**Maharaja Manindra Chandra College**
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| Teacher's name | Paper name with code | Topic | Time period | Subtopic |
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| Sunetra Das | Waves and Optics **PHS-DSCC-3-1** | Oscillations | 1st week of December, 2025 | Differential equation of simple harmonic oscillation and its solution. Kinetic energy, potential energy, total energy and their time average values. (2 Lectures) |
| | | | 2nd week of December, 2025 | Damped and forced oscillations: Transient and steady states, resonance, sharpness of resonance; power dissipation and Quality Factor. (2 Lectures) |
| | | Superposition of Harmonic Oscillations | 3rd week of December, 2025 | Superposition of two collinear Harmonic oscillations having equal frequencies and different frequencies (beats). Superposition of two Perpendicular Harmonic Oscillations for phase difference δ = 0, π, 2π: Graphical and analytical methods, Lissajous' figures with equal and unequal frequency and their uses. (3 Lectures) |
| | | Wave motion | 1st week of January, 2026 | Plane and spherical waves. Longitudinal and transverse waves. Plane progressive (travelling) waves. Wave equation for travelling waves. Particle and wave velocities. (2 Lectures) |
| | | Superposition of harmonic Waves | 2nd and 3rd week of January, 2026 | Velocity of transverse vibrations of stretched strings; standing (stationary) waves in a string: fixed and free ends (analytical treatment). Changes with respect to position and time. (3 Lectures) |
| | | | 3rd and 4th week of January, 2026 | Energy of vibrating string. Transfer of energy. Normal modes of stretched strings. Plucked and struck strings, Superposition of N harmonic waves. (3 Lectures) |
| | | | 1st week of February, 2026 | Phase and group velocities. (1 Lecture) |

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| | | Fermat's Principle | 1st and 2nd week of February, 2026 | Fermat's principle, laws of reflection and refraction at a plane and curved surface. (2 Lectures) |
| | | Polarization | 2nd week of February, 2026 | Description of linear, circular and elliptical polarization. (1 Lecture) |
| | | | 3rd and 4th week of February, 2026 | Propagation of electromagnetic waves in birefringent medium, polarization in uniaxial crystals. Double refraction. Polarization by double refraction. (3 Lectures) |
| | | | 4th week of February to 1st week of March, 2026 | Nicol prism. Ordinary and extraordinary refractive indices. Phase Retardation plates: Quarter-wave and Half-wave plates. (2 Lectures) |
| | | | 1st and 2nd week of March, 2026 | Production and analysis of polarized light, Rotatory polarization, Biot's laws for rotatory polarization. Fresnel's theory of optical rotation. Calculation of angle of rotation. Specific rotation (3 Lectures) |
| Sonali Chakrabarti | Waves and Optics (DSCC-3-1) | Interference | 1st week of December | Huygen's principle,Young's experiment' Fresnel's biprism. |
| | | | 2nd week of December | Stoke's treatment, thin films, Haidinger fringes and Fizeau fringes. |
| | | | 3rd week of December | Newton's rings, Michelson interferometer. |
| | | | 4th week of December | Fabry-Perot interferometer, temporal and spatial coherence |
| | | Diffraction | 1st week of January | Fraunhoffer diffraction,diffraction grating, Resolving power, Rayleigh criterion. |
| | | | 2nd week of January | Circular aperture, Fresnel diffraction, Fresnel half period zones |
| | | | 3rd week of January | Theory of zone plate, Multiple foci of zone plate. |

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| | | Diffraction | 4th week of January | Rectilinear propagation of light explanation. |

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| Shyamal Mondal | Mathematical Physics I **PHS-DSCC-3-2** | Convergence of infinite series | 1st week of December, 2025 | Convergence of power series. Idea of interval of convergence . |
| | | | 2nd week of December, 2025 | Different convergence tests of power series: D'Alembert's ratio test, Cauchy's root test, Integral test. Alternating series test. Absolute and conditional convergence) |
| | | Introduction to Probability | 3rd week of December, 2025 | Probability for discrete events, and combined probability for uncorrelated events. Mean and variance. Independent random variables: Sample space and Probability distribution functions. Binomial, Gaussian, and Poisson distribution with examples. |
| | | | 1st week of January, 2025 | One dimensional random walk. |
| | | Some special integrals | 2nd week of January | Beta and Gamma functions and relation between them. |
| | | | 3rd week of January, 2025 | Expression of integrals in terms of Gamma functions. Error function (probability integral). |
| Mimi Dan Dutta | | Fourier Series | 1st week of December, 2025 | Periodic functions. Orthogonality of sine and cosine functions, Dirichlet Conditions (Statement only). Expansion of periodic functions in a series of sine and cosine functions and determination of Fourier coefficients. |

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| | | 2nd week of December, 2025 | Complex representation of Fourier series. Expansion of functions with arbitrary period. Expansion of non-periodic functions over an interval. Even and odd functions and their Fourier expansions. |
| | | 3rd week of December, 2025 | Applications. Summing of Infinite Series. Term-by-Term differentiation and integration of Fourier Series. Parseval Identity. |
| | Fourier Transform | 1st week of January, 2025 | Fourier Integral theorem. Fourier Transform (FT) with examples. FT of trigonometric, Gaussian, finite wave train, and other functions. Inverse Fourier transform, Properties of FT (translation, change of scale, complex conjugation, etc.). |
| | | 2nd week of January, 2025 | Parseval's identity. Applications of FT in single slit, double slit, rectangular aperture and *N*-slit grating. |
| | Partial Differential Equations | 3rd week of January, 2025 | Solutions to partial differential equations using separation of variables: Solutions of Laplace's equation in problems with cartesian and spherically symmetric cases only. |
| | | 4th week of January, 2025 | Wave equation and its solution for vibrational modes of a stretched string, Diffusion Equation in one dimension. |

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