Semester-I

Type of Course	Course code	Course title	Teaching hrs	Credits
Major- Chemistry	BCHEM101T	Organic Chemistry	4 hrs per week	04
Major- Chemistry Lab	BCHEM101L	Chemistry Practical-I	2 hrs per week	01

Semester-II

Type of Course	Course code	Course title	Teaching hrs	Credits
Major- Chemistry	BCHEM102T	Inorganic Chemistry	4 hrs per week	04
Major- Chemistry Lab	BCHEM102L	Chemistry Practical –II	2 hr per week	01

(Semester II)
(Major Theory)
INORGANIC CHEMISTRY-II
Paper Code: BCHEM201T

Credits: 04

Max Marks: 100

Exam Time Duration - 3 hrs.

End Semester Exam: 70

Total Load: 50Hrs. (4 hours/week)

Internal Evaluation: 30

Pass Marks: 40%

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 12 marks each. Section C will consist of 11 short answer questions that will cover the entire syllabus and will be of 2 marks each. Use of scientific non-programmable calculator is allowed.

INSTRUCTIONS FOR THE CANDIDATES

Students have to attempt four questions in all from Section – A and B by selecting two questions from each section. Section – C will be compulsory. Use of scientific calculator is allowed

.COURSAE OBJECTIVE:

The aim of the course is to enhance the basic knowledge of students on the topics s-block elements, p-block elements, Transition elements and advance theories of acids, bases and Lux- Flood solvent systems.

COURSE OUTCOMES:

S. No.	On completing the course,
CO1	Students will be able to understand the physical and chemical properties of s-block, p-block and d-block elements.
CO2	Students will be able to learn the basic similarities and differences between different groups of the periodic table.
CO3	Students will understand the acid-base concepts in inorganic chemistry like Arrhenius concept, Bronsted-lowry and Lewis concepts. Students will be able to differentiate acids and bases.
CO4	Students will learn about the colour, oxidation states, catalytic and magnetic properties of transition elements.
CO5	Students will acquire some knowledge about important topics like inorganic benzene, boranes, silicones and phosphazenes.

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Section-A

p–Block Elements–I

Comparative study (including diagonal relationship) of groups 13 elements, compounds like hydrides, oxides, oxyacids and halides of groups 13, hydrides of boron–diborane and higher boranes, Borazine, borohydrides, extraction of boron from colemanite, extraction aluminium from Bauxite and purification of Bauxite ore by Bayer's , Hall's and surpeck's Process.
Properties of Gp 13: Atomic and Ionic radii, ionization energy, oxidation states, electronegativity, m.pt. , b.pt. , reducing character and chemical properties.

p–Block Elements–II

Comparative study (including diagonal relationship) of groups 14-17 elements, compounds like hydrides, oxides, oxyacids and halides of groups 14-17; fullerenes, silicates (structural principle), catenation, pπ-dπ bonding involving elements II and III period, allotropes of carbon, alloptropes of phosphorus, arsenic, antimony, bismuth. Ammonia synthesis and properties of phosphines, oxides of nitrogen, phosphorus, arsenic, antimony and bismuth. Allotropes of oxygen, properties of ozone, hydrogen peroxide, oxo-acids of sulphur, sulphur nitrogen compounds, halogen oxides and oxo compounds and basic properties of interhalogens and polyhalides, pseudohalogens.

30Hrs.

Section-B

Chemistry of Transition Elements

Characteristic properties of *d*–block elements, position in the periodic table, general characteristics and Properties of the elements of the first, second and third transition series, their simple compounds and complexes illustrating relative stability of their oxidation states, coordination number and geometry, comparative treatment with their *3*d analogues in respect of ionic radii, oxidation states, magnetic behavior and E.M.F (Latimer and Frost diagrams, Chemistry of Ti, V, Cr, Mn, Fe, Co, Ni and Cu in various oxidation states excluding their metallurgy).

Ionic Solids

Concept of close packing, ionic structure, (NaCl type, Zinc Blende, Wurtzite, CaF_2 and antifluorite), radius ratio rule and coordination number, limitations of radius ratio rule, lattice defects, semi- conductors and Born-Haber's Cycle, solvation energy , solubility of ionic solids, polarizing power and polarizibility of ions, Fajan's rule.
Metallic bond free electron, Valence bond and Band theories.

30Hrs.

BOOKS PRESCRIBED:

Inorganic Chemistry, Weller, Overton, Rourke and Armstrong, 7th Ed. Oxford University Press, 2014.
Concise Inorganic Chemistry, J. D. Lee, 5th Ed., Wiley India, 2008.
Advanced inorganic Chemistry, F. Albert Cotton, Geoffrey Wilkinson 6th Ed.,Wiley, 1999.
Inorganic Chemistry: Principles of Structure and Reactivity, James E. Huheey 4th Ed., Pearson, 2006.
Inorganic Chemistry-Shriver, Atkins and Langford, 5th Ed., 2010.

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(Semester II)
(Major Theory)
PHYSICAL CHEMISTRY-I
Paper Code: BCHEM202T

Max Marks: 100
End Semester Exam: 70 marks
Internal Evaluation: 30 marks
Pass Marks: 40%

Credits: 04
Exam Time Duration - 3 hrs.
Total Load: 50 hrs.(4 hours/week)

INSTRUCTIONS FOR THE PAPER SETTER
The question paper will consist of three sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 12 marks each. Section C will consist of 11 short answer questions that will cover the entire syllabus and will be of 2 marks each. Use of scientific non-programmable calculator is allowed.

INSTRUCTIONS FOR THE CANDIDATES
Students have to attempt four questions in all from Section – A and B by selecting two questions from each section. Section – C will be compulsory. Use of scientific calculator is allowed.

COURSE OBJECTIVES:
The course is well designed to learn about the various states of matter-liquids and gases states, and thermodynamics. The main aim of the course is to give the theoretical background as well as the application perspective of the physical parameters.

COURSE OUTCOMES:

S. No.	On completing the course,
CO1	Students will learn to implicate the concepts of gaseous state, kinetic theory, and van der Waals equations to real systems.
CO2	Learn about applications of Liquid crystals in LCDs and Digital Electronics
CO3	Students will learn about the various thermodynamic terms and processes.
CO4	They Will understand the first law of thermodynamics and will learn to calculate the various thermodynamic properties for reversible isothermal and adiabatic expansion of ideal gases. They will also solve various numerical problems related to these topics.
CO5	Students will learn about the second and third law of thermodynamics. Carnot cycle, concept of entropy and free energy and numerical problems associated with these concepts.

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Section-A

Mathematical Concepts **05Hrs.**

Logarithmic relations. curve sketching, linear graphs and calculation of slopes. differentiation of functions like kx, e^x, x^n, sin x, log x, maxima and minima, partial differentiation and reciprocity relations. Integration of some useful/relevant functions permutations and combinations. Factorials.

Gaseous States **10 Hrs.**

Postulates of kinetic theory of gases, deviation from ideal behaviour, Van der Waals equation of state.

Critical Phenomena: PV isotherms of real gases, continuity of states, the isotherms of van der Waals equation, relationship between critical constants and Van der Waals constants, the law of corresponding states, reduced equation of state.

Molecular Velocities: Root mean square, average and most probable velocities. Qualitative discussion of the Maxwell's distribution of molecular velocities, collision number, mean free path and collision diameter. Liquefaction of gases.

Liquid State **10 Hrs.**

Intermolecular forces, structure of liquids (a qualitative description). Structural differences between solids, liquids and gases. Liquid crystals: Difference between liquids crystal, solid and liquid. Classification, structure of nematic and cholestricphases. Thermography and seven segment cell.

Section-B

Physical properties and molecular structure

Optical activity, polarization (Claussius – Mossotti Equation), Orientation of dipoles in an electric field, dipole moment, induced dipole moment, dipole moment and structure of molecules, magnetic properties- paramagnetism, diamagnetism, and ferromagnetism.

Basics of thermodynamics: Definition of thermodynamic terms: System, surroundings etc. Types of systems, intensive and extensive properties. State and path functions and their differentials.Thermodynamic process. Concept of heat and work.

10Hrs.

First Law of Thermodynamics: Statement, definition of internal energy and enthalpy. Heat capacity, heat capacities at constant volume and pressure and their relationship. Joule's law-Joule-Thomson coefficient and inversion temperature, Calculation of w, q, dU and dH for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process.

Second Law of Thermodynamics: Need for the law, different statements of the law, Carnot cycle and its efficiency, Carnot theorem. Thermodynamic scale of temperature.

Concept of Entropy: Entropy as a state function, entropy as a function of V and T, entropy as a function of P and T, entropy change in physical change, Clausius Inequality, entropy as a criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases.

Third Law of Thermodynamics: Nernst heat theorem, statement and concept of residual entropy, evaluation of absolute entropy from heat capacity data. Gibbs and Helmholtz functions; Gibbs function (G) and Helmholtz function (A) as thermodynamic quantities, (A)

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and (G) as criteria for thermodynamic equilibrium and spontaneity, their advantage over entropy change, Variation of G and A with P, V and T. **15Hrs.**

BOOKS PRESCRIBED:

1. Physical Chemistry, P.W. Atkins, 8th Ed., Oxford University Press, 2006 (Indian Print).
2. Physical Chemistry, T. Engel & P. Reid, 1st ed., Pearson Education, 2006.
3. Physical Chemistry, Castellan, 3rd Ed., Addison Wisley/Narosa, 1985 (Indian Print)
4. Physical Chemistry, G. M. Barrow, 6th Ed., New York, McGraw Hill, 1996.
5. Physical Chemistry, R. J. Silbey, R. A. Albert &Moungi G. Bawendi, 4th Ed., New York: John Wiley, 2005

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(Semester II)
(Major Practicals)
CHEMISTRY PRACTICAL - II
SEMESTER II
PAPER CODE: BCHEM203L

Max Marks: 50
End Semester Exam: 35 marks
Internal Evaluation: 15 marks
Passing Marks: 40%

Total Load: 4hrs / week
Time allowed: 3hrs
Credit: 02

INSTRUCTIONS FOR THE PAPER SETTERS EXAMINERS/CANDIDATES

In this session in morning students will perform physical and organic chemistry practicals. Examiner will again conduct viva-voce of students.

1) The examiner should preferably give different liquids solids to the candidates for the determinations of boiling point/melting point and crystallization from the list of liquids/solids by the paper setter.
2) The paper setter will provide a list of five physical chemistry experiments. The examiner will allot one experiment randomly to each candidate. The candidate will write theory, brief procedure and general calculations of the experiment in the first 10 minutes and thereafter perform the actual experiment.

COURSE OUTCOMES:

S. No.	On completing the course,
CO1	Students learn to analyze melting and boiling point different inorganic complexes.
CO2	To develop the ability to apply the principles of Chemistry
CO3	Students learn to determine molecular weight by Rast method and viscosity Measurements

Laboratory Techniques

Determination of melting points:

Naphthalene, 80-82°C, Benzoic acid 121.5-122°C, Urea 132.5-133°C, Succinic acid 184.5-185°C.

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Cinnamic acid 132.5-133°C. Salicylic acid 157.5-158°C. Acetanilide 113.5-114°C. m - Dinitrobenzene 90°C, p-Dichlorobenzene 52°C, Asprin 133-135°C.

Determination of boiling points

Ethanol 78°C, Cyclohexane 81.4°C, Tolune 110.6°C, Benzene, 80°C.

Physical Chemistry Experiment

1. To determine the specific reaction rate of the hydrolysis of methyl acetate/ethyl acetate catalyzed by hydrogen ions at room temperature.
2. To study the effect of acid strength on the hydrolysis of an ester.
3. Viscosity & Surface Tension of pure liquids.
4. To determine the viscosity and surface tension of C_2H_5OH and glycerin solution in water.
5. Molecular weight determination by Rast method.

DETAILS OF DISTRIBUTION OF MARKS

1) Melting point/boiling point/crystallization	05 marks
2) Physical chemistry experiment	15 marks
a) Initial write up	(5 marks)
b) Performance	(10 marks)
4) Viva-voce	10 marks
5) Note Book	5 marks

BOOKS PRESCRIBED:

1. Experiments in General Chemistry, C.N.R. Rao and U.C. Aggarwal, East-West Press, 1996.
2. Experiments in Physical Chemistry, R.C. Das and B. Behra, Tata McGraw Hill, 1984.
3. Advanced Practical Physical Chemistry, J.B. Yadav, Goel Publishing House, 2016.
4. Advanced Experimental Chemistry, Vol. I, Physical, J.N. Guru and R. Kapoor, S. Chand & Co., 2011

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(Semester I)
(Minor Theory)
BASIC ORGANIC CHEMISTRY
Paper Code: BCHEM104T

Max Marks: 75 **Credits: 03**
End Semester Examination: 50 marks **Exam Time Duration - 3 hrs.**
Internal Evaluation: 25 marks **Total Load: 45 hours, (3 hours/week)**
Pass Marks: 40%

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 10 marks each. Section C will consist of 10 short answer questions that will cover the entire syllabus and will be of 1 mark each. Use of scientific non-programmable calculator is allowed.

INSTRUCTIONS FOR THE CANDIDATES

Students have to attempt four questions in all from Section – A and B by selecting two questions from each section. Section – C will be compulsory. Use of scientific calculator is allowed.

COURSE OBJECTIVES:

The aim of the course is to enhance the basic knowledge of students on the topic structure and bonding, aliphatic, aromatic, cyclic hydrocarbons, Mechanism of organic reactions, chemistry of alkanes and alkenes.

COURSE OUTCOMES:

Sr. No.	On completing the course
CO1	Students would have basics of Organic chemistry starting from bonding in organic compounds and notations in a reaction/ reaction mechanism
CO2	would be able to identify the type of organic reaction and properties and structures of reactive intermediates involved in mechanisms.
CO3	would know the methods of preparation and chemical as well as physical properties of Alkanes, Alkenes, Alkynes

Section-A

Aliphatic aromatic and cyclic hydrocarbons

Alkanes, Alkenes, Alkynes, Organic compounds with different functional groups (aliphatic, aromatic and cyclic) like alcohols, aldehydes, ketones, ethers, esters, amines nitro compounds (list of 10-15 compounds each)

Structure and Bonding

Hybridization, bond lengths and bond angles, bond energy, localized and delocalized

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chemical bond, Van der Waals interactions, resonance, and electronic displacements: Inductive, electromeric, resonance and mesomeric effects, hyperconjugation and their applications. Hydrogen bonding. Aromaticity in benzenoid and non-benzenoid compounds, alternant and non-alternate hydrocarbons, Huckel's rule, anti-aromaticity, homo-aromaticity, non-aromatic.

22hrs.

Section-B

Mechanism of Organic Reactions

Homolytic and heterolytic bond fission with suitable examples. Curved arrow notation, drawing electron movements with half- headed and double headed arrows, Types of reagents of organic reaction. Nucleophilicity and Basicity. Types of reagents-electrophilrs and nucleophiles. Energy considerations. Reactive intermediates-carbocations, carbanions, free radicals, carbenes, arynes and nitrenes (with examples). Assigning formal charges on intermediates and other ionic species. Methods of determination of reaction mechanism (intermediates & isotope effect).

Alkanes

Alkanes- Isomerism in alkanes, sources, methods of formation (with special reference to Wurtz reaction, Kolbe reaction, Corey-House reaction and decarboxylation of carboxylic acids), physical properties and Mechanism of free radical halogenation of alkanes: orientation, reactivity and selectivity.

Alkenes

Alkenes- Nomenclature of alkenes-methods of formation, mechanisms and dehydration of alcohols and dehydrohalogenation of alkyl halides regioselectivity in alcohol dehydration. The Saytzeff's rule, Hofmann elimination, physical properties and relative stabilities of alkenes. Chemical reactions of alkenes-mechanisms involved in hydrogenation, electrophilic and free radical additions. Markownikoff's rule, hydroboration-oxidation, oxymercuration reduction. Epoxidation, ozonolysis.

23hrs.

BOOKS PRESCRIBED:

1. Organic Chemistry, J. Clayden, N. Greeves, S. Warren, 2nd Ed., Oxford university Press, 2017.
2. Advanced Organic Chemistry, F. A. Carey, R. J. Sundberg, 2nd Ed., Springer, 2008.
3. Organic Chemistry, T. W. G. Solomons, 10 Ed., Wiley, 2024.
4. Advanced Organic Chemistry, Jerry march, 4th Ed., Wiley, 2015.

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(Semester-II)
(Minor Practicals)
BASIC ORGANIC CHEMISTRY PRACTICAL
SEMESTER I
PAPER CODE: BCHEM205L

Max Marks: 25
End Semester Examination: 15marks
Internal Evaluation: 10marks
Pass Marks: 40%

Credits: 01
Time allowed: 3 hrs.
Total Hours: 4 hours/week

INSTRUCTIONS FOR THE PAPER SETTERS EXAMINERS/CANDIDATES
Paper setter will enlist the two experiments and the examiner will randomly distribute these mixtures among the students. Each candidate will analyze one mixture along with crystallization of the given sample. Students are permitted to consult the books for the scheme of tests for semi-micro analysis.

COURSE OUTCOMES:

S. No.	On completing the course,
CO1	Students learn to analyze melting point of different organic compounds.
CO2	To develop the ability to apply the principles of Chemistry
CO3	Students will learn about the techniques used chemical analysis.

Determination of melting points:

Naphthalene, 80-82^{0}C, Benzoic acid 121.5-122^{0}C, Urea 132.5-133^{0}C, Succinic acid 184.5-185^{0}C,

Cinnamic acid 132.5-133^{0}C, Salicylic acid 157.5-158^{0}C, Acetanilide 113.5-114^{0}C, m - Dinitrobenzene 90^{0}C, p-Dichlorobenzene 52^{0}C, Asprin 133-135^{0}C.

Crystallization:
Phthalic acid from hot water Acetanilide from boiling water
Naphthalene from ethanol
Benzoic acid from water.
To prepare asprin from salicyclic acid
To prepare phthalimide from phthalic anhydride 07marks

Viva-Voice 05marks

Practical Note Book 03marks

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BOOKS PRESCRIBED:

1. Salts and Their Reactions a Class-Book of Practical Chemistry, D. Leonard, Forgotten Books, 2009.
2. A Systematic Qualitative Chemical Analysis a Theoretical and Practical Study of Analytical Reactions of the More, Common Ions of Inorganic Substances, Forgotten Books, 1992.
3. Salt Analysis Chart, Sibaji Sarka, 2017.
4. Physical Chemistry Laboratory Manual - An Interdisciplinary Approach 1 Edition, A. Anand, R. Kumari, 1st Ed. Dreamtech Press, 2020.

(Semester-II)
Interdisciplinary Course (IDC)
BASIC ANALYTICAL CHEMISTRY
Code: BCHEM 206T

Max Marks: 50
End Semester Examination: 35 marks
Internal Evaluation: 15 marks
Pass Marks: 40%

Credits: 02
Time allowed: 3 hrs.
Total Lectures: 30hrs, (2 hours/week)

INSTRUCTIONS FOR THE PAPER SETTER
The question paper will consist of three sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 06 marks each. Section C will consist of 11 short answer questions that will cover the entire syllabus and will be of 1 mark each. Use of scientific non-programmable calculator is allowed.

INSTRUCTIONS FOR THE CANDIDATES
Students have to attempt four questions in all from Section – A and B by selecting two questions from each section. Section – C will be compulsory. Use of scientific calculator is allowed.

COURSE OBJECTIVES:
The aim of the course is to expose the students to the basic fundamentals of Analytical Chemistry.

COURSE OUTCOMES:

S. No.	On completing the course,
CO1	Students will be having knowledge about the importance and need of Analytical chemistry.
CO2	Understand the concept, principle and applications of UV-VIS spectroscopy and the problems pertaining to the structure elucidation of simple organic compounds.
CO3	Students will learn about the techniques used chemical analysis.
CO4	Student will also learn some Physical methods of analysis

Section-A

Qualitative and quantitative aspects of analysis
Introduction to analytical chemistry, Methods of quantitative analysis, chemical analysis with its scale of operation, various steps in quantitative analysis. Sampling in analysis. Theory of sampling importance of selecting a representative sample, criterion of a good sampling plan. Stratified sampling Vs. random sampling. Minimization of variation in stratified sampling.

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sampling plan for solids, liquids and gases. Reliability of analytical data, Errors in chemical analysis, classification of errors, Minimization of errors, accuracy and precision. Improving accuracy of analysis, correlation and Regression, linear regression. Analysis of variance.

Theoretical basis of Quantitative inorganic analysis:

Law of mass action, chemical and ionic equilibrium, solubility, Solubility product and common ion effect, effect of temperature upon the solubility of precipitates, the ionic product of water, pH, effect of temperature on pH, Salt hydrolysis, hydrolysis constant, degree of hydrolysis, buffer solutions, different types of buffers and Henderson's equation.

Sampling and treatment of samples for chemical analysis:

Techniques of collection of Solids, liquids and gaseous samples, dissolution of solid samples, attack with water, acids, and alkalis, fusion with Na_2CO_3, NaOH, Na_2O_2, $K_2S_2O_7$; Microwave assisted digestion techniques (only elementary idea).

Volumetric Analysis:

Equivalent weights, different types of solutions, Normal solutions, Molar solutions, and molal solutions and their inter relations. Primary and secondary standard substances, principles of different type of titrations-i) acid-base titration, ii) redox titration, iii) complexometric titrations. Types of indicators - i) acid-base, ii) redox iii) metal-ion indicators. Principles in estimation of mixtures of $NaHCO_3$ and Na_2CO_3 (by acidimetry); Principles of estimation of iron, copper, manganese, chromium (by redox titration).

15Hrs.

Section-B

Acid base titrations:

Principles of titrimetric analysis, titration curves for strong acidstrong base, weak acid-strong base and weak base-strong acid titrations, poly protic acids, poly equivalent bases, determining the equivalence point-theory of acid base indicators, colour change range of indicator, selection of proper indicator.

Redox Titrations:

Principles behind the Iodometry, permaganometry, dichrometry, difference between iodometry and iodimetry.

Complexometric titrations:

Complex formation reactions, stability of complexes, stepwise formation constants, chelating agents, EDTA-acidic properties, complexes with metal ions, equilibrium calculations involving EDTA, conditional formation constants, derivation of EDTA titration curves, effect of other complexing agents, factors affecting the shape of titration curves-completeness of reaction, indicators for EDTA titrations-theory of common indicators, titration methods employing EDTA-direct, back and displacement titrations, indirect determinations, titration of mixtures, selectivity, masking and de-masking agents, typical applications of EDTA titrations-hardness of water, magnesium and aluminium in antacids, magnesium, manganese and zinc in a mixture, titrations involving uni-dentate ligands-titration of chloride with Hg^{2+} and cyanide with Ag^{+}.

Potentiometry:

Fundamentals of potentiometry, indicator and ion-selective electrodes. Membrane electrodes. Glass electrode for pH measurement, glass electrodes for cations other than protons. Liquid membrane electrodes, solid state ion selective detectors and biochemical electrodes.

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(Semester-II)
Interdisciplinary Course (IDC)
BASIC ANALYTICAL CHEMISTRY
Code: BCHEM 206T

Max Marks: 50
End Semester Examination: 35 marks
Internal Evaluation: 15 marks
Pass Marks: 40%

Credits: 02
Exam Time Duration: 3 hrs.
Total Lectures: 30hrs. (2 hours/week)

INSTRUCTIONS FOR THE PAPER SETTER
The question paper will consist of three sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 06 marks each. Section C will consist of 11 short answer questions that will cover the entire syllabus and will be of 1 mark each. Use of scientific non-programmable calculator is allowed.

INSTRUCTIONS FOR THE CANDIDATES
Students have to attempt four questions in all from Section – A and B by selecting two questions from each section. Section – C will be compulsory. Use of scientific calculator is allowed.

COURSE OBJECTIVES:
The aim of the course is to expose the students to the basic concepts regarding Chemistry of drugs.

COURSE OUTCOMES:

S. No.	On completing the course,
CO1	Students will be having knowledge about the importance and need of Drugs chemistry.
CO2	Understand the concept, principle and applications of drugs used in pharmaceutical formulations.
CO3	Students will learn about the techniques used Drug analysis.
CO4	Student will also learn about drug formulation.

Section-A

General Introduction of Drugs

Introduction: Diseases- causes of diseases, Drug-Definition and sources.

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ADME of drugs (brief)- Absorption, distribution, drug metabolism (in liver), elimination (brief), Toxicity.

Examples:

1. Zintac (Ranitidine, antacid)
2. Paracetamol (antipyretic)
3. Benadryl (Cough syrup)

Characteristics of an ideal drug.

Nomenclature of Drugs: Chemical name- Generic name-Trade name. Trader names for the given generic names:

1. Asprin
2. Amoxycillin
3. Ciprofloxacin
4. Paracetamol
5. Mebendazole

Drug formulation: Definition-need for conversion of druf into pharmaceutical (drug formulations) – Additives-diluents, binders, lubricants,antioxidants, flavourants,sweeteners, colourants, coating agents. Classification of drug formulations: oral, parental and topical dosage forms-advantage and disadvantages.

Oral Dosage forms: Tablets (Asprin-analgestic; Ciprofloxacin- antibacterial). Capsules (Amoxycillin-antibiotic; Omperazole-antacid) Syrups (B-complex syrup; benadryl-Cough syrup).

Classification of Drugs

Classification of drugs based on therapeutic actions- Chemotherapeutic agents, Phrmacodynamic agents and drugs acting on metabolic processes.

Brief explanation for the following drug with their utilities only:

Chemotherapeutic agernts: Antimalarials-Chloroquine; Antibiotic- Amoxycillin; Antitubercular drugs- isoniazide; Antiprotozoals-metronidazole.

Pharmacodynamic agents

1. Drug acting on CNS: Diazepam (CNS depressant), general anesthetic (thiopental sodium), antipyretic and analgestic (Ibuprofen)
2. Drugs acting on PNS: Local anesthetic (Benzocaine)
3. Drugs acting on cardiovascular system: Metroprolol (antihypertensive agents), Nefidipine (antianginal and antihypertensive agent)
4. Drugs acting on renal system: Diuretics (Acetazolamide)

Drugs acting on metabolic processes

1. Vitamins: Common name, source, deficiency, Vitamin A, B2, B6, C, D, E and K-remedy.
2. Hormones: Function (brief)- Deficiency of hormones (Insulin, Testosterone and Osterone).

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BOOKS PRESCRIBED:

1. An Introduction to Medicinal Chemistry, Graham L. Patrick., 1995
2. Medicinal Chemistry: Principles and Practice Edited by F.D. King.,2002
3. Textbook of Organic Medicinal and Pharmaceutical Chemistry, Edited by Charles O. Wilson, Ole Gisvold, Robert F. Doerge, 2010.
4. Introduction to Medicinal Chemistry, Alex Gringuage, 1996.
5. Principles of Medicinal Chemistry, William O. Foye, Thomas L. Lemice and David A. Williams.
6. Introduction to Drug Design, S.S. Pandeya and J. R. Dimmock, New Age International.
7. Burger's Medicinal Chemistry and Drug Discovery, Vol-1 (Chapter-9 and Ch-14), Ed. M.E. Wolff, John Wiley.
8. Goodman and Gilman's Pharmacological Basis of Therapeutics, Mc Graw-Hill.
9. The Organic Chemistry of Drug Design and Drug Action, R.B. Silverman, Academic Press.
10. Strategies for Organic Drug Synthesis and Design, D. Lednicer, John Wiley.

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BOOKS SUGGESTED (THEORY COURSES)

1. *Basic Inorganic Chemistry.* F.A. Cotton. G. Wilkinson and P.L.. Gaus. Wiley.
2. *Concise Inorganic Chemistry. J.D.* Lee. ELBS,1999.
3. *Concepts of Models of Inorganic Chemistry.* B. Doaglas. D. McDaniel and 1. Alexander, John Wiley.
4. *Inorganic Chemistry.* D.E. Shriver, P. W. Aikins and C.H. Langford. <Oxford.
5. *Inorganic Chemistry.* W. W. Porterfield Addison. Wesley.
6. *Inorganic Chemistry.* A.G. Sharpe, ELBS.
7. *Inorganic Chemistry.* G.L. Miessler and O.A. Tarr, Prentice Hall.
8. *Organic Chemistry.* Morrison and Boyd, Prentice Hall.
9. *Organic Chemistry.* L.G. Wade Ir.Prentice Hall.
10. *Fundamentals of Organic Chemistry.* Solomons, John Wiley, 2024.
11. *Organic Chemistry.* Vol. I, II & III. S.M. Mukherji, S.P. Singh and R.P. Kapoor. Wiley Eastern Ltd. (New Age International)
12. *Organic Chemistry.* F.A. Aarey, McGraw Hill India.
13. *Introduction to Organic Chemistry.* Stretwieser, Heathcock and Kosover. Machmilan.
14. *Physical Chemistry.* G.M. Barrow, International Student Edition. McGraw Hill.
15. *Basic Programming with Application.* V.K. Jain, I'ata McGraw Hill.
16. *Computers and Common. Sense.* B. Ryal and Shely, Prentice Hall.
17. *University General Chemistry.* C.N.B. Rao. Macmillan.
18. *Physical Chemistry.* R.A. Alberty, Wiley Eastern Ltd.
19. *The Elements of Physical Chemistry,* P.w. Aikins, Oxford.
20. *Physical Chemistry Through Problems.* S.K. Dogra and S. Dogra. Wiley Eastern Ltd.

BOOKS SUGGESTED (LABORATORY COURSES)

1. *Vogel's Qualitative Inorganic Analysis,* revised, Svehla, Orient Longman.
2. *Vogel's Textbook of Quantitative Inorganic Analysis* (revised), J.. Basseff. R.C. Dennery, G.H. Jeffery and J. Mendham, ELBS.
3. *Standard Methods of Chemical Analysis,* W.w. Scott the Technical Press.
4. *Experimental Inorganic Chemistry:* W.G. Palmer, Cambridge.
5. *Handbook of Preparative Inorganic Chemistry.* Vol. I & II, Brauer, Academic Press.
6. *Inorganic Synthesis,* McGraw Hill.
7. *Experimental Organic Chemistry.* Vol. I & II, P.R. Singh, D.S. Gupta and K.S. Bajpai. Tata McGraw Hill.
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