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Course Outcome of Degree Syllabus of PHYSICS Honours

CC1— MATHEMATICAL PHYSICS

- The emphasis of course is on applications in solving problems of interest to physicists.
- The students are to be examined entirely on the basis of problems seen and unseen.
- Students can learn about plotting of functions , continuous and differentiable functions.
- Functions can be expanded into taylor's series and binomial series.
- They gain knowledge about solutions of different kind of differential equations.
- They will be able to use vector differentiation operator and their integration with different scalars and vectors.

CC2—MECHANICS

- This course would empower the students to acquire engineering skills and practical knowledge , and theoretical basis for doing experiments in related areas, which help the student in their everyday life.
- Students will gain basic knowledge for their higher studies, like knowledge about rotational dynamics, elasticity, gravitation, central force motion and oscillations.

CC3—ELECTRICITY AND MAGNETISM

- Here students can gain knowledge of gauss law and solve solve the electric field for various geometric objects. Potential can be calculated in different cases.



- Enable to understand the concept of magnetic field, polarization, relation between B, H, M & ferromagnetism.
- Thorough knowledge of basic concept of electrical circuits and network theorem.

CC4---WAVES AND OPTICS

- This course objective will give clear idea in geometrical optics with matrix formulation.
- Students will know about different types of waves and wave equation and other parameters.
- Wave nature of light can be understood by different interference pattern.
- Thorough knowledge about Fraunhofer and Fresnel diffraction.

CC5---MATHEMATICAL PHYSICS II

- Students learn about Fourier analysis of periodic functions and their applications in physical problems.
- Learn about special functions like Legendre differential equations, hermite differential equations and there polynomials.
- Gain knowledge of some special integrals like beta, gamma functions.
- Laplace equation in rectangular, cylindrical and spherical symmetry.
- Conducting sphere and dielectric sphere in external uniform electric field .Wave equations and their solutions.

CC6---THERMAL PHYSICS

- This course is to develop a working knowledge of thermal physics.
- Various laws of thermodynamics are explained.
- Different types of heat engine like reversible and irreversible heat engines are introduced. Their efficiencies and entropies have been analyzed.
- Students came to know about thermodynamic potentials like enthalpy, free energies etc.
- Different phase transitions are also explained.
- They can gain knowledge about kinetic theory of ideal and real gases.



CC7---ANALOG SYSTEMS AND APPLICATIONS

- This course is to make students understand different blocks in communication system.
- How noise effects communication using different parameters.
- PN junction diode , two terminal devices, rectifiers, bipolar junction transistors, coupled amplifier, feedback amplifiers are introduced.
- Students can also gain the knowledge of operation amplifiers and their applications.

CC8---MATHEMATICAL PHYSICS---III

- The emphasis of course is on applications in solving problems of interest to physicists.
- Students are to be examined on the basis of problems known and unknown.
- Topics to be covered are complex analysis, Cauchy-Riemann conditions, complex algebra, and singularities.
- Fourier transform, Laplace transform and their different properties.

CC9---ELEMENTS OF MODERN PHYSICS.

- Atomic spectra and models are introduced in this course. Here students can gain the knowledge about Compton effect, photoelectric effect, alpha particle scattering, atomic and line hydrogen atom and their limitations.
- Knowledge of wave packets, wave particle duality, and uncertainty principle is introduced.
- Different facts and concepts about nuclear physics like size and structure of atomic nucleus, liquid drop model, shell model, radioactivity fusion and fission, nuclear reactor are also added in this course.

CC10---DIGITAL SYSTEMS AND APPLICATIONS

- This course introduced the concept of binary codecs Boolean algebra, cathode ray oscilloscope.
- Students can gain knowledge about designing of arithmetic and logic circuits . Operations of basic digital electronic devices .



- Strong idea about data processing circuits like multiplexers, de-multiplexers, Decoders, encoders, adders, subtractors can be gained by the students.
- Students can have foundation in the techniques and designing of shift registers, ring counter and computer memory like RAM, ROM and their addressing.

CC11—QUANTUM MECHANICS AND APPLICATIONS

- To become familiar with Blackbody radiation, ultraviolet catastrophe, photoelectric effect and Compton effect and hence students get aware of how quantum theory emerged.
- Students have gained a clear knowledge about wave properties of particles, DeBroglie wave and its implications on the uncertainty principle.
- Schrodinger's equation, expectation values, operators, Hermitian, normalization concepts has been introduced.
- Real life applications like 1D infinite rigid box, step potentials, quantum dots are introduced.
- Students came to know about effects of electric and magnetic field on the line spectrum of hydrogen like Zeeman effect and Stark effect.

CC12—SOLID STATE PHYSICS

- The course gives an introduction to solid state physics and will enable the student to employ classical and quantum mechanical theories needed to understand the physical properties of solids.
- Emphasis is put on building models able to explain several different phenomena in the solid state.
- Concepts of magnetic properties of matter, dielectric properties of materials and elementary band theory have been introduced.
- Students came to know about superconductors.

CC13—ELECTROMAGNETIC THEORY

- This course is to provide students with an opportunity to develop knowledge and understanding of the key principles and applications of electromagnetic theory and their relevance to current developments in physics, at a level appropriate for professional physicists.
- EM wave propagation in unbounded media, bounded media. Concepts of refractive index, dielectric constant, skin depth, plasma frequency, Brewster's law, reflection and transmission coefficient, has been introduced.



- Students will feel excitement when they came to know about polarization effects of electromagnetic waves, phase retardation plates and rotatory polarization.

CC14—STATISTICAL MECHANICS

- This course familiarizes the students in depth about statistical distribution and have basic idea about Maxwell-Boltzmann, Bose-Einstein and Fermi Dirac statistics and their applications.
- Students became aware of classical statistics and quantum statistics.
- Gibbs paradox , sakur tetrode equation, planks laws of black body radiation, Rayleigh jeans law, ultraviolet catastrophe are also introduced.

DSE1—CLASSICAL DYNAMICS

- This course defines and understands basic mechanical concepts related to advanced problems involving the dynamic motion of classical mechanical system.
- It describes and understands the differential equations and other advanced mathematics in the solution of the problems of mechanical system.
- Describes the motion of a mechanical system using lagrange , Hamiltonian formalism.
- Describes the motion of particle in non inertial system.

DSE2—NUCLEAR AND PARTICLE PHYSICS

- After taking this course, students are able to determine the charge, mass of any nucleus by using various spectrograph.
- They are able to understand the size of nucleus and all its properties.
- This course has leaded the students to understand interaction of various types of radiation with matter which they observe in their daily life.
- Its easy for them now to relate the theory to practical.

DSE3—NANOMATERIALS AND APPLICATIONS

- This course introduces the fundamentals of nanoscale engineering and manufacturing.
- Different applications of nanomaterials are explained which make the students clear about the concept behind nanomaterials.
- Students got familiarize with the basic concepts of thermal properties of nano materials.
- Synthesis of nanomaterials , their characterizations and their applications are explained.



DSE4---PROJECT SUBMISSION

- Project on different topics are to be submitted by all the students of 3rd yr Physics hons. Based on different topics.
- Groups of 8 students each, are created and topics are distributed.
- All the projects are then valued out of 100 marks.

GENERIC ELECTIVE1---To be read by the students of CHEMISTRY AND MATHS HONS.

- These students are made familiarize with the concepts of mechanical properties of matter, oscillation and waves, thermal physics, and electricity and magnetism.

GENERIC ELECTIVE 2---To be involved by the students of CHEMISTRY AND MATHS HONS.

- Concepts of optics like, Aberrations, rainbow formation, diffraction, interference are introduced.
- Some basic idea about atomic physics is gained by the students like Rayleigh jeans law, Compton Effect etc.
- Quantum mechanics related topics are also studied by the students.
- Nuclear physics and special theory of relativity are also introduced.

Principal
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