**LESSON PLAN**

**OF**

**Physics DEPT.**

**UG Courses**

**Odd Semester**



**2023-24**

**INDIRA GANDHI (PG) MAHILA MAHAVIDYALAYA**

**Affiliated to Kurukshetra University, Kurukshetra**

**Karnal Road, Kaithal -136027 (Haryana)**

**Indira Gandhi Mahila Mahavidyalaya,Kaithal**

**(2023– 2024)**

**Subject Code- B23-PHY-101 Class – B.Sc.**

**Subject – MechanicSem.- 1st**

|  |  |  |
| --- | --- | --- |
| **Sr. No.** | **Date** | **Course content** |
| **1** | **24July-29July** | Fundamentals of Dynamics: Rigid body, Moment of Inertia |
| **2** | **31July- 5 Aug** | Radius of Gyration, Theorems of perpendicular and parallel axis (with proof), Torque, Rotational Kinetic Energy, Angular momentum, Law of conservation of angular momentum |
| **3** | **7Aug - 12Aug** | Moment of Inertia of ring, Disc, Angular Disc, Solid cylinder, Solid sphere, Hollow sphere |
| **4** | **14Aug - 19Aug** | Moment of Inertia of Rectangular plate, Square plate, Solid cone, Triangular plate, Rolling motion, condition for pure rolling, |
| **5** | **21Aug - 26 Aug** | acceleration of body rolling down an inclined plane, Fly wheel, Moment of Inertia of an irregular body. |
| **6** | **28 Aug - 2Sep** | Elasticity: Deforming force, Elastic limit, stress, strain and their types, Hookes law, Modulus of rigidity, Relation between shear angle and angle of twist, elastic energy stored/volume in an elastic body, |
| **7** | **4Sep - 9Sep** | Elongation produced in heavy rod due to its own weight and elastic potential energy stored in it, Tension in rotating rod, Poissons ratio and its limiting value, Elastic Constants and their relations. |
| **8** | **11 Sep - 16Sep** | Torque required for twisting cylinder, Hollow shaft is stiffer than solid one. Bending of beam, bending moment and its magnitude, Flexural rigidity, |
| **9** | **18 Sep - 23Sep** | Bending of cantilever (loaded by a weight W at its free end), weight of cantilever uniformly distributed over its entire length. Dispersion of a centrally loaded beam supported at its ends, determination of elastic constants for material of wire by Searles method. |
| **10** | **25 Sep – 30 Sep** | Special Theory of Relativity: Michelsons Morley experiment and its outcomes, |
| **11** | **3 Oct - 7Oct** | Postulates of special theory of relativity, Lorentz Transformations, Simultaneity and order of events, Lorentz contraction, Time dilation, Relativistic transformation of velocity |
| **12** | **9Oct - 14Oct** | relativistic addition of velocities, variation of mass-energy equivalence, relativistic Doppler effect, relativistic kinematics, transformation of energy and momentum, transformation of force, Problems of relativistic dynamics. |
| **13** | **16Oct - 21Oct** | Gravitation and central force motion: Law of gravitation, Potential and field due to spherical shell and solid sphere. Motion of a particle under central force field, |
| **14** | **23Oct - 28Oct** | Two body problem and its reduction to one body problem and its solution, compound pendulum or physical pendulum in form of elliptical lamina and expression of time period, determination of g by means of bar pendulum, Normal coordinates and normal modes, |
| **15** | **30Oct - 4 Nov** | Normal modes of vibration for given spring mass system, possible angular frequencies of oscillation of two identical simple pendulums of length (l) and small bob of mass (m0 joined together with spring of spring constant (k). |
| **16** | **6 Nov - 9Nov** | Revision |
| **17** | **17 Nov - 18 Nov** | Revision |
| **18** | **20 Nov – 24 Nov** | Revision |
| 19 | 27 Nov-30Nov. 1,2 Dec | Revision |
| 20 | 4 Dec- 9 Dec | Revision |
| 21 | 11Dec- 16 Dec | Revision |
| 22 | 18 Dec- 23 Dec | Revision |
| 23 | 25 Dec - 30 Dec | Revision |

**Indira Gandhi Mahila Mahavidyalaya,Kaithal**

**(2023– 2024)**

**Subject Code- Class – B.Sc.**

**Subject – Elementary MechanicsSem.- 1st**

|  |  |  |
| --- | --- | --- |
| **Sr. No.** | **Date** | **Course content** |
| **1** | **24July-29July** | Fundamentals of Dynamics: Rigid body, Moment of Inertia |
| **2** | **31July- 5 Aug** | Radius of Gyration, Theorems of perpendicular and parallel axis (with proof) |
| **3** | **7Aug - 12Aug** | Moment of Inertia of ring, Disc |
| **4** | **14Aug - 19Aug** | Moment of Inertia of Angular Disc |
| **5** | **21Aug - 26 Aug** | Moment of inertia of Solid cylinder |
| **6** | **28 Aug - 2Sep** | Elasticity: Deforming force, Elastic limit, stress, strain and their types, Hookes law, |
| **7** | **4Sep - 9Sep** | Modulus of rigidity, Relation between shear angle and angle of twist |
| **8** | **11 Sep - 16Sep** | Poissons ratio and its limiting value, |
| **9** | **18 Sep - 23Sep** | Torque required for twisting cylinder |
| **10** | **25 Sep – 30 Sep** | Special Theory of Relativity: Michelsons Morley experiment and its outcomes, |
| **11** | **3 Oct - 7Oct** | Postulates of special theory of relativity, Lorentz Transformations, Lorentz contraction, Time dilation, Relativistic transformation of velocity |
| **12** | **9Oct - 14Oct** | relativistic addition of velocities, variation of mass-energy equivalence |
| **13** | **16Oct - 21Oct** | Gravitation and central force motion: Law of gravitation, Potential and field due to spherical shell and solid sphere. Motion of a particle under central force field, |
| **14** | **23Oct - 28Oct** | Normal coordinates and normal modes, |
| **15** | **30Oct - 4 Nov** | Normal modes of vibration for given spring mass system, possible angular frequencies of oscillation of two identical simple pendulums of length (l) and small bob of mass (m0 joined together with spring of spring constant (k). |
| **16** | **6 Nov - 9Nov** | Revision of unit ist |
| **17** | **17 Nov - 18 Nov** | Revision |
| **18** | **20 Nov – 24 Nov** | Revision |
| 19 | 27 Nov-30Nov. 1,2 Dec | Revision of unit 2nd |
| 20 | 4 Dec- 9 Dec | Revision |
| 21 | 11Dec- 16 Dec | Revisionof unit 3rd |
| 22 | 18 Dec- 23 Dec | Revision |
| 23 | 25 Dec - 30 Dec | Revision of unit 4th |
|  |  |  |

**Indira Gandhi Mahila Mahavidyalaya,Kaithal**

**(2023– 2024)**

**Subject Code-301Class – B.Sc**

**Subject – Fortran and thermodynamicsSem.- III**

|  |  |  |
| --- | --- | --- |
| **Sr. No.** | **Date** | **Course content** |
| **1** | **24July-29July** | Computer organization ,binary representation ,algorithm development |
| **2** | **31July- 5 Aug** | Flow chart and their interpretation ,fortran preliminaries |
| **3** | **7Aug - 12Aug** | Built in functions ,executable and non executable statements ,input and output statements |
| **4** | **14Aug - 19Aug** | Format ,if ,do and go to statements |
| **5** | **21Aug - 26 Aug** | Dimension arrays ,statement function and function Subprogram |
| **6** | **28 Aug - 2Sep** | Algorithm, flow chart and programming for print out of natural numbers.,range  Of these set of given numbers ,ascending and Descending order |
| **7** | **4Sep - 9Sep** | Mean and standard deviation,least squarefitting of curve,roots of quadratic equation,  Product of two matrices, numerical integration (trapezoidal and Simpson1/3rule) |
| **8** | **11 Sep - 16Sep** | Thermodynamic system and zeroth law of thermodynamics first law of thermodynamics  And it's limitations, reversible and irreversible process.Second law of thermodynamics  And it's significance |
| **9** | **18 Sep - 23Sep** | Carnot theorem , absolute scale of temperature, absolute zero and magnitude of each division on work scale and perfect gas scale, joule's free expansion ,jouleThomsoneffect |
| **10** | **25 Sep – 30 Sep** | Joule Thompson experiment, Entropy and it's deprivation,T-S diagram, entropy of a perfect gas,Nernst heat law. |
| **11** | **3 Oct - 7Oct** | ,Liquefaction of gases,Soldification of He below 4K, cooling by Adiabatic demagnetisation |
| **12** | **9Oct - 14Oct** | Latent heat equation and their derivation,significance ,specific heat of saturated vapours phase diagram and triple point of a substance. |
| **13** | **16Oct - 21Oct** | Development of Maxwell thermodynamics relations |
| **14** | **23Oct - 28Oct** | Thermo dynamical function and the relations between them. Derivation of Maxwell Thermo dynamical relations.Application of Maxwell relations |
| **15** | **30Oct - 4 Nov** | Revision |
| **16** | **6 Nov - 9Nov** | Revision |
| **17** | **17 Nov - 18 Nov** | Revision |
| **18** | **20 Nov – 24 Nov** | Revision |

**Indira Gandhi Mahila Mahavidyalaya,Kaithal**

**(2023– 2024)**

**Subject Code- 302 Class – B.Sc.**

**Subject – Optics -1Sem.- III**

|  |  |  |
| --- | --- | --- |
| **Sr. No.** | **Date** | **Course content** |
| **1** | **24July-29July** | Basic, Interference, types of interference, young double slit experiment ,  coherent sources, condition of interference ,analytical treatment of interference  ,expression for fringe width |
| **2** | **31July- 5 Aug** | Fresnel biprism application of Fresnel biprism to determine wavelength of light  and thickness of sheet ,Lloyd mirror, numerical |
| **3** | **7Aug - 12Aug** | Difference between biprism and llyod mirror,phase change on reflections, interference by  Division of amplitude-thin film |
| **4** | **14Aug - 19Aug** | Interference by division of amplitude in parallel film, interference due to transmitted light  ,wedge shaped film |
| **5** | **21Aug - 26 Aug** | Newton rings, formation of newton ring,in reflected and transmitted system |
| **6** | **28 Aug - 2Sep** | Application of newton ring in determination of wavelength of light  and refractive index of liquid, Michelson interferometer |
| **7** | **4Sep - 9Sep** | Form of fringes ,standardization of a meter, determination of wavelength, numericals |
| **8** | **11 Sep - 16Sep** | diffraction, Huygens Fresnel theory, Fresnel assumption, rectilinear propagation of light, Fresnel half period zone, zone plate |
| **9** | **18 Sep - 23Sep** | Diffraction at a straight edge, rectangular slit |
| **10** | **25 Sep – 30 Sep** | diffraction at a, circular aperture, narrow slit, narrow wire |
| **11** | **3 Oct - 7Oct** | Fraunhofer diffraction at a single slit, and double slit |
| **12** | **9Oct - 14Oct** | Fraunhofer diffraction at double slit continue, plane diffraction grating,  Fraunhofer diffraction at N slit |
| **13** | **16Oct - 21Oct** | Plane transmission grating spectrum, dispersive power of grating ,  Determinarion of wavelength of light by plane transmission grating |
| **14** | **23Oct - 28Oct** | limit of resolution, Rayleigh criteria ,resolving power of telescope and grating ,numerical |
| **15** | **30Oct - 4 Nov** | Revision |
| **16** | **6 Nov - 9Nov** | Revision |
| **17** | **17 Nov - 18 Nov** | Revision |
| **18** | **20 Nov – 24 Nov** | Revision |

**Indira Gandhi Mahila Mahavidyalaya,Kaithal**

**(2023– 2024)**

**Subject Code- 501Class – B.Sc.**

**Subject – Quantum Mechanics and Laser physicsSem.- V**

|  |  |  |
| --- | --- | --- |
| **Sr. No.** | **Date** | **Course content** |
| **1** | **24July-29July** | Overview scale of quantum physics,boundary between classical  And quantum, photon,photo electriceffect,Compton effect  ,Frank Hertz experiment,de Broglie hypothesis |
| **2** | **31July- 5 Aug** | Davisson and germer experiment, G.P Thomson experiment,  Phase velocity,group velocity and their relation ,Heisenberg uncertainty principle,  uncertainty principle from de Broglie wave |
| **3** | **7Aug - 12Aug** | Gamma ray microscope,electron diffraction from a slit,derivation of 1-D time dependent  Schroedinger's wave equation, Time independent Schroedinger's wave equation |
| **4** | **14Aug - 19Aug** | Eigenvalues,eigenfunction,wavefunction and it's significance,orthogonality and  Normalization of function,concept of observer and operator |
| **5** | **21Aug - 26 Aug** | Expectation values of dynamical quantities,probability current density  ,free particle in one dimensional box |
| **6** | **28 Aug - 2Sep** | One dimensional step potential E > V, One dimensional step potential E<V |
| **7** | **4Sep - 9Sep** | One dimensional potential barrier E > V, One dimensional potential barrier  E < V |
| **8** | **11 Sep - 16Sep** | Solution of Schroedinger's equation for harmonic oscillator,  Absorption and emission of radiation |
| **9** | **18 Sep - 23Sep** | Main features of a laser:directionality,high intensity,  High degree of coherence,spatial and temporal coherence ,Einsteins coefficient and  Possibility of amplification |
| **10** | **25 Sep – 30 Sep** | Momentum transfer,life time of a level,kinetic of optical absorption,  Population inversion,resonance cavity |
| **11** | **3 Oct - 7Oct** | Laser pumping ,threshold condition for laser emissions, numericals, three level pumping and four level pumping |
| **12** | **9Oct - 14Oct** | ,line broadening mechanism  Natural,collision and Doppler broadening |
| **13** | **16Oct - 21Oct** | He-Ne laser and ruby laser (principle,construction andworking) |
| **14** | **23Oct - 28Oct** | Optical properties of semi conductor, semi conductor laser,Applications of lasers in field  Of medicine and industry |
| **15** | **30Oct - 4 Nov** | Revision |
| **16** | **6 Nov - 9Nov** | Revision |
| **17** | **17 Nov - 18 Nov** | Revision |
| **18** | **20 Nov – 24 Nov** | Revision |

**Indira Gandhi Mahila Mahavidyalaya,Kaithal**

**(2023– 2024)**

**Subject Code- 502Class – B.Sc.**

**Subject – Nuclear PhysicsSem.- V**

|  |  |  |
| --- | --- | --- |
| **Sr. No.** | **Date** | **Course content** |
| **1** | **24July-29July** | Nuclear composition, mass and binding energy,  Systematic of nuclear binding energy,  Nuclear stability,nuclear size,spin,parity,statistics |
| **2** | **31July- 5 Aug** | Magnetic dipole moment quadrupole moment.Angular Momentum  Determination of mass by bain bridge.  Bain bridge and Jordan mass spectrograph  .Mosleys law.Rutherford back scattering experiment |
| **3** | **7Aug - 12Aug** | Bain bridge and Jordan mass spectrograph  .Mosleys law.Rutherford back scattering experiment |
| **4** | **14Aug - 19Aug** | Alpha disintegration,energetic of alpha decay,  origin of continuous beta spectrum,types  of beta decay,energetic of beta decay,  nature of gamma rays and their energetics |
| **5** | **21Aug - 26 Aug** | Interaction of heavy charged particles,  Range and struggling of alpha particles, Geiger Nuttal law. |
| **6** | **28 Aug - 2Sep** | Interaction of light charged particle,  Range of electron ,absorption of beta particles.,  Interaction of gamma rays |
| **7** | **4Sep - 9Sep** | Passage of gamma radiation through matter,  Electron positron annihilation.Absorption of  Gamma rays and its application |
| **8** | **11 Sep - 16Sep** | Linear accelerator ,tendem accelerator, |
| **9** | **18 Sep - 23Sep** | cyclotron and  Betatron accelerator |
| **10** | **25 Sep – 30 Sep** | Ionization chamber,proportionalcounter,  GM counter |
| **11** | **3 Oct - 7Oct** | GM counter,scintillation counter and  Semi conductor detector |
| **12** | **9Oct - 14Oct** | Nuclear reactions,elastic and in elastic  scattering,nuclear disintegration, photo nuclear reaction |
| **13** | **16Oct - 21Oct** | Radiative capture direct reaction,heavy ion reaction  And Spallation reactions.,conservation laws  ,Q value and reactionThreshold |
| **14** | **23Oct - 28Oct** | Nuclear fission and nuclear fusion reaction,Nuclear reactors ,general aspects of reactor design  ,nuclear fission and fusion reactors |
| **15** | **30Oct - 4 Nov** | Revision |
| **16** | **6 Nov - 9Nov** | Revision |
| **17** | **17 Nov - 18 Nov** | Revision |
| **18** | **20 Nov – 24 Nov** | Revision |