

TEACHING PLAN
DEPARTMENT OF PHYSICS
MOYNA COLLEGE
STREAM -B.SC (GENERAL)
ACADEMIC YEAR : 2016 - 2017
TEACHER - SK MASIUR RAHAMAN

PART I	PAPER I	3. SHM, Simple & Compound pendulums, torsional pendulum : Superposition of two simple harmonic motions of some frequency along the same line, interference, superposition of two mutually perpendicular simple harmonic vibrations of same frequency, Lissajous figures, forced oscillator and damped oscillator, critical damping.	05.10.16-30.11.16	8	LECTURE DEMONSTRATION ILLUSTRATION GROUP DISCUSSION	DO
		CLASS TEST	02.12.16	01		
PART I	PAPER I	General Properties of Matter: Gravitation : Gravitational potential and intensity due to thin uniform spherical shell and solid sphere of uniform density, escape velocity. Elasticity : Elasticity, small deformation, Hooke's Law, elastic constants of an isotropic solid – interrelations. Torsion of a cylinder, bending moment, cantilever, simply supported beam with concentrated load at the centre, strain energy. Viscosity : Viscous fluids, Streamline and turbulent motion, Poiseuille's formula, critical velocity, Reynolds number, Bernoulli's theorem, Reynold's number, Stokes' law..Surface Tension : Surface tension and surface energy, molecular theory, angle of contact, elevation and depression of liquid columns in a capillary tube, excess pressure in a spherical bubble and spherical drop.	06.12.16-20.01.17	15	LECTURE DEMONSTRATION ILLUSTRATION GROUP DISCUSSION	1. Snatak Padartha Bijnan (Vol.1) – C. R. Dasgupta (Book Syndicate). 2. Snatak Padarthabidya (Vol. 1) – M. D. Khan (Calcutta Book House).
		CLASS TEST	25.01.17	01		

YEAR	PAPER	TOPICS	DATE	NO OF CLASSES	TEACHING METHOD	REFERENCE BOOKS
PART I	PAPER I	<p>Waves : Speed of transverse waves on a string, speed of longitudinal waves in fluid, energy density and energy transmission in waves – measurement, gravity waves and ripples, group velocity and wave velocity – measurements. Standing waves – normal modes of bounded systems examples, Harmonics and quality of sound examples.</p> <p>Acoustics : Noise and music, human ear its responses, audibility, intensity and loudness, Bel and decibel, musical scale, temperament and musical instruments. Reflection and refraction sound, acoustic impedance, percentage reflection and refraction at a boundary. Measurements of frequency, wave form, intensity and velocity. Acoustics of halls, reverberation, Sabine's formula.</p> <p>9. Geometrical Optics : Reflection and refraction : Fermat's Principle, laws of reflection and refraction at a plane surface, refraction at a spherical surface, lens formula. Combination of thin lenses - equivalent focal length. Optical instruments: Dispersion and dispersive power, chromatic aberration and its remedy, different types of Siedel aberration (qualitative) and their remedy. Eye-piece : Ramsden and Huygen's</p>	27.01.17-03.03.17	14	LECTURE DEMONSTRATION ILLUSTRATION GROUP DISCUSSION	<p>1. Snatak Padartha Bijnan [A Handbook of Degree Physics] (Vol. 1) – C. R. Dasgupta (Book Syndicate)</p> <p>2. Snatak Padarthabidya (Vol. 1) – M. D. Khan (Calcutta Book House).</p>
		CLASS TEST	07.03.17	01		

YEAR	PAPER	TOPICS	DATE	NO OF CLASSES	TEACHING METHOD	REFERENCE BOOKS
2 ND YEAR	PART II PAPER II	<p>Physical optics: Interference - Interference of light, principle of superposition, Young's double slit experiment, intensity distribution, conditions of interference, optical path retardation, lateral shift of fringes, interference in thin films, Newton's ring experiment. Diffraction - Fresnel's diffraction, half period zones, rectilinear propagation, zone plates. Fraunhofer different, diffraction at a single slit, double slit (no derivation), intensity distribution. Diffraction grating, diffraction at N parallel slits, intensity distribution, plane diffraction grating. Rayleigh criterion, Resolving powers of a grating and a prism. Polarization - Polarization of light, uniaxial crystals, Brewster's law, Double refraction phase retardation plates. Optical activity, rotation of plane of polarization, right-handed and left-handed active substances (definitions and examples only), specific rotation.</p>	10.08.16-05.09.16	15	LECTURE DEMONSTRATION ILLUSTRATION	1. Snatak Padartha Bijnan [A Handbook of Degree Physics] (Vol. 2) – C. R. Dasgupta (Book Syndicate). 2. Snatak Padarthabidya (Vol - 2) – M. D. Khan (Calcutta Book House).
		CLASS TEST	09.11.16	01	DO	DO

PART II	PAPER II	<p>Electronics: p-n junction diode, diode as a rectifier, bridge rectifier, Zener diode, Zener diode as a voltage regulator. Transistors - characteristics of a transistor in CE mode, graphical analysis of CE configuration, d.c. biasing-selection of Q-point. Digital Electronics- binary number system, conversion from decimal to binary and vice versa. Logic gates- OR, AND, NOT gates, truth tables, de Morgan's theorem, NOR and NAND universal gates.</p>	06.09.16-05.10.16	12	LECTURE DEMONSTRATION ILLUSTRATION	1. Snatak Padartha Bijnan [A Handbook of Degree Physics] (Vol. 2) – C. R. Dasgupta (Book Syndicate). 2. Electronics- Chattopadhyay and Rakshit
		CLASS TEST	09.11.16	01		

YEAR	PAPER	TOPICS	DATE	NO OF CLASSES	TEACHING METHOD	REFERENCE BOOKS
PART II	PAPER II	<p>MODERN PHYSICS: Relativity: Postulates of special theory of relativity; length contraction and time dilation (derivations are not required), velocity addition theorem (statement only), variation of mass with velocity and mass-energy equivalence (derivations are not required). 10. Atomic Physics: Bohr model, Spectra of hydrogen atom, Vector Atom model, concept of quantum numbers, Pauli exclusion principle. 10. Quantum mechanics: Wave particle duality - de Broglie hypothesis and matter waves; Compton effect, Heisenberg uncertainty principle, wave-function $\Psi(x,t)$, probability density, normalization, Schrodinger equation in one-dimension, application to particle in a one dimensional box, eigenfunctions and eigenvalues. 11. Nuclear Physics: Structure of a nucleus- shell model, concept of binding energy, nuclear reactions, stability, fission and fusion, energy production in stars, nuclear reactors. 12. Solid State Physics: Crystal structures, lattice and basis, unit cell, cubic crystal system- sc, fcc, and bcc, packing fractions, X-ray diffraction – Laue Equations (statement only) and Bragg's law. Energy band structure of solids - Distinction of insulators, semiconductors and metals.</p>	11.11.16-11.01.17	20	LECTURE DEMONSTRATION PROJECT PROBLEM SOLVING	1. Snatak Padartha Bijnan [A Handbook of Degree Physics] (Vol. 2) – C. R. Dasgupta (Book Syndicate). 2. Paramanu O Kendrak Gathan Parichaya (Vol. 1 & 2) – S. N. Ghoshal (WBSBB). 3. College Physics (Vol. 1-2) – A. B. Gupta (Books & Allied).
		CLASS TEST	27.01.17	01		

PART II	PAPER III	<p>material of the lens (b) a wettable liquid.</p> <p>3. Determination of <i>refractive index</i> of material of a prism by spectrometer using method of minimum deviation.</p> <p>4. To measure the <i>horizontal component of earth's magnetic field</i> by magnetometer.</p> <p>5. Study of <i>Newton's ring</i> and determination of <i>wavelength</i> of source (radius of curvature of the lens be supplied).</p> <p>6. Use of <i>bridge rectifier</i> and study of its load regulation characteristics</p> <p>7. To study the <i>forward and reverse bias characteristics</i> of a <i>Zener diode</i> and determination of dynamic resistance before and after breakdown.</p> <p>8. To study the <i>load regulation characteristics</i> of the Zener Diode with specific reference voltage.</p> <p>9. To draw the <i>output characteristic of a transistor</i> in CE mode.</p> <p>10. To verify truth tables of OR, AND and NOT gates.</p>			DO	
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YEAR	PAPER	TOPIC	DATE	NO OF CLASSES	TEACHING METHOD	REFERENCE BOOKS
3 RD YEAR PART- III	IV-A	D. LASER and Modern Optics : 1. LASER principle: Einstein A,B coefficient, Population Inversion, Feedback energy in resonator. 2. LASER type: Solid state LASER-Ruby, Semi conductor LASER. 3. LASER Application: Elementary idea on Holography, Medical Application, Isotope separation. 4. Basics of Camera and Photography. 5. Optical fiber: Core and cladding, total internal reflection, optical fiber as waveguide, acceptance angle and numerical aperture, step index fiber	12.08.16-25.08.16	8	LECTURE DEMONSTRATION ILLUSTRATION GROUP DISCUSSION	1.Undergraduate Physics (Vol. 3) - A. B. Bhattacharya, R. Bhattacharya (Central Book Agency). 2. Snatak Padarthabidya (Vol. 3) – M. D. Khan and A . Pal (Calcutta Book House).
		CLASS TEST	31.08.16	01		
PART III	IVA	Electronics : 1. p-n Junction and Zener diode characteristics (Review), Half Wave rectifier, Full Wave rectifier, Bridge rectifier, Filter, Use of Zener as Voltage regulator, Designing of dc power supply. 2. Bipolar junction transistors: Method of operation, current components input and output characteristics (Review only), Hybrid model, Basic transistor CE amplifier.	01.09.16-05.10.16	18	LECTURE DEMONSTRATION ILLUSTRATION GROUP DISCUSSION DO	1. Snatak Padartha Bijnan (Vol. 2) – C. R. Dasgupta (Book Syndicate). 2.Electronics- D.Chattopadhyay and P.C. Rakshit

PART III	PAPER IVA	<p>3. OPAMP and its use as inverting, non-inverting amplifier, adder, subtractor, differentiator, Integrator.</p> <p>4. Digital electronics: XOR, XNOR gates, Half adder, full adder, Product of Sum (POS), Sum of Product (SOP) technique, simplification by Karnaugh Map</p> <p>5. Communication principle: Basic idea about modulation and demodulation.</p> <p>CLASS TEST</p>	09.11.16	01		
		<p>Computer Hardware, Software and application :</p> <p>1. Basic building blocks</p> <p>2. Computer soft ware- Operating system, DOS, UNIX, WINDOWS</p> <p>3. Elementary programming with Fortran: Flow chart, Control statement, do Loops, functions and subroutines, input output statements, simple programs –</p> <p>a. To find the area of a circle.</p> <p>b. To print out all natural even odd numbers between its limits.</p> <p>c. To find the maximum, minimum and range of a set of numbers.</p> <p>d. To evaluate mean of some numbers.</p> <p>e. To evaluate sum of finite series (simple series)</p> <p>CLASS TEST</p>	10.11.16-10.01.17	20	LECTURE DEMONSTRATION ILLUSTRATION GROUP DISCUSSION	Undergraduate Physics (Vol. 3) - A. B. Bhattacharya, R. Bhattacharya (Central Book Agency).
			20.01.17	01		

PART III	PAPER IVB	<p>Project-type sample experiment:</p> <ol style="list-style-type: none"> 1. To convert an ammeter into a voltmeter and a voltmeter into an ammeter. 2. To measure the internal resistance of an analog voltmeter and to increase its internal resistance using an OPAMP. 3. To use OP AMP as inverting, non inverting, differential amplifier and as an adder. 4. To construct and verify the truth tables of half adder / full adder. 5. Computer programming – covering the content of the theoretical syllabus (Part III Gen). 	10.11.16-23.02.17	12	<p>THEORY</p> <p>CIRCUIT IMPLIMENTATION</p> <p>DEMO</p>	<p>1.Byabharik Padarthabidya – C.R.Dasgupta</p> <p>2.Practical Physics Vol-2 –B Ghosh</p>
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