**COURSE PLAN - ODD SEMESTER (AUGUST 2023 TO DECEMBER 2023)**
**III SEMESTER(NEP)**
**SECTION I**

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| **Class** | **BSc** | **Semester** | **III** | **Total Hours** | **55** |
| **Course Code** | **Phy.DSCT3** | **Course Title** | **W ave motion and optics** | **Hours per week** | **4** |
| **Faculty name** | **Umamaheswari .U** | **Faculty Contact details** | 9390711255 | | |
| **Course Type (DSC/SEC/AECC/OE)** | **DSC** | | **Course Description** | Sound & Light phenomenon details | |
| **Credits** | **4** | | | | |
| **Course Learning Outcomes** | CO1-Identify Types of waves and its Characteristics, obtaining wave equation and parameters associated with waves. Mathematical treatment of the superposition of waves under different conditions. | | | | |

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| | CO2-Describe the formation of Standing waves, mathematical treatment and applications. Analytical treatment of resonance in open and closed pipes and study Helmholtz resonator. Describe acoustics and its parameters in a building and study the effects.<br>CO3-Understand the different models on light propagation and phenomenon associated and measure the parameters like the wavelength of light using experiments like Michelson interferometer, interference and thin films.<br>CO4-Explain diffraction due to different objects like singles slit, two slits, diffraction of grating, oblique incidence, circular aperture and give the theory and experimental setup for the same.<br>CO5-Explain the polarization of light and obtain how the polarization occurs due to quarter wave plates, half wave plates, and through the optical activity of a medium. |
| **Class policies and guidelines** | Students are required to attend the sessions by maintaining class decorum and being attentive towards the class.<br>Student's participation through discussion during class is encouraged |

## SECTION II

| **Week** | **Time Period** | Hours per week | Module/ Unit/ Topic number and title | Module/ Unit/ Topic details | Teaching learning methods used)/ activities and or class trips/ dates for assessment | Resource/ Reference details |
|---|---|---|---|---|---|---|
| 1. | 25.09.2023 to 30.09.2023 | 4 | Unit 1 | **Waves:** Plane and Spherical Waves. Longitudinal and Transverse Waves. Characteristics of wave motion, Plane Progressive (Travelling) Wave and its equation (derivation), Wave Equation – Differential form (derivation). Particle and Wave Velocities - Relation between them | Integrative, Constructive | 1.The Physics of Waves and Oscillations, N K Bajaj Tata McGraw-Hill Publishing Company Ltd., Second Edition, 1984.<br>2.Waves and Oscillations N |

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| | | | | | | Subramanyam and Brij Lal Vikas Publishing House Pvt. Ltd., Second Revised Edition, 2010 |
| 1. | 02.10.2023 to 07.10.2023 | PRACTICAL EXAMS( II SEM) | | | | |
| 2. | 09.10.2023 to 14.10.2023 | 4 | Unit 1 | Energy Transport – Expression for intensity of progressive wave, Newton's Formula for Velocity of Sound. Laplace's Correction (Derivation). Brief account of Ripple and Gravity Waves. **Superposition of Harmonic Waves**: Linearity and superposition Principle. Superposition of two collinear oscillations having (1) equal frequencies | Integrative, Constructive | 1.The Physics of Waves and Oscillations, N K Bajaj Tata McGraw-Hill Publishing Company Ltd., Second Edition, 1984. 2.Waves and Oscillations N Subramanyam and Brij Lal Vikas Publishing House Pvt. Ltd., Second Revised Edition, 2010 |
| 3. | 16.10.2023 to 25.10.2023 | 4 | Unit 1 | Beats – Analytical treatment. Superposition of two perpendicular harmonic oscillations: Lissajous Figures with equal and unequal frequency- Analytical treatment. Uses of Lissajous' figures. Problems, Question Pattern discussion, Revision | Integrative, Constructive, Collaborative | 1.The Physics of Waves and Oscillations, N K Bajaj Tata McGraw-Hill Publishing Company Ltd., Second Edition, 1984. 2.Waves and Oscillations N Subramanyam and Brij Lal Vikas Publishing House Pvt. Ltd., Second Revised Edition, 2010 |

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| 4. | 26.10.2023 to 31.10.2023 | FIRST INTERNAL EXAM(40% syllabus completion) | | | | |
| 5. | 02.11.2023, to 11.11.2023 | 4 | Unit 2 | **Standing Waves :** Velocity of transverse waves along a stretched string (derivation), Standing (Stationary) Waves in a String - Fixed and Free Ends (qualitative). Theory of Normal modes of vibration in a stretched string, Energy density and energy transport of a transverse wave along a stretched string. | Integrative, Constructive, Collaborative | 1.Oscillations and Waves Satya Prakash Pragathi Prakashan, Meerut, Second Edition 2003 2.Waves and Oscillations N Subramanyam and Brij Lal Vikas Publishing House Pvt. Ltd., Second Revised Edition, 2010 |
| 6. | 13.11.2023 to 18.11.2023 | 4 | Unit 2 | Vibrations in rods – longitudinal and transverse modes (qualitative). Velocity of Longitudinal Waves in gases (derivation). Normal Modes of vibrations in Open and ClosedPipes – Analytical treatment. Concept of Resonance, Theory of Helmholtz resonator. | | 1.Oscillations and Waves Satya Prakash Pragathi Prakashan, Meerut, Second Edition 2003 2.Waves and Oscillations N Subramanyam and Brij Lal Vikas Publishing House Pvt. Ltd., Second Revised Edition, 2010 |
| 7. | 20.11.2023 to 25.11.2023 | 4 | Unit 2 &3 | **Acoustics**: Absorption coefficient, Reverberation time - Sabine's Reverberation formula (derivation), Factors affecting acoustics in buildings, Requisites for good acoustics. Acoustic measurements – intensity and pressure levels. | Integrative, Constructive, Collaborative, Inquiry Based. | A Text Book of Sound D R Khanna and R S Bedi Atma Ram & Sons, Third Edition 1952 2.A Text Book of Optics Brij Lal, M N Avadhanulu & N |

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| | | | | **Nature of light** : Corpuscular theory- laws of reflections and refraction; The Wave model, Group velocity & wave velocity - relation between them, Maxwell's electromagnetic waves. **Interference of light by division of wave front**: Coherent source-Interference of light waves by division of wave-front, Young's double slit interference- theory and experiment, Fresnel Biprism-theory and experiment (determination of wavelength) **Question Pattern discussion, University Papers revision.** | | Subrahmanyam S. Chand Publishing 2012 |
| 8. | 27.11.2023 to 06.12.2023 | MODEL EXAM(90% Syllabus completion) | | | | |
| 9. | 07.12.2023 to 09.12.2023 | 4 | Unit 3 & 4 | **Interference of light by division of amplitude:** Interference at thin films - reflected and transmitted light, Colours of thin films; Theory of air wedge; Theory of Newton's rings (Reflection). Determination of Refractive index of a liquid, Michelson Interferometer-Determination of wavelength of light **Fraunhofer diffraction**: Introduction- Fraunhofer diffraction- Theory of single slit diffraction, Two slit diffraction pattern, Theory of diffraction Grating, | Integrative, Constructive, Collaborative, Reflective | A Text Book of Optics Brij Lal, M N Avadhanulu & N Subrahmanyam S. Chand Publishing 2012 |

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| | | | | Normal and oblique incidence – experimental determination of wavelength,<br>Resolving power – Rayleigh criterion, Expression for resolving power of grating and telescope | | |
| 10. | 11.12.2023 to 16.12.2023 | 4 | Unit 4 | **Fresnel Diffraction**- Concept of Fresnel half period zones, Comparison of Zone plate with lens, Theory of diffraction at a straight edge, Qualitative discussion on diffraction by a circular aperture and diffraction by an opaque disc<br>**Polarisation:** Production of polarized light, Malus' law, Phenomenon of double refraction in crystals, Quarter wave plate and half wave plate, Optical activity**,** Laurent's half shade polarimeter (Text Book No 5**), Question Pattern discussion, University Papers revision.** | Integrative, Constructive, Collaborative, Inquiry Based | A Text Book of Optics Brij Lal, M N Avadhanulu & N Subrahmanyam S. Chand Publishing 2012 |
| 11. | 18.12.2022 onwards | Revision and remedial | | | | |

# COURSE PLAN - ODD SEMESTER (AUGUST 2023 TO DECEMBER 2023)
## III SEMESTER(NEP)
## SECTION I

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| **Class** | **BSc** | **Semester** | **III** | **Total Hours** | **26** |
| **Course Code** | **AECC** | **Course Title** | **India and Indian Constitution** | **Hours per week** | **2** |
| **Faculty name** | **Umamaheswari .U** | **Faculty Contact details** | 9390711255 | | |
| **Course Type (DSC/SEC/AECC/OE)** | **AECC** | | **Course Description** | The purpose of the course is to familiarize the students with the key elements of Indian constitution. | |
| **Credits** | **2** | | | | |
| **Course Learning Outcomes** | Understand the philosophy of the Constitution and its structure. • Measure the powers and functions of various offices under the Constitution. • Appreciate the role of Constitution in a Democracy | | | | |

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| **Class policies and guidelines** | Students are required to attend the sessions by maintaining class decorum and being attentive towards the class.<br>Student's participation through discussion during class is encouraged |

## SECTION II

| **Week** | **Time Period** | Hours per week | Module/ Unit/ Topic number and title | Module/ Unit/ Topic details | Teaching learning methods used)/ activities and or class trips/ dates for assessment | Resource/ Reference details |
|---|---|---|---|---|---|---|
| 1. | 25.09.2023 to 30.09.2023 | 4 | Unit 1 | Chapter- 1 Making of Indian Constitution : Constituent Assembly- Composition, Objectives, | Collaborative, Reflective | 1. Durga Das Basu, Introduction to the Constitution of India, Gurgaon; LexisNexis, (23rd edn.) 2018. |
| 1. | 02.10.2023 to 07.10.2023 | PRACTICAL EXAMS( II SEM) | | | | |
| 2. | 09.10.2023 to 14.10.2023 | 4 | Unit 1 | Preamble and Salient features of the Indian Constitution.. | Collaborative, | 1. Durga Das Basu, Introduction to the Constitution of India, Gurgaon; LexisNexis, (23rd edn.) 2018. |
| 3. | 16.10.2023 to 25.10.2023 | 4 | Unit 1 | Salient features of the Indian Constitution.. | Constructive, Integrative | P.M Bakshi, Constitution of India, Universal Law Publishing House, New Delhi, 1999. |
| 4. | 26.10.2023 to 31.10.2023 | FIRST INTERNAL EXAM(40% syllabus completion) | | | | |
| 5. | 02.11.2023, to 11.11.2023 | 4 | Unit 1 | Chapter-2 Fundamental Rights, Fundamental Duties, Directive | Collaborative, | P.M Bakshi, Constitution of India, |

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| | | | | Principles | | Universal Law Publishing House, New Delhi, 1999. |
| 6. | 13.11.2023 to 18.11.2023 | 4 | Unit 2 | Chapter-3 Union Government- President, Prime Minister and Council of Ministers | Constructive, Integrative | J.N. Pandey, The Constitutional Law of India, Allahabad; Central Law Agency, (55th edn.) 2018 |
| 7. | 20.11.2023 to 25.11.2023 | 4 | Unit 2 | Chapter-4 State Government- Governor, Chief Minister and Council of Ministers | Constructive, Integrative | P.M Bakshi, Constitution of India, Universal Law Publishing House, New Delhi, 1999. |
| 8. | 27.11.2023 to 06.12.2023 | MODEL EXAM(90% Syllabus completion) | | | | |
| 9. | 07.12.2023 to 09.12.2023 | 4 | Unit 3 | Chapter-5 Judiciary- Supreme Court and High Court: Composition, Powers and Functions and Judicial Review. | | D. C. Gupta, Indian Government and Politics, Vikas publishing House, New Delhi, 1975. |
| 10. | 11.12.2023 to 16.12.2023 | 4 | Unit 3 | Chapter-6 Electoral Process: Election CommissionComposition, Powers and Functions, Electoral Reforms. | | D. C. Gupta, Indian Government and Politics, Vikas publishing House, New Delhi, 1975. |
| 11. | 18.12.2022 onwards | Revision and remedial | | | | |

**COURSE PLAN – ODD/EVEN SEMESTER 2023-2024**
**UG /PG**

**SECTION I**

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|---|---|---|---|---|---|
| **Class** | **B.Sc.** (M-Ch,M-Phy,M-Cs) | **Semester** | **II** | **Total Hours** | **56** |
| **Course Code** | **MATDSCT 2.1** | **Course Title** | **Algebra II & Calculus II** | **Hours per week** | **4** |
| **Faculty name** | **Rashmi N** | **Faculty Contact details** | **9743136333** | | |
| **Course Type (DSC/SEC/AECC/OE)** | **DSC** | | **Course Description** | Students who have opted Mathematics as a major subject will be studying this subject. Students learn about Groups-I, Groups-II, Partial derivative, Integral Calculus and its practical applications. | |
| **Credits** | **4** | | | | |
| **Course Learning Outcomes** | • Recognize the mathematical objects called Groups.<br>• Link the fundamental concepts of groups and symmetries of geometrical objects.<br>• Explain the significance of the notions of Cosets, normal subgroups and factor groups.<br>• Understand the concept of differentiation and fundamental theorems in differentiation and various rules.<br>• Find the extreme values of functions of two variables. | | | | |

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| **Class policies and guidelines** | • Students are required to attend the sessions by maintaining class decorum and being attentive towards the class.<br>• Students are also required to maintain their own notes based on the lectures delivered in class.<br>• Students are required to comply with pre-reading requirements of class.<br>• Student's participation through discussion during class is encouraged.<br>• Calculators and other stationary have to be carried. |

## SECTION II

| **Week** | **Time Period** | Hours per week | Module/ Unit/ Topic number and title | Module/ Unit/ Topic details | Teaching learning methods used)/ activities and or class trips/ dates for assessment | Resource/ Reference details |
|---|---|---|---|---|---|---|
| 1. | WEEK 1 | 4 | **Unit-1: Groups-I** | Definition of a group with examples and properties, congruence, problems. | Lecture + Group discussion | . Topics in Algebra, I N Herstein, Wiley Eastern Ltd., NewDelhi, 2006. |
| 2. | WEEK 2 | 4 | **Unit-1: Groups-I** | Subgroups, centre of groups, order of an element of a group and its related theorems, cyclic groups, Coset decomposition | Lecture + interactive learning | Higher algebra, Bernard & Child, Arihant, 2016. |
| 3. | WEEK 3 | 4 | **Unit-1: Groups-I** | Lagrange's theorem and its consequences. Fermat's theorem and Euler's $\phi$ function. | Lecture + inquiry based learning<br><br>Assignment: Important | Modern Algebra, Sharma and Vasista, Krishna Prakashan |

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| | | | | | and standard theorems in Unit 1 | Mandir, Meerut,U.P,1960 |
| 4. | WEEK 4 | 4 | **Unit-II: Groups-II** | Normal subgroups-Examples and problems, Quotient group, Homomorphism and isomorphism of groups, Kernel and Image of a homomorphism. | Lecture + problem solving | . Modern Algebra, Sharma and Vasista, Krishna Prakashan Mandir, Meerut,U.P,1960 |
| 5. | WEEK 5 | 4 | Revision | | | |
| 6. | FIRST INTERNAL EXAM(40% syllabus completion)(Including Revision ) | | | | | |
| 7. | WEEK 6 | 4 | **Unit-II: Groups-II** | Normality of the kernel, Fundamental theorem of homomorphism, Properties related to isomorphism, Permutation group, Cayley's theorem. | Discussion and solving | Topics in Algebra, I N Herstein, Wiley Eastern Ltd., NewDelhi, 2006. |
| 8. | WEEK 7 | 4 | **Unit-III: Partial Derivatives**: | Functions of two or more variables-explicit and implicit functions, partial derivatives. Homogeneous functions-Euler's theorem, total derivatives, differentiation of implicit and composite functions. | Lecture + ppt | Differential Calculus, Shanti Narayan, S. Chand & Company, NewDelhi, 1998. |
| 9. | WEEK 8 | 4 | **Unit-III: Partial Derivatives**: | Jacobians and standard properties and illustrative examples. Taylor's and Maclaurin's series for functions of two | Problem solving | Differential Calculus, Shanti Narayan, S. Chand & Company, |

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| | | | | variables, Maxima-Minima of functions of two variables. | | NewDelhi, 1998. |
| 10. | WEEK 9 | 4 | **Unit-IV: Integral Calculus:** | Recapitulation of definite integrals and its properties. Line integral: Definition of line integral and basic properties, examples on evaluation of line integrals. Double integral. | Discussion and problem solving | Integral Calculus, Shanti Narayan and P K Mittal, S. Chand and Co. Pvt.Ltd., 2015. |
| 11. | WEEK 10 | 4 | Revision | | | |
| 12. | MODEL EXAM(80% Syllabus completion) | | | | | |
| 13. | WEEK 11 | 4 | **Unit-IV: Integral Calculus:** | Definition of Double integrals and its conversion to iterated integrals. Evaluation of double integrals by changing the order of integration and change of variables. Computation of plane surface areas.<br><br>**Cross cutting issue**: Environmental model in Integral Calculus | Peer based learning (problem solving) | Integral Calculus, Shanti Narayan and P K Mittal, S. Chand and Co. Pvt.Ltd., 2015. |
| 14. | WEEK 12 | 4 | **Unit-IV: Integral Calculus:** | Volume underneath a surface of revolution using double integral. Triple integral: Definition of triple integrals and evaluation-change of variables, volume as triple integral. | Peer based learning (problem solving) | Text Book of B.Sc. Mathematics, G K Ranganath, S Chand &Company, 2011. |

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| 15. | | Revision and IA Upload |
| 16. | | Revision |
| 17. | | Practical exams |
| 18. | | Semester End Exam |
| 19. | | Semester End Exam |

**COURSE PLAN - ODD SEMESTER (AUGUST 2023 TO DECEMBER 2023)**
**V SEMESTER (NEP)**
**SECTION I**

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| **Class** | **BSc Chemistry** | **Semester** | **V Semester** | **Total Hours** | **56** |
| **Course Code** | **DSC V** | **Course Title** | **Chemistry V- Physical and Organic Chemistry-III** | **Hours per week** | **4** |
| **Faculty name** | **Dr. Nebula Murukesh** | **Faculty Contact details** | Assist. Professor & Assist. Dean, School of Science<br>email: nebulam@sfscollege.in<br>Mobile: 8197869982 | | |
| **Course Type**<br><br>**(DSC/SEC/AECC/OE)** | **DSC** | | **Course Description: The course comprises two parts; Physical chemistry and organic chemistry.** | | |
| **Credits** | **04** | | | | |
| **Course Learning Outcomes** | CO1: Demonstrate a solid understanding of the properties, structures, and nomenclature of alcohols, thiols, and phenols<br>CO2: Evaluate the suitability of different synthetic methods and reagents for specific applications involving aldehydes and ketones and understanding the practical applications of aldehydes and ketones & carboxylic acids in various industries, research, and daily life.<br>CO3: Explain the Lambert-Beer's law, the laws of photochemistry, photochemical and photophysical processes as well as to | | | | |

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| | calculate the quantum yield of photochemical combinations. Also to develop an understanding on nuclear stability, nuclear reactions, radioactive decay and applications of nuclear and radiochemistry<br>CO4: Explains the fundamental concepts of quantum mechanics and its application in chemistry<br>CO5: Learning about the fundamental of electrochemistry and to determine the electrode potential of a half cell, identify different types of electrodes, construct cells and demonstrate its application |
| **Class policies and guidelines** | ★ Turn your cell phone off.<br>★ Students should attend every class, on time and prepared, and should remain in class for the duration of the class period.<br>★ Students are responsible for all study materials and assignments missed because of absence or lateness.<br>★ As per the College policy, all students should have a minimum of 85% attendance to appear for Examinations.<br>★ Listen actively and attentively.<br>★ Ask questions if you are confused.<br>★ Try not to distract or annoy your classmates. |

**SECTION II**

| **Week** | **Time Period** | Hours per week | Module/ Unit/ Topic number and title | Module/ Unit/ Topic details | Teaching learning methods used)/ activities and or class trips/ dates for assessment | Resource/ Reference details |
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| 1. | 25.09.2023 to 30.09.2023 | 4 | Unit I | Alcohols: Introduction and classification. Methods of preparation-(i) From carbonyl compounds reduction of aldehydes and ketones (by Meerwein-Pondorff- Verley reaction);(ii) from acids and esters (by reduction with $LiAlH_4$); (iii) From alkenes (by hydroboration oxidation with alkaline peroxide); (iv)hydration of alkenes. Reactions of alcohols: Acidic nature, esterification, oxidation of alcohols with $KMnO_4$. Comparison of the reactivity of 1°,2°and 3°alcohols- Lucas test, oxidation with $K_2Cr_2O_7$.Glycols: Preparation from alkenes using $OsO_4$, $KMnO_4$ and from epoxides.Oxidation of glycols by periodic acid and lead tetraacetate with mechanism. Pinacol-pinacolone rearrangement. Glycerol:Preparation from propene and from oils/fats. Uses. Reactions of glycerol: (i) nitration, (ii) action of concentrated $H_2SO_4$ and (iii) oxidation by periodic acid. | Write the equations for the reactions and name the compounds<br><br>Handbook for Reactions<br><br>(CO1) | Advanced Organic Chemistry. Arun Bahl and B.S Bahl, 22nd Edn, New Delhi, 2016.<br><br>Organic Chemistry, Volumes I and II, I L Finar, Longman, (1999).<br><br>Organic reactions and their mechanisms. Kalsi. P.S, 2nd Edn, New Delhi, 2000.<br><br>A textbook of Organic Chemistry. OP Agarwal, 2012 |
| 2. | 02.10.2023 to 07.10.2023 | II Sem Practical Examination | | | | |

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| 3. | 09.10.2023 to 14.10.2023 | 4 | Unit I (Organic Chemistry III) | Thiols: Nomenclature. Methods of formation and chemical reactions (with sodium,NaOH,metal oxides, formation of thioesters and oxidation with mild and strong oxidizing agents). Uses of dithianes. Introduction of umpolung character (reversal of polarity) in carbonyl compounds. Phenols Classification. Acidic nature - Comparison of acidic strength of phenol with alcohols and monocarboxylic acids.Effect of electron withdrawing –NO2 group and electron donating –CH3 group on acidity of phenols at o-, m-, p- positions. Pechmann reaction, Mechanism of Reimer-Tiemann and Kolbe-Schmidt reactions. Industrial applications of phenols: Conversion of phenol to (i) aspirin, (ii)methyl salicylate, (iii) salol, (iv)salicylsalicylic acid | Write the equations for the reactions and name the compounds<br><br>(CO1) | Advanced Organic Chemistry. Arun Bahl and B.S Bahl, 22nd Edn, New Delhi, 2016.<br><br>Organic Chemistry, Volumes I and II, I L Finar, Longman, (1999).<br><br>Organic reactions and their mechanisms. Kalsi. P.S, 2nd Edn, New Delhi, 2000.<br><br>A textbook of Organic Chemistry. OP Agarwal, 2012 |
| 4. | 16.10.2023 to 25.10.2023 | 4 | Unit I (Organic Chemistry III) | Aldehydes and Ketones Nomenclature. Preparation of aldehydes: (i)from acid chlorides (Rosenmund reaction), (ii) Gattermann- Koch aldehyde synthesis. Preparation of Ketones: (i) From nitriles,from carboxylic acids with alkyl lithium, (ii) from acid chlorides with metal alkyls. Mechanisms of Cannizzaro reaction, Benzoin | Blended Learning<br><br>Write the equations for the reactions and Write the mechanisms of reactions in group and explain. | https://youtu.be/wEr9R7hwhv8 https://youtu.be/i60klB1OJg4<br><br>https://youtu.be/_JtMGnTKN2s<br><br>https://youtu.be/UNKvA8hSazY<br><br>Advanced Organic Chemistry. Arun Bahl and B.S Bahl, 22nd |

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| | | | Unit III (Physical Chemistry III) | condensation, Reformatsky Reaction and Knoevenagel condensation.General mechanism of condensation with ammonia and its derivatives (NH2−R;R=−NH2,−OH,−NH−CO−NH2). Reduction:Reduction by LiAlH4 and NaBH4.Mannich reaction.Mechanisms of Clemmensen and Wolff-Kishner reduction.<br><br>Photochemistry : Characteristics of electromagnetic radiation, Lambert-Beer's law and its limitations, physical significance of absorption coefficients. Laws of photochemistry. Grotthus-Draper law, Stark-Einstein law – Statements, differences between photophysical and photochemical processes-any four differences with examples. Comparison of photochemical and thermal reactions with an example each. | Study card/handbook for name reactions<br><br>Discussion on Industrial Applications<br><br>(CO2)<br><br>Verification of Beer lambert's Law using colourimetry<br><br>(CO3) | Edn, New Delhi, 2016.<br><br>Organic Chemistry, Volumes I and II, I L Finar, Longman, (1999).<br><br>Organic reactions and their mechanisms. Kalsi. P.S, 2nd Edn, New Delhi, 2000.<br><br>Physical Chemistry, P. W. Atkins, Julio de Paula, ELBS, 7th ediBon, (2002).<br><br>Principles of Physical Chemistry, 4th Edition B. R. Puri and L. R. Sharma and M. S.Pathania, S. L. N. Chand & Co., 1987 |
| 5. | 26.10.2023 to 31.10.2023 | FIRST INTERNAL EXAM(70% syllabus completion) | | | | |
| 6. | 02.11.2023, to 11.11.2023 | 4 | Unit III (Physical Chemistry III) | Quantum yield definition, Magnitude of Quantum yield of photochemical combination of (i) H2 and Cl2 (ii) H2 and Br2 (iii) dissociation of HI (iv) dimerisation | Jablonski Diagram<br><br>(CO3) | Organic Chemistry, R.N Morrison and R.N Boyd, DarlingKindersley (India) Pvt. Ltd. |

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| | | | | of anthracene: reason for low, high and medium quantum yields. Photosensitization-definition with example, photostationary equilibrium – definition and example. Singlet and triplet states – definitions. Fluorescence, phosphorescence, luminescence, bioluminescence and chemical sensors definitions of all these with suitable examples<br><br>Nuclear and Radiochemistry. Nucleus: Structure and stability, binding energy calculations. Instability of the nuclei, radioactive decay law, half-life: numerical problems. Radioactive equilibrium, radioactive series. Artificial radioactivity: Nuclear reactions induced by γ-radiation, α, n, p,and d particles. Nuclear fission and fusion. Nuclear reactors, Breeder reactors, atomic energy programme in India. Isotopes- use of radio isotopes in tracer technique, agriculture, medicine, food preservation and Carbon dating-Numerical problems | Schematic diagrams, Radioactive reactions, Debate, work out problems<br><br>(CO3) | Pearson Education, (2016<br><br>Nuclear and Radiation Chemistry Sharma B. K, Goel Publishing House, 1987.<br><br>Inorganic Chemistry, 3rd Edition (ISE) A G Sharpe, Addison Wesley, 1989. |
| 7. | 13.11.2023 to 18.11.2023 | 4 | Unit II (Organic Chemistry III) | Carboxylic acids and their derivatives 10h Carboxylic acids:Nomenclature,Classification -mono,di,tricarboxylic acids,hydroxy acids- lactic acid, tartaric acid and citric acid. Mono | Blended Learning (CO2) | ttps://youtu.be/WI5gA0hHvek<br><br>**https://youtu.be/N1kkpFE5zfo** |

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| | | | | carboxylic acids: preparation- acid hydrolysis of nitriles with mechanism. Acidic strength- pKa values. Effect of substituents on the strength of aliphatic and aromatic carboxylic acids. Comparison of acid strength of formic and acetic acid, acetic acid and mono-chloro, dichloro, trichloroacetic acids, benzoic and p-nitrobenzoic acid, p-aminobenzoic acid, explanation. Reactions: Formation of esters, acid chlorides, amides and anhydrides. Hell-Volhard-Zelinsky reaction, decarboxylation and reduction using LiAlH4. | | **https://youtu.be/1Eh0jQvMXkM**<br><br>https://youtu.be/QiyzRMxcNuk<br><br>https://youtu.be/f8waz_5jN5Q<br><br>https://youtu.be/X6udqwOfbnw<br><br>https://youtu.be/uDa-apS9vp0<br><br>**https://youtu.be/teR7DjtfHFc**<br><br>**https://youtu.be/teR7DjtfHFc**<br><br>**https://youtu.be/bUGQ3cct4cI**<br><br>**https://youtu.be/EESWUAgitCs**<br><br>Advanced Organic Chemistry. Arun Bahl and B.S Bahl, 22nd Edn, New Delhi, 2016.<br><br>Organic Chemistry, Volumes I and II, I L Finar, Longman, (1999).<br><br>Organic reactions and their mechanisms. |

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| | | | | | | Kalsi. P.S, 2nd Edn, New Delhi, 2000.<br><br>A textbook of Organic Chemistry. OP Agarwal, 2012 |
| 8. | 20.11.2023 to 25.11.2023 | 4 | Unit II (Organic Chemistry III)<br><br>Unit IV | Di and tri carboxylic acids: Action of heat on dicarboxylic acids - oxalic acid, malonic acid, succinic acid, glutaric acid and adipic acid. Reactions of tartaric acid and citric acid- action of heat and reduction with HI. Acid derivatives: Acid chlorides- hydrolysis, reaction with alcohol, ammonia and lithium dialkyl cuprates. Acid anhydrides –acetic anhydride- hydrolysis, reaction with alcohol and ammonia. Amides-hydrolysis,reduction,Hoffmann degradation. Esters-acid hydrolysis and alkaline hydrolysis, ammonolysis and alcoholysis<br><br>Quantum Mechanics: Concepts of Operators: Laplacian, Hamiltonian, Linear and Hermitian operators. Angular Momentum operators and their properties. Commutation of operators. Solutions of Schrödinger wave equation for a free particle, particle in a three-dimensional box. | Write the equations for the reactions and Write the mechanisms of reactions in group and explain.<br>(CO2)<br><br>Review of postulates of Quantum Mechanics<br><br>(CO4) | Advanced Organic Chemistry. Arun Bahl and B.S Bahl, 22nd Edn, New Delhi, 2016.<br><br>Organic Chemistry, Volumes I and II, I L Finar, Longman, (1999).<br><br>Organic reactions and their mechanisms. Kalsi. P.S, 2nd Edn, New Delhi, 2000.<br><br>A textbook of Organic Chemistry. OP Agarwal, 2012<br><br>Introduction to Quantum Chemistry, A. K. Chandra, Tata McGraw Hill, (1988).<br>Quantum Chemistry, Ira. N. Levine, PrenBce Hall, New Jersey, |

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| | | | (Physical Chemistry III) | | | (1991). |
| 9. | 27.11.2023 to 06.12.2023 | MODEL EXAM (90% Syllabus completion) | | | | |
| 10. | 07.12.2023 to 09.12.2023 | 4 | Unit IV (Physical Chemistry III) | Quantum mechanical degeneracy, tunneling (no derivation). Application of Schrödinger equation to harmonic oscillator, rigid rotator. Application of Schrödinger wave equation to | Simulations<br><br>(CO4) | PhET Simulations: Quantum Phenomena (aapt.org)<br><br>Introduction to |

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| | | | | hydrogen atom. Schrödinger equation to hydrogen atom in spherical polar coordinates. Separation of variables. List of wave functions for few initial states of hydrogen like atoms. The Stern-Gerlach experiment and the concept of electron spin, spin orbitals (elementary idea only) and Pauli's exclusion principle. Approximate methods: Need for approximate methods. Statement of variation theorem and application to simple systems (particle-in-a-box, harmonic oscillator, hydrogen atom). | | Quantum Chemistry, A. K. Chandra, Tata McGraw Hill, (1988). Quantum Chemistry, Ira. N. Levine, PrenBce Hall, New Jersey, (1991). |
| 11. | 11.12.2023 to 16.12.2023 | 4 | Unit IV (Physical Chemistry III) | Electrochemistry II : Galvanic cell: conventions of representing galvanic cells-reversible and irreversible cells, derivation of Nernst equation for single electrode potential (free energy concept). Weston-cadmium cell: Determination of Emf of a cell by compensation method. Determination of E of Zn/Zn2+ and Cu/Cu2+electrodes. Liquid junction potentials, elimination of liquid junction potential. Types of electrodes: Metal and gas electrodes (chlorine), metal/metal insoluble salt electrodes, redox electrodes. Reference electrodes-standard hydrogen electrode, calomel | ICT Tools<br><br>Relating Knowledge with Real Life Glucometer CO5 | Principles of Physical Chemistry, 4th Edition B. R. Puri and L. R. Sharma and M. S.Pathania, S. L. N. Chand & Co., 1987 |

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| | | | | electrode, quinhydrone electrode and glass electrode. Determination of pH using these electrodes. Numerical problems. Concentration cells: (i) Emf of concentration cells (ii) determination of solubility of sparingly soluble salts and numerical problems. Redox electrodes, Emf of redox electrodes. Potentiometric titration involving only redox systems | | |
| 12. | 18.12.2022 onwards | Revision and remedial | | | | |

Principal