Conductometric titration of strong acid and strong base [NaOH+HCl]
2. Potentiometrically pH of a given solution using hydrogen electrode or quinhydrone electrode.
3. Potentiometric Experiments Determination of Acid-base titration.
4. Determination of partition coefficient of Iodine between CCl_4 and water.
5. Determination of partition coefficient of $KI+I_2$ + KIbetween CCl_4 and water.
6. Viva-voce -15
7. Note Book -5

Semester – IV
Elective Course (P) 2C
Practical Organic chemistry (Special)

Full Marks – 50 Duration of Exam 12 hrs. Credits – 5

Any two experiments have to be set (Marks 30)

1. Separation and identification of organic compounds using chemical methods from organic mixtures containing up to three components

2. Preparation of organic compounds involving several stages

3. Estimation of carbohydrates, protein, aminoacids, ascorbic acid, blood cholesterol and aspirin by UV – visible Spectrophotometric method.

4. Viva Voce — 15 Marks
5. Note Book — 05 Marks

UNIVERSITY DEPARTMENT OF COMMERCE & MANAGEMENT

B.R. AMBEDKAR BIHAR UNIVERSITY, MUZAFFARPUR

Ref. No. Date

A meeting of the syllabus committee for modification in the syllabus of M.Com 1st and 4th semester (B.R.A.) was held on 22/03/2019 at 11 a.m. under the chairmanship of Prof. Premanand, H.O.D. P.G. Dept. of Commerce and Management, BRA Bihar University, Muzaffarpur.

The following members were present:-

1. Prof. Premanand ——— Chairman
2. Prof. S. Alay Mujtaba ——— Dean, Member
3. Prof. Shoaib Singh ——— Member
4. Prof. R.K. Srivastava ——— Member
5. Prof. Ajit Kr. Singh ——— External Expert
6. Prof. J.C. Verma ——— External Expert

The following resolutions were passed:-

1. In the 1st Semester, Paper Statistical Analysis units –IIIrd & IVth were replaced as under:
   - Unit – III: Probability Theory: [illegible]
   - Unit – IV: Probability Distributions: [illegible]

   By

   - Unit – III: [illegible]
   - Unit – IV: [illegible]

2. In the 4th Semester, unit – V was replaced by Goods and Services Tax Act-2017. The content includes: Overviews of GST, Implementation of GST, Liability of the tax payers, GST Network and GST Council.
3. Papers of other Subjects were remain unchanged.

Description of Papers for M.Com. Degree in the Faculty of Commerce under CBCS for Session : 2018-2020

Semester	Course/ Paper Code	Nature of Course/ Paper	Marks	Marks of CIA	Marks of ESE	Passing criterion	Qualifying Criterion
SEMESTER I	COMCC-1	Management Concept	100	30	70	40% or 12 out of 30 / 40% or 28 out of 70	Marks decide class/ CGPA
	COMCC-2	Statistical Analysis	100	30	70	40% or 12 out of 30 / 40% or 28 out of 70	Marks decide class/ CGPA
	COMCC-3	Managerial Economics	100	30	70	40% or 12 out of 30 / 40% or 28 out of 70	Marks decide class/ CGPA
	COMCC-4	Business Finance	100	30	70	40% or 12 out of 30 / 40% or 28 out of 70	Marks decide class/ CGPA
	AECC-1	Ability Enhancing Compulsory Course	100	50	50	40% or 20 out of 50 / 40% or 20 out of 50	Qualifying
SEMESTER II	COMCC-5	Human Resource Management	100	30	70	40% or 12 out of 30 / 40% or 28 out of 70	Marks decide class/ CGPA
	COMCC-6	Marketing Management	100	30	70	40% or 12 out of 30 / 40% or 28 out of 70	Marks decide class/ CGPA
	COMCC-7	Financial Management	100	30	70	40% or 12 out of 30 / 40% or 28 out of 70	Marks decide class/ CGPA
	COMCC-8	Corporate Legal Framework	100	30	70	40% or 12 out of 30 / 40% or 28 out of 70	Marks decide class/ CGPA
	COMCC-9	Management Accounting	100	30	70	40% or 12 out of 30 / 40% or 28 out of 70	Marks decide class/ CGPA
	AEC-1	Ability Enhancing Elective paper *	100	50	50	40% or 20 out of 50 / 40% or 20 out of 50	Qualifying
SEMESTER III	COMCC-10	Entrepreneurship Development in India	100	30	70	40% or 12 out of 30 / 40% or 28 out of 70	Marks decide class/ CGPA
	COMCC-11	Research Methodology	100	30	70	40% or 12 out of 30 / 40% or 28 out of 70	Marks decide class/ CGPA
	COMCC-12	Corporate Direct Tax	100	30	70	40% or 12 out of 30 / 40% or 28 out of 70	Marks decide class/ CGPA
	COMCC-13	Advance Accountancy	100	30	70	40% or 12 out of 30 / 40% or 28 out of 70	Marks decide class/ CGPA
	COMCC-14	Security Analysis and Portfolio Management	100	30	70	40% or 12 out of 30 / 40% or 28 out of 70	Marks decide class/ CGPA
	AECC-2	Ability Enhancing Compulsory Course	100	50	50	40% or 20 out of 50 / 40% or 20 out of 50	Qualifying
SEMESTER IV	COMEC-1	Corporate Tax Planning and Management	100	Will be decided by the deptt.	Will be decided by the deptt.	40% or 12 out of 30 / 40% or 28 out of 70	Marks decide class/ CGPA
	COMEC-2	Advance Cost Accounting	100	Will be decided by the deptt.	Will be decided by the deptt.	40% or 12 out of 30 / 40% or 28 out of 70	Marks decide class/ CGPA
	DSE-1	Discipline Specific Elective	100	30	70	40% or 12 out of 30 / 40% or 28 out of 70	Qualifying
	or GE-1	Generic Elective – may be continued to subject / across the faculty	100	30	70	35% or 11 out of 30 / 35% or 25 out of 70	Qualifying

CURRICULUM UNDER CBCS FOR POST GRADUATE COMMERCE (M. COM.)

SEMESTER - I

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Management Concept	100	70+30	5	45% IN CIA AND 45% IN ESE	50	
[illegible]	Statistical Analysis	100	70+30	5	DO	50	
[illegible]	Managerial Economics	100	70+30	5	DO	50	
[illegible]	Business Finance	100	70+30	5	DO	50	
AEC	Environment Sustainability and Swachh Bharat Abhiyan Activities	100	70+30	[illegible]	Do	50	
	Total	500		22		250	

SEMESTER - II

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Human Resource Management	100	70+30	5	45% IN CIA AND 45% IN ESE	50	
[illegible]	Marketing Management	100	70+30	5	DO	50	
[illegible]	Financial Management	100	70+30	5	DO	50	
[illegible]	Corporate Legal Framework	100	70+30	5	DO	50	
[illegible]	Management Accounting	100	70+30	5	Do	50	
AEC	*	100	70+30	[illegible]	DO	50	
		600		[illegible]		300	

SEMESTER - III

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Entrepreneurship Development in India	100	70+30	5	45% IN CIA AND 45% IN ESE	50	
[illegible]	Research Methodology	100	70+30	5	DO	50	
[illegible]	Corporate Direct Tax	100	70+30	5	DO	50	
[illegible]	Advanced Accountancy	100	70+30	5	DO	50	
[illegible]	Security Analysis and Portfolio Management	100	70+30	5	Do	50	
[illegible]	Human Values [illegible]	100	70+30	[illegible]	Do	50	
		600		[illegible]		300	

- * BASKET OF AEC COURSE (Select any one)
  - Computer & IT skill
  - [illegible]
  - Financial Risk Management
  - [illegible] Management
  - [illegible]
  - [illegible]
  - Environmental Law
  - Tourism & Hospitality Management
  - Life Skill & skill Development
  - Yoga [illegible]

SEMESTER – IV

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]							
COMEC-1	Corporate Tax Planning and Management	100	70+30	5	3hr	50	
COMEC-2	Advance Cost Accounting	100	70+30	5	3hr	50	
DSE-1 or GE-1	DSE-1 i.e. CC-5 of Other Discipline and GE-1 from the basket of GE Course **	100	30+70	5	3hr	50	
	Total	300		15		150	

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
COMEC-1	Services Marketing	100	70+30	5	3hr	50	
COMEC-2	Retail Management	100	70+30	5	3hr	50	
DSE-1 or GE-1	DSE-1 i.e. CC-5 of Other Discipline and GE-1 from the basket of GE Course **	100	30+70	5	3hr	50	
	Total	300		15		150	

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
COMEC-1	Industrial Relations in India	100	70+30	5	3hr	50	
COMEC-2	Labour Welfare and Social Security	100	70+30	5	3hr	50	
DSE-1 or GE-1	DSE-1 i.e. CC-5 of Other Discipline and GE-1 from the basket of GE Course **	100	30+70	5	3hr	50	
	Total	300		15		150	

** Basket of GE Courses

- Music
- Dramatics
- Fine Arts
- Graphic Design
- Gender in Politics
- Human rights
- Any courses run by the department

FIRST SEMESTER

(COMM-C-1) MANAGEMENT CONCEPT

Unit – I **The Basics** - Concept, Nature, Scope, Significance, Levels, Managerial [illegible], Management by Objectives.

Unit – II **The Management Thought** - Taylor, Fayol, [illegible], Contemporary [illegible] and Critical Evaluation.

Unit – III **The Management Function** - Planning, Organising, Staffing, Directing, Leading, Coordinating, Communicating and Control - An introductory idea.

Unit – IV **The Functional Areas of Management** - Production, Finance, HRD and Marketing Functions - A Brief Overview.

Unit – V **Management Information System** - Concept, Functional Information System and Their Role in Decision Making.

BOOKS RECOMMENDED :

1. [illegible] : Management Principles & Practice, [illegible], New Delhi.
2. [illegible] : Essentials of Management, [illegible], Delhi.
3. Koontz, Harold & Other: Essentials of Management, Tata McGraw Hill, New Delhi.
4. Robbins, Stephen P.: [illegible] Management, Prentice Hall, New Delhi.
5. [illegible]

(COMM-C-2) STATISTICAL ANALYSIS

Unit – I **Business Forecasting** - Types of Business Forecasting Techniques, Forecasting Methods.

Unit II **Correlation and Regression Analysis** - Meaning, Importance, Types of Correlation, Karl Pearson's Coefficient of Correlation, Spearman's Rank Correlation, Regression Analysis - Concept, Importance, Difference between Correlation and Regression, Linear Simple [illegible]

Unit – III **Moments** - Meaning, Objectives, Calculation of Moments about Arbitrary Mean, Calculation of Moments about Arbitrary Origin, Calculation of Central Moments by Arbitrary Origin, Conversion of Central Moments into Moments about Arbitrary Origin.

Unit – IV **Association of Attributes** - Methods of Determining Association: Meaning, Classification, Notation, Determination of Unknown Class Frequencies (upto 3rd order), Yule's Coefficient of Association of Attributes.

Unit – V Chi-Square Test - Test of Independence and Test of Goodness of Fit.

BOOKS RECOMMENDED :

1.	Hooda, R.P.	Statistics for Business and Economics, Macmillan, New Delhi.
2.	Gupta, S.P.	Statistical Method, Sultan Chand, New Delhi.
3.	Asthana, B.N.	Elements of Statistics, Chaitanya Pub. House, Allahabad.
4.	Elhance, D.N.	Fundamentals of Statistics, Kitab Mahal, Allahabad.
5.	S.P. Singh	Statistics: Theory and Practice, S. Chand, New Delhi.
6.	Gupta, B.N.	Statistics, Sahitya Bhawan, Agra.

ECOMCC-3: MANAGERIAL ECONOMICS

Unit – I **Introduction :** Nature and Scope of Managerial Economics, Role and Responsibilities of Managerial Economist.

Unit – II **Demand Analysis :** Individual and Market Demand Functions, Law of Demand, Determinants of Demand, Elasticity of Demand-Meaning and Importance-Use of Elasticity in Managerial Decisions.

Unit – III **Pricing Theory :** Price Determination Under Different Market Conditions, Price Determination and Firms Equilibrium in Short Run And Long Run Under Perfect Competition and Monopoly.

Unit – IV **Pricing Policies & Practices :** Objectives of Pricing Policies, Pricing Methods and Policies.

Unit – V **Profit :** Nature And Measurement of Profit

BOOKS RECOMMENDED :

1. Dhingra, O.P. — Managerial Economics – Tata Mcgraw Hill, Delhi.
2. Dean, Joel — Managerial Economics, Prentice Hall Delhi.
3. Peterson, Hik Others — Managerial Economics- Prentice Hall,Delhi.
4. Varshney& Maheshwari — Managerial Economics- Sultan Chand & Sons, New Delhi.
5. Shepherd, D.H. — Managerial Economics, Tilhan Publ. House, New Delhi.

ECOMCC-4: BUSINESS FINANCE

Unit – I **Introduction :** Definition, nature and Scope of Business Finance, Finance Function in Business, Traditional and Modern Views of Finance, Objectives of Financial Management – Profit Maximization Vs. Wealth Maximization.

Unit – II **Planning for Funds :** Financial Plan - Meaning and Basic Considerations, Factors Affecting Fixed Capital and Working Capital Requirements.

Unit – III **Capitalization :** Concept, Cost and Evolution, Theories of Capitalization, Over – capitalization and Under Capitalization – Their Causes, Effects and Remedies.

Unit – IV **Factors of Capital Requirement :** Long - Term and Medium – Term Financing - Purpose, Sources and Importance, Short Term Financing – Purpose, Sources and Importance.

Unit – V **Raising of Funds :** Sources and Forms of External Financing with Special Reference to India; Underwriting of Capital Issues – Theory and Actual Practices of underwriting in India.

BOOKS RECOMMENDED :

1. Pandey, I.M. – Financial Management, Vikas Publishing, Delhi.
2. Khan, M.Y. & Other - Financial Management, Tata McGraw, New Delhi.
3. Chandra, Prasanna – Financial Management, Tata McGraw, New Delhi.
4. Hampton, John – Financial Decision, Prentice Hall, New Delhi.
5. Kishore, Ravi M. – Financial Management, Taxmann, New Delhi.

SECOND SEMESTER

CORE-3: HUMAN RESOURCE MANAGEMENT

Unit – I **Introduction** : Concept of Human and Personnel, Concept and Dimensions of Human Resource Management, Objectives and Significance.

Unit – II **Selection, Training and Development** : Man Power Planning, Sources of Recruitment, Selection Procedure, Training Methods, Development of H.R.

Unit – III **Employee Relations** : Concept and Importance of Departmental Relationship, Trade Union and Collective Bargaining, Social Responsibility of Trade Unions

Unit – IV **Human Resource Appraisal** : Concept and Significance, Criteria of Performance Appraisal.

Unit – V **Human Resource Accounting and Auditing** - Concept and Methods.

BOOKS RECOMMENDED :

1. I.L.O., Ed., Labour Problems in Public Sector, I.M. Publication of I.M. Nanda University.
2. Subba Rao P, Personnel and Human Resource Management, HPH, Mumbai.
3. Dipak K.C., Strategic Human Resource Management, Pioneer Publication
4. Aswathappa, K. Human Resource Management, TMH, New Delhi
5. Gary Dessler, Human Resource Management, Prentice Hall India, New Delhi
6. Monappa, A & Saiyadain M - Personnel Mgt, TMH

(CORE-4) MARKETING MANAGEMENT

Unit – I **The Fundamentals** : Concept, Nature, Scope, Import and Scope in market, Consumer and Industrial Markets, Market Segmentation.

Unit – II **Marketing Environment** : Micro and Macro Environment - the components and their role in making the marketing decisions.

Unit – III **Marketing Information System** : Concept, Sub-systems, Management of inputs, importance of MIS

Unit – IV **Consumer Behaviour** : Understanding Consumer Behaviour, Factors influencing Consumer Behaviour.

Unit – V **Marketing Mix : The Concept, The Ingredients of Marketing Mix :**

Product – Concept, Product Life Cycle, product innovation, Product Line, Packing and Packaging, Branding, product Development.

Promotion – Concept, Components, Advertising, Publicity, Sales Promotion, Personal Selling, Cause related and Sponsorship Marketing, Word of mouth Promotion

Pricing – Policy, Objectives, Strategies

Place – Levels of distribution and Physical Distribution

BOOKS RECOMMENDED :

1. Kotler Philip & Gary Armstrong – Principles of Marketing, Prentice Hall, New Delhi.
2. Ramaswamy, V. S. & Other – Marketing Management, MacMillan, India, New Delhi.
3. Boyden, Forbes, L., & Other – Fundamentals of Marketing, McGraw Hill, New York.
4. Still Richard R. & Other – Sales Management Decisions, Prentice Hall, New Delhi.
5. Schleimer, S. – Case Study in Marketing, Prentice Hall New Delhi.
6. Jha and Singh – Marketing Management in Indian Perspective, Himalaya Publishing House, Mumbai.

(CORE-C7) FINANCIAL MANAGEMENT

Unit-I	**Financial Management :** Concept, Objectives and Significance.
Unit-II	**Cost of Capital and Capital Budgeting :** Meaning and Significance of Cost of Capital, Computation of Cost of Debt, Preference Capital, Equity Capital and Retained Earnings, Combined (Weighted) Cost of Capital, Meaning and Significance of Capital Budgeting, Methods of Evaluating Investment Opportunities : Payback Period, Net Present Value, Internal Rate of Return.
Unit-III	**Capital Structure:** Traditional Approach of Capital Structure, MM Hypothesis, Trenor Arbitrage, Capital Structure, Leverage – Operating Leverage, Financial Leverage, Combined Leverage, Measurement of Leverage.
Unit-IV	**Management of Income:** Retained Earnings – A Source of Internal Financing, Concept and Types of Dividend, Determinants of Dividend Policy, Dividend Policy – Walter's Model and MM Hypothesis.
Unit-V	**Management of Working Capital:** Meaning, Significance and Types of Working Capital, Sources of Working Capital, Determinants of Working Capital.

BOOKS RECOMMENDED :

1. Pandey, I.M. – Financial Management, Vikas Publishing, Delhi.
2. Khan, M.Y. & Jain – Financial Management, Tata McGraw, New Delhi.
3. Chandra, Prasanna – Financial Management, Tata McGraw, New Delhi.
4. Kishore, Ravi M. – Financial Management, Taxmann, New Delhi.
5. Bhattacharya, H – Working capital Management, Prentice Hall, New Delhi.

(CORE-C8) CORPORATE LEGAL FRAMEWORK

Unit – I	**The Indian Companies Act, 2013 :** Nature and Types of Companies, Memorandum and Articles of Association and Prospectus.
Unit – II	**Share Capital :** Share and Share Capital, Membership and Transfer of Shares.
Unit – III	**Meetings and Management :** Kinds of Meeting, Annual General Meeting and Board Meetings, Role and Responsibilities of Directors and Managing Director of a Company.
Unit – IV	**Accounts and Audit :** Annual Accounts, Statutory Audit, Special Audit and Cost Audit, Corporate Social Responsibility.
Unit – V	**Other Legislations :** Introductory notes of SEBI, FEMA, IRDA and Consumer Protection Act.

BOOKS RECOMMENDED :

1. Ishi, Ahuja – Student Guide to Companies Act, Taxmann, New Delhi.
2. Majumdar and Kapoor – Company Law and Practice, Taxmann, New Delhi.
3. Kapoor, N.D. – Company Law, Sultan Chand, New Delhi.
4. The Companies Act, 2013 (Bare Act).
5. Ramaiya – A Guide to Companies Act, Wadhwa Gurgaon, Nagpur.
6. Bare Acts – SEBI, FEMA, IRDA and Consumer protection Act.

6208CC-9 MANAGEMENT ACCOUNTING

Unit – I **Introduction to Accounting:** Management Accounting As An Area of Accounting, Objectives, Nature And Scope of Management Accounting, Cost Accounting And Management Accounting, Difference between Management Accounting and Financial Accounting and Cost Accounting.

Unit – II: **Budgeting:** Definition of Budget, Essential of Budgeting, Types of Budget Flexible Budget, Functional Budget, Sales Budget, Production Budget.

Unit – III **Standard Costing and Variance Analysis:** Standard Costing as a Control Technique, Variance Analysis Meaning and Importance, Kinds of Variance and Their Uses, Material and Labour variance.

Unit – IV **Break Even Analysis :** Concept of Cost Volume, Profit Analysis, Break Even Point, Margin of Safety and Break Even Chart

Unit – V **Management Reporting :** Financial Information System Need and Importance, Essentials of Good Reporting System

BOOKS RECOMMENDED :

1. S. N. Maheshwari – Accounting for Management, Sultan Chand, New Delhi
2. Kuppapally – Accounting for Managers, PHI, New Delhi
3. Arora, M.N. – Accounting for Management, Himalaya Publishing House, Mumbai
4. B. Chakravarty & S. Chakravarty – Management Accounting, Oxford University Press, New Delhi
5. Sehgal and Sehgal – Accounting for Management, Taxmann, New Delhi

THIRD SEMESTER

(COMCC-10) ENTREPRENEURSHIP DEVELOPMENT IN INDIA

Unit – I **Entrepreneur** – The Concept, Characteristics, Entrepreneurial Traits, Types of Entrepreneurs, Role of Entrepreneurs in Economic Growth.

Unit – II **Entrepreneurship Theories and Development** – Theories of Entrepreneurship, Entrepreneurs Development Programme, Promotional Policies and Strategies.

Unit – III **Motivation and Behaviour** – Entrepreneurial Behaviour and Motivation, Entrepreneurial Success in Rural Areas, De-motivating Factors of entrepreneurial development.

Unit – IV **Ideas and Inputs** – Sources of Ideas, Ideas Processing, Input Requirements, Financing Criteria, Technical Assistance, Marketing Assistance, Sickness and Remedial Assistance, Preparation of Feasibility Reports.

Unit – V **Women Entrepreneurs** – Segments of Women Entrepreneurs, Profile of a Women Entrepreneurs of India, Threat issues in the Development of Women Entrepreneurs in India.

BOOKS RECOMMENDED :

1. Gupta and Srinivasan – Entrepreneurship Development in India, Sultan Chand, New Delhi.
2. Gupta and Khan : Entrepreneurship Development, International Book House Pvt. Ltd., New Delhi
3. Saini and Saini – Entrepreneurship, Excel Books, New Delhi
4. Khanka : Entrepreneurship Development, S. Chand, New Delhi
5. Vasant Desai – Entrepreneurial Development, Himalaya Publishing House, Mumbai.

(COMCC-11) RESEARCH METHODOLOGY

Unit – I Introduction

Concept and Types of Research, Steps in Research Process, Formulation of Research Problem, Hypothesis Development, Research Design

Unit – II : Collection and Presentation of Data

Types of Data – Primary and Secondary; Scaling of Parametric and non-Parametric Quality, Collection, Classification, Tabulation and Pictorial Presentation, Questionnaire and Schedule, Case Study Method and Field Study

Unit – III : Sampling Methods and Techniques

Meaning and Methods of Sampling, Probability and non-probability methods, Random and Non-random techniques, Stratification

Unit – IV : Hypothesis Testing

Hypothesis Testing, Tests of Significance – t Test, F Test, χ^2 Test and ANOVA

Unit – V : Report Writing

Types of Report, Steps in Report Writing, Research Report Format – Contents and Style, Documentation : Footnotes and Bibliography, Paper Writing for a Journal / Seminar Presentation

BOOKS RECOMMENDED :

1. O.R. Krishnaswami & M. Ranganatham – Methodology of Research in Social Sciences, HPH, Mumbai
2. J.K. Sachdeva – Business Research Methodology, HPH, Mumbai
3. C.R. Kothari – Research Methodology – Methods and Techniques, New Age International Publishers
4. Shashi K. Gupta & Praneet Rangi – Research methodology – Methods, Tools and Techniques, Kalyani Publishers

(COMCC-II) ADVANCED ACCOUNTANCY

Unit – I **Investment Accounting :** Concept of Investment, Types of Investment, Dealing in Securities, Investment Ledger, Accounting for Investments

Unit – II **Voyage Accounting :** Introduction, Meaning of Voyage Accounting, Expenses and Income Related to Voyage, Preparation of Voyage Account

Unit – III **Social Accounting :** Social Responsibilities of Business, Meaning of Social Accounting, Approaches to Social Accounting, Measurement of Social Costs Benefit

Unit – IV **Accounting for Price Level Changes (Inflation Accounting) :** Introduction, Limitations of Historical Accounting, Meaning of Accounting for Changing prices, Approaches to Price level Accounting Or Inflation Accounting : Current Purchasing Power Accounting (CPPA), Current Cost Accounting (CCA).

Unit – V **Financial Reporting for Corporate Sector :** Introduction, Objectives of Corporate Reporting, Users of Accounting Information, External Users and Internal Users, Disclosure Requirements, Directors's Report, Auditor's Report, Internal Financial Reporting.

BOOKS RECOMMENDED :

1. Bhatia and Grewal – Advanced Accounts, S Chand, New Delhi
2. Jain and Narang – Advanced Accountancy, Kalyani Publications, Ludhiana
3. Shukla and Gupta – Advanced Accounting, SBP, Agra
4. Rao, M.S. Bhaskarao – Advanced Accountancy, New Age International Pvt., New Delhi
5. Maheshwari, S.N. – Advanced Accountancy – Vikash Publications, New Delhi

(COMCC-II) CORPORATE DIRECT TAX

Unit – I **Direct Taxation** – Concept and objectives of Income tax system, Corporate Tax, Meaning and Objectives, Types of Companies Assessee

Unit – II **Computation of Total Income of a Company:** Income from House Properties, Income From Business and Profession, Capital Gains, Income from Other Sources

Unit – III **Computation of Corporate Tax:** Rebate on income Tax for Companies, Set off and carry forward of losses, Computation tax liabilities on Total Income of Company

Unit – IV **Special Tax Provisions** – Tax provisions in Respect of Free Trade Zone, Tax Provisions in Respect of Infrastructure Development, Tax Provisions in respect of backward Areas, Tax Provisions in Respect of Tax Incentives to Exporters

Unit – V **Tax payment** – Tax Deduction at Source and Tax collection at source

BOOKS RECOMMENDED:

1. V. S. Singhania – Direct Tax – Law and Practice, Taxmann, New Delhi
2. H.C. Mehrotra – Income Tax, Sahitya Bhawan, Agra
3. H.C. Mehrotra – Wealth Tax, Sahitya Bhawan Agra
4. Chawla & Gupta – Wealth Tax.

(CONCC-14) SECURITY ANALYSIS & PORTFOLIO MANAGEMENT

1. Investment Management - Concept of Investment Management, Investment Management Functions, Investment Management Organizations

2. Concept of Investment - Investment Process Investment Outlets, Investors, Investment Environment, Portfolio, Selecting the Best Portfolio

3. Risk & Return - Security Returns Risk, Systematic Risk, Unsystematic Risk Return Relationships.

4. Security Analysis - Approaches of Security Analysis, Technical Analysis, Fundamental Analysis, Efficient Market Hypothesis.

5. Portfolio Analysis and Revision - Markowitz theory, sharp Index Model, Optimum Portfolio, Portfolio Revision

BOOKS RECOMMENDED

1. Pandian P., Security Analysis and Portfolio Management, Vikash Publishing House, New Delhi
2. Bhalla, V.K. : Investment Management, Eighteenth Edition, new Jersy, Prentice Hall Inc.
3. Fischer, Donald & Jordan, Ronald J. Security analysis and Portfolio Management, New Delhi, Prentice Hall of India
4. Sharpe, William F etc. Investments, New Delhi, Prentice Hall of India.
5. Fuller, Russell J and Farrell James, L - Modern investments and Security analysis - New York, Mc Graw Hill, 1985.
6. Huang, Stanley, S.C. and Randall Maury H - Investment Analysis and Management, London Allyn and bacon, London 1987
7. (The list of cases and specific references including recent articles will be announced in the class at the time of finalizing of the course.)

FOURTH SEMESTER

SPECIALIZATION / BC: ACCOUNTING AND FINANCE

(COMEC-1) CORPORATE TAX PLANNING AND MANAGEMENT

Unit – I **Introduction** – Concept of Tax Planning and Management, Tax Planning vs Tax Management, Tax Planning and Financial Management, Tax Avoidance and Evasion.

Unit – II **Tax Planning for Setting up of a new business** – Tax Planning with reference to setting up of a new business – Tax Provisions in respect of nature and area of business establishment.

Unit – III **Tax Planning and Financial Management Decision** – Tax Planning with Reference to Capital Structure, Capital Structure Decisions and Dividend Policy.

Unit – IV **Tax Planning with reference to Forms of Business Organisation** – Tax Planning with Reference to Sole Proprietary Business, HUF, Partnership Firm and Joint Stock Company – a comparative study.

Unit – V **Tax Planning for Employee's Remuneration** – Mode of Remuneration Payment for Tax Planning.

BOOKS RECOMMENDED :

1. Lakhotia, R. N. – Corporate tax planning, [illegible] Delhi.
2. Singhania V. K. – Direct taxes, Taxmann Publication.
3. Singhania and Sethi – Direct Tax Planning and Management, Taxmann, New Delhi.

(COMEC-2) ADVANCED COST ACCOUNTING

Unit-I **Introduction** : Meaning, Definition and Need for Cost Accounting; Classification of Cost, Installation of a Costing System.

Unit-II **Services costing** : Cost collection, transport costing, [illegible] and maintenance charges, Log sheet – The Related Numerical problems.

Unit-III **Marginal Costing** : Meaning, Significance and Application of Marginal Costing, Determination of Profit under Marginal Costing – The Related Numerical problems.

Unit-IV **Differential Costing**: Meaning and Uses; Difference between Marginal Costing and Differential Costing, The Related Numerical problems.

Unit-V **Recent Developments in Cost Accounting** – A Brief Idea of Activity Based Costing, Cost Control, Cost Reduction and Cost Audit.

BOOKS RECOMMENDED :

1. Saxena and Vashistha – Cost Accounting, Sultan Chand, New Delhi
2. Horngren, Sundaram and Datar – Advanced Management Accounting, PHI, New Delhi
3. Kishore, Ravi M. – Cost Accounting, Taxmann, New Delhi
4. Jain, S. K. – Cost Accounting, [illegible] Publishers, Kolkata
5. Maheshwari – Cost and Management Accounting, Sultan Chand, New Delhi
6. Khan and Jain – Cost Accounting, TMH, New Delhi

SPECIALIZATION : BE: MARKETING

(CODE:C-1) SERVICES MARKETING

Unit – I **The Fundamentals :** Services : the concept, Salient Features, Marketing Concept in Services, Services Marketing and the services sector, Role of Services Sector in the National economy of India, Impact if Technology on Services Marketing, Marketing Mix for Services.

Unit – II **Some Important Aspect in Services Marketing :** Demand Supply Management, Service Product Development, Service Encounter, Service Consumer Behaviour, Service Quality, Service Recovery, Marketing Services of Profit and Non-Profit Organizations.

Unit – III **Application in Selected Profit Making Organizations :** Bank, Insurance, Tourism, Hotel.

Unit – IV **Application in Selected Non-Profit Organizations :** Educational, Health, Political and Religious.

Unit – V **Emerging Challenges :** Trends in Indian Economy, Aspects of Globalization, Emerging Areas.

BOOKS RECOMMENDED :

1. Lovelock - Services Marketing, prentice Hall, New Delhi
2. Rajendra Nargundkar - Services Marketing, Tata Mc Graw Hill, New Delhi
3. K.K. Jha - Services Marketing, HPH, Mumbai
4. Donald W. Cowell - The Marketing of Services, CIMC Foundation London
5. Rajiv Bhave - Marketing Professional Services, Prentice Hall, New Delhi

(CODE:C-2) RETAIL MANAGEMENT

Unit – I **Introduction to Retail management :** Concept of Retail and Retailing, Types of Retailers, Retailing in India, Retail Outlets – the Formats, Retail Organization, Design and Structure, Retail Retailing.

Unit – II **Planning and Merchandising Management :** Sales Forecasting for Retailing, Determining the Planning Process, Merchandising Management the Concept, Merchandising Plan.

Unit – III **Pricing and Location :** Strategic Profit Model, Activity Based Costing, Factors influencing Retailers Choice of Locations, Retail Location Strategies.

Unit – IV **HRM in Retail :** Importance of HRM in Retailing, Competitive Advantages of Effective HRM, Developing Employee Skills, Motivational Factors

Unit – V **Retail Marketing :** Retail marketing the concept, Retail Market Strategy, Stores in Retail Marketing Emerging Trends in Indian retail Market, FDI in Retail.

BOOKS RECOMMENDED :

1. Michael Levy, Barton, A. Weitz – Retail Management, Tata Mc Graw Hill, New Delhi
2. David Gilbert – Retail Marketing Management, Pearson Education, Singapore
3. Raju R. Nair – Retail Management, HPH, Mumbai
4. Nirmalya – Retail Management, Jaico Publishing House

SPECIALIZATION / (C): HUMAN RESOURCE MANAGEMENT

(CDMEC-2) INDUSTRIAL RELATIONS IN INDIA

Unit-I **Industrial Relation in India and Emerging Challenges**: Industrial Relations: The Concept - Evolution of Industrial Relations; Emerging Trends in Industrial Relations in an Era of Globalisation.

Unit-II **Trade Unionism and Collective Bargaining**: Trade Unions, Growth and Development of Unions; Functions of Unions; Trade Unions Act, 1926 and Recent Amendments; Collective Bargaining; Concept, Collective Bargaining Process.

Unit-III **Grievance Redressal and Discipline Mechanism**: Discipline Mechanism-Judicial Approach to Discipline; Misconduct; Disciplinary Proceedings; Domestic Enquiries; Charge-sheets; Conduct of Enquiry and Award of Punishments; Grievance and Redressal: Approaches and Nature of Grievances; Causes; Redressal Mechanisms.

Unit-IV **Industrial Conflict and Regulations of Industrial Disputes**: Industrial Conflict-Nature of Conflicts; Strikes; Lockouts; Arbitration; Conciliation; Adjudication; Settlement of Disputes.

Unit-V **Workers Participation**: Workers Participation-Evolution and Nature of Participation; Forms of Participation; Impact of Participation; Prerequisites for Success-full Participation; Limitations of Participation.

BOOKS RECOMMENDED :

1. **Kochan**, T. A. & Katz Harry: Collective Bargaining and Industrial Relations, 2nd ed. Homewood, Illinois, Richard D Irwin, 188.
2. **Mamkoottam, K.** – Trade Unions, Myth and Reality, New Delhi, Oxford University Press.
3. **Niland, J. R. etc.** – The Future of Industrial Relations, New Delhi, Sage, 1994.
4. **Ramaswamy, E.A.** – The Rayon Spinners – The Strategic Management of Industrial Relations, New Delhi, Oxford University Press, 1994.
4. **Jha D. K.** – Labour Problem in [illegible] Sector. L.N. Mithila University, Darbhanga Mithila university, Darbhanga, Publication.

(CDMEC-3) LABOUR WELFARE AND SOCIAL SECURITY

Unit-I **Labour Welfare**: Concept, Objectives and Scope of Labour Welfare; Types of Labour Welfare-Statutory and Non-Statutory; Agencies of Labour Welfare Work.

Unit-II **Labour Welfare in India**: Labour Welfare under Constitution of India; Main Provisions of the Factories Act, 1948, Regarding Labour Welfare;

Unit-III **International Labour Organisation in Pursuit of Labour Welfare**: Structure Functions and Roles.

Unit-IV **Social Security**: Concept, Need and Significance of Social Security; Types of Social Security; Social Assistance and Social Insurance.

Unit-V **Social Security in India**: Main Features and Provisions of the Employees State Insurance Act, 1948, the Employees' Provident Funds and Misc. Provisions Act, 1952, the Workmen's Compensation Act, 1923 and the Maternity Benefit Act, 1961 with regard to Labour Welfare.

BOOKS RECOMMENDED :

1. Bhatnagar, Punekar and Deodhar – Trade Union, Industrial Relation and Labour Welfare, HPH, Mumbai.
2. Malik, P.L. – Hand Book of Industrial Law, Eastern Book, Lucknow.
3. Arun Monappa – Industrial Relations, TMH.

AECC-2

A- Environmental Sustainability (3 Credit)

B- Swachha Bharat Abhiyan Activities (2 Credits)

Each credit requires 10 hours of teaching- learning for theory and 20 hours for practical assignment field work

A-Unit-1 Environmental ethics & ecosystem: Concept of sustainable development with reference to human values in western and Indian perspective, sustainable development & conservation of natural resources (Nature, factors, structure, development and people participation) development; environmental rural and urban, concept of Ecosystem

A-Unit-2 Development and its effect on environment: Environment Pollution - water, air, noise etc. due to Urbanization, Industrial civilization, Concept of Global Warming, Climate Change, Green House Effect, Acid rain, Ozone layer depletion. Measure of encroachment of exotic plants particularly parthenium and [illegible] with special reference to impact on [illegible] & [illegible] on indigenous flora & fauna

A-Unit-3 Concept of Bio-diversity and its conservation. Environmental Degradation and conservation laws, Policies, Social efforts and role of social reforms in this direction. Role of science in conservation of environment, concept of Three 'R' (reduce, reuse, recycle). Need of environmental education and awareness programme and ecological economics.

B-Unit-4 Swachha Bharat Abhiyan: The concept of Swachhata at personal, Gandhian approach towards social and environmental moral values & concept of swachhata and its relation to moral upgradation of society and [illegible]. Awareness Programme related to Swachhata. Role of 'Swachhagrahi' in Swachha Bharat Abhiyan.

Sanitation and hygiene: why sanitation is health, sanitation and human rights, plantation, value of [illegible], concept of community participation and role of state agencies. Case study of Sanitation effects in [illegible], diseases, [illegible] and [illegible] - [illegible] of spread of diseases through body and other biological fluids and [illegible]

B-Unit-5 Assignment/Practical field work based on unit-4

or

Alternative to unit-4 and unit-5 a student can also enroll for Swachha Bharat Internship programme of MHRD.

(2)

HCC – 3 Credit - 5

Human Values and Professional Ethics (3 Credits)

Gender Sensitization (2 Credits)

(One credit requires ten hours of theory and twenty hours of practical/assignment/field work)

Unit – 1: Variety of Moral Issues, Principals of Ethics and Morality:-

Understanding the Harmony in the Society (society being an extension of family): Integrity, Work Ethic, Courage, Empathy, Self Confidence, Professional Ethics and Values, Ethics as a Subset of Morality, Ethics and Organizations, Duties and Rights of employees and employers.

Unit – 2: Holistic approach to corporate ethics:-

Situational Ethics – Types, Vocational, Conflict and Ambivalence in values, Values in Finance, Business and Environment, Professional Rights, Intellectual Property Rights, Corporate Responsibility, Social Audit and Ethical Investing, Computer and Ethics.

Unit – 3: Professional Ethics:-

Augmenting Universal Human Order, Characteristics of people-friendly and eco-friendly production, Strategy for Transition from the Present State to Universal Human Order, At the Level of Individuals: as Socially and Ecologically Responsible Technologists and Managers, At the Level of Society: as Mutually Enriching Institutions and Organizations, Case studies of typical holistic technologies and management systems.

Unit – 4: Gender – An Overview:

Gender: Definition, nature and evolution, culture, tradition, diversity; Gender stereotypes: biological, sociological, psychological conditioning; Gender based division of labour – domestic work and use value.

Unit – 5: Gender – Contemporary perspectives

Gender justice and human rights, international perspectives; Gender – constitutional and legal perspectives; media & gender; Gender: emerging issues and challenges.

(3)

Generic Elective (GE) course

Course title: Graphic Designing

Course code: GE-[illegible]

Credit 5

(There shall be 5 units each consisting of [illegible] credits)

Course offered in: Semester - II

Course content:

Unit	Topics
I	**HTML5 and CSS3:** [illegible] Introduction to Internet and W.W.W. [illegible] Tags, Graphics, Tables and [illegible] Tags, [illegible] Tags, [illegible] Tags, [illegible] CSS3, API, Example Applications etc.
II	**PHP Programming and MySQL:** [illegible] Functions, [illegible] Error Handling, [illegible] Object Orientation, Form Handling and [illegible] Example Applications.
III	**Java script and jQuery:** Java script – Basic data types, control [illegible], functions, [illegible] events, [illegible] handling, [illegible], animation, Example Applications. jQuery – [illegible]
IV	**Content Management and SEO:** WordPress – Installation, Settings, Categories, Posts, Media, Pages, Tags, Links, Comments, Plugins, Users. SEO – Introduction, [illegible]
V	**Assignment:** Field Work based on Unit I, II, III and IV.

Note: Students who enrolled for WEB DESIGNING as AECC in Semester II shall not be allowed to take Graphic Design as a GE course in Semester IV

(6)

Generic Elective (GE) course	
Course title: Inclusive Policies	
Course code: GE-1	Credit 4 (There shall be 5 units each consisting of two credits)
Course offered in: Semester- IV	
Course content:	
Unit	Topics
I	**Concept of Inclusive Policy** a. [illegible] b. [illegible]
II	**Right of Individual and their Redressal** a. [illegible] b. [illegible]
III	**Sources of Inclusive Policies** a. [illegible] b. [illegible]
IV	**Inclusive Policies and Women Rights** a. [illegible] b. [illegible]
V	**Assignment / Field Work based on Unit I, II, III and IV.**

(5)

Generic Elective (GE) course	
Course title: Human Rights	
Course code: GE-1	Credit: 6 (One credit by 5 units and assessing of one credit)
Course offered in: Semester: IV	
Course content	
Unit	Topics
I	**Conceptual Aspects of Human Rights** a. Meaning and concept of Human Rights b. Human Rights, Natural Rights, Civil Rights, Political Rights and Legal Rights
II	**Evolution of the Concept of Human Rights** a. Magna Carta, The glorious revolution of Independence, The French Declaration of the Rights of Man and the Citizen, Geneva Convention of Red Cross and formation of Human Rights, UNO b. International Bill of Rights, Implications of Universal Declaration of Human Rights, International Covenant on Civil and political Rights, International Covenant on Economic, Social and cultural Rights
III	**Structure, Nature, Classification and Human Rights** a. Value of Dignity, Equality, Human Values and the idea of Universal Human Rights, Multiculturalism and Minority Rights, protection and promotion of Human Rights in Multicultural societies. b. Human Liberation, Human Rights, Universalism of Human Rights, Particularism and the Rights of national Self-Determination, state Sovereignty and the Problem of International Human rights
IV	**Theoretical aspects of Human rights** a. Theories of Human rights (Natural, Normative, Legal, Historical, J.S. Mill, Marxian, Contemporary Marx, Communist) b. Evolution, Perspectives of Human Rights
V	Assignment: Field Work based and Unit (I, II, III and IV)

Dr. [illegible]

Generic Elective (GE) Course | Credit - 3

Family Management

(One credit requires ten hours of theory and twenty hours of practical/assignment/field work)

Unit 1 : Concept of a good Indian family :

Indian society and Indian family, Importance of relationship within family, satisfaction and dissatisfaction in between Indian and western family, definite role of family members.

Unit 2 : Food production and cleanliness :

Cooking : art or science, personal grooming, hygiene & uniform, Do's and don'ts while working in the kitchen, Domestic Food Production, nutrition- Balanced Diet and its function, effect of heat on fat, carbohydrates, proteins, vitamins and minerals. Cholesterol and trans fats and related diseases. Disease producing microbes.

Unit 3 : House keeping :

Equipment handling, care & cleaning & classification of cleaning equipments. Care, cleaning & polishing of surfaces - metals, glass, floor, ceramic, Plastic, daily cleaning of rooms and bath rooms.

Unit 4 : Safety & health care :

Psychology - child care and care of the elderly. Basic human anatomy and physiology (emphasis: respiratory, circulatory, digestive, nervous & reproductive systems). First aid in different accidents (haemorrhage, fractures, shock & unconsciousness, cardiac arrest, burns, wound bites, snake bite, poisoning, [illegible] etc.). Nursing. First aid box. Importance of group practice of yoga and exercise.

Unit 5 : Importance of communication and care in family :

Leadership in family, communication gap between generations, significance of soft skills, Indian laws related to family problems, understanding and misunderstanding within the family members and among close relatives, [illegible]. Necessity of [illegible] programmes for family members.

Ability Enhancement Course (AEC) / Skill Enhancement Course (SEC)

Course title: Computers & ICT	
Course code: AEC-[illegible] Or SEC-[illegible]	Credit: 4 (There shall be [illegible])
Course offered in: Semester - II	
Course content:	

Unit	Topics
I	**Basics of Computer System:** What is a computer? Computer System [illegible] - Hardware and Software [illegible] Motherboard, SMPS, Processor, RAM, [illegible] [illegible]
II	**Basics of Operating System:** Introduction to [illegible] Operating System. Introduction to Windows Operating System. [illegible] Windows Operating Systems.
III	**Information Management:** [illegible] Processing and [illegible] using Word processor [illegible] Database and [illegible] analysis using spread sheet and statistical packages. [illegible]
IV	**Skill (Special Skill Development):** [illegible] of the following [illegible]: a. [illegible] b. Accounting software c. Spread sheet using [illegible] d. Multimedia [illegible]
V	Networking Basics. Network [illegible] [illegible]
VI	**Assignment:** Field Work based on Unit I, II, III and IV.

Ability Enhancement Course (AEC) or Skill Enhancement Course (SEC)	
Course title : Web Designing	
Course code: AEC-[illegible]	Credit [illegible] (there shall be [illegible] [illegible])
Course offered in Semester: II	
Course description: This paper is designed to [illegible] [illegible] [illegible] [illegible] [illegible]	
Course objectives: To [illegible] students to the technology of web [illegible] design and to introduce various tools and languages [illegible] [illegible]	
Course content:	
Unit	Topics
I	**HTML5 and CSS3:** General Introduction to Internet and WWW; [illegible] Tags, [illegible], Video and Sound Tags, Link and Anchor Tags, Table Tags, Form Tags, [illegible], [illegible] Events, [illegible], CSS3, API, Example Applications etc.
II	**PHP Programming and My SQL:** Programming [illegible], [illegible], GET & POST, [illegible], User defined Functions, Built in Functions, Cookies, Sessions, Error Handling, MySQL [illegible] and its integration, AJAX, XML, Object Orientation, [illegible] [illegible], Example Applications.
III	**Java script and jQuery:** Java script – [illegible] data types, control statements, functions, arrays and objects, [illegible] DOM [illegible], [illegible] handling, [illegible], Example Applications. jQuery – [illegible], Selectors, Attributes, DOM, Events, AJAX, CSS, UI, Plug-ins.
IV	**Content Management and SEO:** WordPress – [illegible], [illegible], Categories, Posts [illegible] Pages, Tags, [illegible], [illegible], [illegible], [illegible]. SEO – Introduction, [illegible]
V	**Lab/Assignment based on learning based on Unit I, II, III and IV**

Learning outcomes:
On completion of this course, the students would:
1. Have a strong foundation to understand [illegible] [illegible] of the field of web designing.
2. Develop [illegible] [illegible]

The laboratory work will consist of [illegible] Experiments:

1. [illegible] basic HTML [illegible] [illegible] Headings, Link, Forms, Tables, Link and Anchor Tags etc.
2. Including graphics, video and sound in web pages; [illegible] & Image Maps.
3. Creating advanced CSS, [illegible]
4. [illegible] Style sheets
5. Creating and [illegible] [illegible]
6. Installing web server, [illegible] PHP. Creating [illegible] and [illegible] GET & POST methods [illegible] HTML.
7. MySQL [illegible] and [illegible] integration with PHP.
8. [illegible] [illegible] [illegible] and [illegible].
9. Development of a web site using Word Press [illegible] a variety of [illegible]

Ability Enhancement Course (AEC) or Skill Enhancement Course (SEC)

Course title : Derivatives and Risk Management	
Course code: SEC-[illegible]	Learning Hours: [illegible]
Course offered in Semester: [illegible]	
Course description: [illegible] understanding and mastering DERIVATIVES [illegible] derivatives market.	
Course objectives: i. To develop skills among the students [illegible] banking sector. ii. To develop knowledge among the students [illegible]	

Course content:

Sl. No.	Topics	No. of Periods
1	**Introduction** - Risk [illegible] Risk.	[illegible]
2	**Risk and Derivatives based Hedging Strategies** Risk Associated with Investment • Systematic Risk • Non Systematic Risk Hedging: Risk Management • Strategy [illegible] • Strategy of [illegible] Hedging/Risk Management Through Derivatives • Short Hedge • Long Hedge	[illegible]
3	**Financial Markets and Derivatives** Financial Markets: • Money Market • Capital Market Online Derivatives Market and Types of [illegible] Traders in Derivatives Market • Hedgers • Speculators • Arbitrageurs	[illegible]
4	**Derivatives: A Birds-eye view** **Introduction** Different derivative instruments [illegible] Futures [illegible] • Types of [illegible]	[illegible]

[illegible signatures]

	• Margin [illegible] margin and mark to market margin Forward contract:- • Features of forward contracts • Difference of futures, options, swaps and forward contracts	
4	**SWAP** • Foreign Exchange Swap • Interest Rate Swap (Plain Vanilla IRS) • Cross Currency SWAP [illegible] • Derivatives Trading in [illegible] Derivatives Trading in India [illegible]	[illegible]

Learning outcomes:-
By the end of the course, students should be able to understand the mechanism of managing and hedging risk which [illegible] the [illegible] of the [illegible] (21st century).

A Few Topics for Case Studies:
Risk management as Decision-making Process in the Banking Sector [illegible] managing risk under the conditions of uncertainty [illegible] in project management [illegible] of the knowledge of [illegible] types of risk associated with the investment hedging Strategy for [illegible] Hedging and [illegible] Delta Hedging, Vega and Rho Hedging.

Assignments:
Each student has to prepare a dissertation on any topic related to any of the Units. The dissertation should contain the following heads:
1. Preface
2. Definition
3. Review of Literature
4. Methodology
5. Observations/Case Study
6. Relevance
7. Discussion
8. Conclusion
9. Reference

List Of Books:
1. **Derivatives and Risk Management** by [illegible] Publisher [illegible] India Limited, Delhi.
2. **The Essentials of Risk Management** by Michel Crouhy, [illegible] ISBN: [illegible]
3. **Credit Risk management for Indian Banks** by [illegible] Publishing
4. **Risk Management** by Indian Institute of Banking
5. **Risk Management and Financial Institutions** by John C. Hull Published by John Wiley and Sons, New Jersey
6. **Risk Management** by [illegible]
7. **Fundamentals of Risk Management: Understanding Evaluating and implementing effective Risk Management** by Paul Hopkin, [illegible] Publisher Kogan Page
8. **Essentials of Risk Management** by Michel Crouhy, Publisher McGraw Hill Education
9. **Essentials of Financial Risk Management** by [illegible] Publisher Wiley [illegible]

	• Margin (Initial/maintenance margin and mark to market margin) Forward transaction: • Features of forward transaction • Difference of between options, futures and forward contracts	
5	**SWAP** • Foreign Exchange Swap • Interest Rate Swap (Plain Vanilla SWAP) • Cross Currency SWAP ([illegible] SWAP) • Derivatives Trading at NSE/Commodity Derivatives Trading in India ([illegible])	[illegible]

Learning outcomes:
By the end of the course students should be able to understand the mechanism of managing and handling risk which explicitly addresses the uncertainties of the competitive corporate world of 21st century.

A Few Topics for Case Studies:
Risk management in Decision-making Process in the Banking Sector; Risk and Uncertainty in business; managing risk under the conditions of uncertainty; Investment strategy and Risk; [illegible] risk in project management; Importance of the knowledge of various types of risk associated with the investment; Hedging Strategy for portfolio; Delta Hedging; [illegible] Hedging and Theta [illegible] Hedging; Vega and Rho Hedging.

Assignments:
Each student has to prepare a dissertation on any topic related to any of the Units. The dissertation should include the following heads:

1. Preface
2. Definition
3. Review of Literature
4. Methodology
5. Observations/Case Study
6. Relevance
7. Decisions
8. Conclusions
9. Reference

List Of Books:

1. **Derivatives and Risk Management** by Dhanesh Kumar Khatri Macmillan Publishers India Limited, Delhi.
2. **The Essentials of Risk Management** by Michel Crouhy, Dan Galai ISBN: [illegible]
3. **Credit Risk management for Indian Banks** by K. Vaidyanathan, Sage Publishing.
4. **Risk Management** by Indian Institute of Banking
5. **Risk Management and Financial Institutions** by John C. Hull Published by John Wiley and Sons, New Jersey.
6. **Risk Management** by Paul Hopkin Published by [illegible]
7. **Fundamentals of Risk Management: Understanding Evaluating and Implementing effective Risk Management** by Paul Hopkin Published by [illegible] Ltd. UK, Publisher Kogan Page.
8. **Essentials of Risk Management** by Michel Crouhy Publisher McGraw Hill Education.
9. **Essentials of Financial Risk Management** by [illegible] Publisher Wiley [illegible]

Ability Enhancement Course (AEC) or Skill Enhancement Course (SEC)	
Course title: Solid Waste Management	
Course code: AEC/SEC-1	Credit: 4 [illegible]
Course offered in: Semester II	

Course description: The course should cover general introduction including definitions of solid waste, municipal waste, biomedical waste, hazardous waste, e-waste, legal issues and requirements for solid waste management, including and characterization of solid waste.

Course objectives:

1. Understanding of problems of municipal waste, biomedical waste, hazardous waste, e-waste, industrial waste etc.
2. Become aware of Environment and health impacts of solid waste mismanagement.

Course content:

Unit	Topics
I	General introduction including definitions of solid waste including municipal, hospital and industrial solid waste; E-waste; legal issues and requirements for solid waste management; Solid waste management rules, 2016.
II	Health and environmental issues related to solid waste management.
III	Methods of waste collection, collection techniques, waste treatment compatibility, waste storage requirements, transportation of solid waste.
IV	Treatment and disposal techniques for solid waste: composting, Composting, Vermicomposting, [illegible], [illegible], Incineration, [illegible] techniques, Landfilling.
V	Source Reduction, Product Recovery and Recycling, Recovery of Biological Conversion Products: Compost and Biogas. Incineration and Energy Recovery. Integrated Waste Management (IWM).

Learning outcomes:

After completion of the course students should be able to characterize solid waste, analysis of hazardous waste constituents, understand health and environmental issues related to solid waste management, steps in solid waste management—waste reduction at source, collection techniques, materials and resource recovery/recycling, transport, optimization of solid waste transport, treatment and disposal techniques.

Practical

1. Awareness about disposal of different wastes in [illegible] (Concept of disposal of Biodegradable, Non-Biodegradable and Bio-hazardous wastes in different coloured bins).
2. Method of composting
3. Method of vermicomposting
4. [illegible]
5. Bio-gas production

Assignments

1. Define and explain issues related to Solid wastes.
2. Explain health issues related to solid waste management.
3. Explain environmental issues related to solid waste management.
4. Explain methods for biodegradable wastes.
5. Explain methods for Non-biodegradable wastes.
6. Explain methods for recyclable wastes.
7. Explain about hazards and toxic chemical wastes.
8. Explain about E-wastes and their disposal.
9. Explain about Landfilling method of solid waste disposal.
10. Explain about composting method of solid waste disposal etc.

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Ability Enhancement Course (AEC) or Skill Enhancement Course (SEC)

Course title: Mushroom Technology	
Course code: [illegible]	Credit [illegible] (Hours shall be [illegible] each consisting of one credit)
Course offered in Semester: [illegible]	

Course description: [illegible] of Mushrooms, Edible and Poisonous mushrooms; Different aspects of mushroom cultivation in relation to environment; Nutritional value of mushrooms; [illegible] and health benefits of mushrooms; [illegible] mushrooms; Preservation method for mushrooms [illegible]; Diseases of mushrooms caused by bacteria, fungi and viruses and its control.

Course objectives:

1. Cultivation methods for edible varieties of mushrooms
2. Preservation method for mushrooms [illegible] as well as for spent and [illegible]
3. Awareness of health benefits of mushroom consumption

Course content:

Unit	Topics
I	General introduction about fungi including a general life cycle of Mushrooms, Edible and Poisonous mushrooms; Different aspects of mushroom cultivation in relation to environment; Importance and health benefits of mushrooms
II	Production method of some edible mushrooms – Button mushroom, [illegible] mushrooms [illegible]
III	Preservation method for mushrooms [illegible] drying. Diseases of mushrooms caused by bacteria, fungi and viruses and its control.
IV	Isolation and culture of spawn [illegible]. Production of [illegible]
V	Different methods of [illegible] of mushroom [illegible]

Learning outcomes:

After completion of the course students should be able to understand the cultivation methods [illegible] production of mushrooms [illegible] diseases of mushrooms and its [illegible] method for mushrooms [illegible] and health benefits of mushroom consumption.

Practical:

1. Production of mother culture for spawn culture
2. Cultivation of Oyster mushroom
3. [illegible] of mushroom spent [illegible]
4. Preparation of mushrooms for drying

Assignments:

1. Edible mushrooms cultivated in India
2. Poisonous mushrooms
3. Cultivation method for Button and Oyster mushrooms
4. Nutritional and other health benefits of mushrooms
5. Mushroom [illegible] production methods etc.

[illegible signature] [illegible]

[illegible signature] [illegible]

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Ability Enhancement Course (AEC) or Skill Enhancement Course (SEC)

Course title: Environmental Law and Policy	
Course code: AEC-/SEC-1	Credit 2 [illegible]
Course offered in Semester: II	
Course description: Law and policy plays a major role in the conservation and management of natural resources as well as pollution control. This course intends to introduce the students to the vast field of Environmental Law and Policy. The course would be divided into three broad areas. The first part would cover the basic concepts and principles of Environmental Law. [illegible]	
Course objectives: 1. To provide an overview of the law and policies relating to environment both at the national and international level. 2. To critically analyse the implementation of these laws and the role of adjudicatory bodies in the field of environment.	
Course contents:	
Unit	**Topics**
I	**Introduction:** Environment: meaning and components; Environment vs Development debate; [illegible] Introduction to environmental laws in India; Constitutional provisions; [illegible] General principles in Environmental law: Precautionary principle, Polluter pays principle, Sustainable development, Public trust doctrine.
II	**Forest, Wildlife and Biodiversity related laws:** Evolution and Development of Forest and Wildlife laws; Colonial forest policies; Forest policies after independence. Statutory framework on Forests, Wildlife and Biodiversity: IFA, 1927; WLPA, 1972; FCA, 1980; Biological Diversity Act, 2002; Forest Rights Act, 2006. Strategies for conservation: Project Tiger, Elephant, [illegible]
III	**Air and Water Laws:** National Water Policy Laws relating to prevention of pollution, access and management of water and institutional mechanisms: Water Act, 1974; Water Cess Act, 1977; EPA, 1986. Pollution Control Boards Ground water and law Legal framework on Air pollution: Air Act, 1981; EPA, 1986 as amended to date including rules and notifications [illegible]
IV	**Environment protection laws and large Projects:** Legal framework on environment protection: Environment Protection Act [illegible] [illegible] Marine laws of India, Coastal zone regulations, [illegible]
V	**Judicial remedies and the role of National Green Tribunal:** Role of judiciary in environmental protection, [illegible]

Learning outcomes:
On completion of this course, the students should

1. Have a strong foundation to understand issues related to the field of environmental law and policy
2. Develop an inter-disciplinary approach in the broad framing of environment

Assignments:

1. Environmental Laws in India
2. Evolution and Jurisdiction of Green and Wildlife Laws
3. Legal Framework for Air pollution
4. Biodiversity Diversity Law
5. Role of Judiciary in environmental protection
6. [illegible] Laws
7. Water Laws
8. Wildlife conservation etc.

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Ability Enhancement Course (AEC) or Skill Enhancement Course (SEC)

Course title: Tourism And Hospitality Management

Course code: [illegible]	Credit [illegible] ([illegible])
Course offered in: Semester - II	

Course description: The course is designed to enable students to learn various components of tourism and hospitality industry [illegible] tour arrangements, transportation, hospitality [illegible]. This course will enable students to [illegible] skills required for self employment and [illegible] for others.

Course objectives: The aim of the course is to provide [illegible] knowledge of [illegible] transportation, hotel, destination and [illegible].

Course contents:

Unit	Topics
I	**Introduction:** Overview of tourism industry. Concept of tourism. Why it is important to [illegible] tourism? Scope of tourism and its economic importance. History of Tourism.
II	**Elements of Tourism:** Attraction, accessibility, accommodation, tourism product, characteristics of tourism products, types of products and tourism. [illegible] Industry, Hotel Chains, Departments of Hotel, [illegible] and [illegible]. Public Relation.
III	**Tour operation:** Travel Agency and Tour Operator, Travel related documents, Passport, Visa, currency regulations, customs, health regulations, baggage regulations etc.
IV	**Transportation:** Role of transportation industry in tourism, Indian railways and its special [illegible] ([illegible] on Wheels, Royal [illegible]), airlines operating in India and [illegible]. [illegible] of Taxi and [illegible] available.
V	**Travel circuits:** Some popular and important tourism circuits in India ([illegible] triangle, [illegible] [illegible], [illegible]), [illegible] and [illegible], [illegible] and [illegible] circuits.

Learning outcomes:

On completion of this course, the students would:

1. Have a strong foundation to undertake specialized courses in the field of tourism and hospitality Management.
2. [illegible] for self employment and [illegible] for others.

Assignment: Assignment will be based on Unit I, II, III, IV and V

[illegible signature] 20/07/2018

[illegible signature] [illegible]/2018

Ability Enhancement Course (AEC) or Skill Enhancement Course (SEC)	
Course title: Life and Communication Skill Development	
Course code: AEC/SEC-[illegible]	Credit 3 (there shall be 3 units each consisting of one credit)
Course offered in: Semester: [illegible]	
Course description: Acquisition of life skills will empower students to cope with the transitory fluctuations in personal and professional lives while in an age of communication the curriculum will equip students to develop expertise in the utilities of ICT in the transmission of knowledge.	
Course objectives: 1. To develop communication skill of students. 2. To develop writing skill of students. 3. To develop expertise in the utilities of ICT in the transmission of knowledge.	
Course content:	
Unit	**Topics**
I	**Life Skills:** Critical thinking, Assessing Uses of Logic, Problem solving, Creative thinking.
II	**Inter personal Skills:** Childhood Ethics; Coping with emotions and stress, Transactions and empathy, Negotiating difference of opinion.
III	**Communication skills:** What is Communication?, Listening Skills, Speaking Skills, Reading Skills, Writing Skills, Group Discussion and Personal Interview, Barriers to Communication
IV	**Specialized Writing Skills:** Official letters, Business letters, Personal letters, Writing agendas, Minutes, Reports, Writing CVs, Resume, Statement of Purpose, Sending applications through mail with attachments, Summarising, Documentation
V	**Information and Communication Technology (ICT) Literacy:** Word processing, Excel, PageMaker, Pdf conversion, Preparing PowerPoint Presentation.
Learning outcomes: After completion of the course students should be able to cope with the transitory fluctuations in personal and professional lives. The course will equip students to develop expertise in the utilities of ICT in the transmission of knowledge.	
Assignments: Assignments will be based on Unit I, II, III, IV and V.	

Ability Enhancement Course (AEC)

Yoga Sciences

Unit – 1st

BASIC CONCEPT OF YOGA

1. **Introduction to Yoga** : Definition of Yoga,Thinkers on yoga and their views - Patanjali, Gheranad and Goraksh; Karma Yoga, Bhakti Yoga and Gyan Yoga : Concept and Characteristics.
2. **Raja Yoga** : Eight steps of Yoga; Brief introduction and significance of Yamas and Niyamas.
3. **Asanas and Pranayama** : Methods, advantages and limitations; Concept of Prana and Nadis; The subtle body, Chakras.
4. **Pratyahara and Dharana** : Significance and techniques; Pratyahara and Dharana – Yoga Nidra, Antar Mauna, Ajapa Jap.
5. **Hath Yoga** : Shatkarmas- their methods, benefits and limitations.
6. **Body and Mind** : Body-mind relation; the causation, maintenance and transaction; Psychosomatic disorders.

UNIT - 2

EXPERIMENTAL YOGA

1. **Yogic Lifestyle and Health** : Medical concept and definition of health; Causes of disease according to medical science and yogic texts; Ayurveda and their management through yoga.
2. **Diet and Nutrition** : Medical and Yogic concept of diet; the three Gunas in relation to diet.
3. **Effect of Yoga on body systems** : The Bones and Joints, Cardiovascular, Respiratory, Digestive, Nervous, Endocrinal and Excretory systems. Preventive,Promotive and curative effects of yoga.
4. **Stress management** : Concept and types of stress, Effects of stress on body and mind; Yogic management techniques.
5. **Social Health management** : Causes and effects of crime and substance abuse on society; Role of yoga as supportive and transformative agent.