Courses Description

College: Science

Department: Physics

Couse ID: 102731 **Description:** Electrodynamics

Full Course Description: Maxwell's equations and electromagnetic waves, classical treatment of the generation and interaction of electromagnetic waves, quantum mechanical treatment of the radiation field, emission and absorption of radiation by atoms, optically allowed and forbidden transitions, scattering and absorption of electromagnetic radiation, detection of electromagnetic radiation.

Couse ID: 102733 **Description:** Plasma Physics

Full Course Description: Plasma oscillations and waves including electrostatic and electromagnetic waves in plasma, magnetohydrodynamics including the study of different instabilities in plasma, laser-plasma interactions including Raman and Brillouin scattering, introduction to kinetic theory, applications to inertial confinement fusion and to space physics .

Couse ID: 102751 **Description:** Classical Mechanics

Full Course Description: Basic principles; conservation laws, systems of particles, accelerated coordinates systems, Lagarangian dynamics; constrained motion, generalized coordinates, Hamilton principle, symmetry principles, small oscillations; normal modes, modal matrix, normal coordinates, Lagarangian for a continuous string, Rigid bodies; inertia tensor, Euler's equations, Hamilton's dynamics; Hamilton-Jacobi theory, strings, solution for an infinite string .

Couse ID: 102763 **Description:** Nuclear Instrumentation and Analysis

Full Course Description: This course consists of a weekly lecture covering the principles and characteristics of nuclear detection instruments, in addition to 6 hours of weekly lab work covering the following experiment :□
Geiger counter, ?-ray spectroscopy using sodium iodide delector, ?-ray spectroscopy using germanium detector, X-ray spectroscopy using silicon detector, ?-ray spectroscopy using surface barrier detector, coincidence technique, proportional counter & neutron detectors, health physics instruments, thermoluminscense dosimetry, build up Factor .□

Couse ID: 102765 **Description:** Applications of Radioactive Isotopes

Full Course Description:

Couse ID: 102767 **Description:** Biophysics

Full Course Description: Quantum mechanics and molecular structure. The hydrophobic effect and the formation of three dimensional structures of biological molecules, biopigments, molecular modeling, the jablonski-diagram, the influence of . -electron system expansion of the electronic absorption and fluorescence spectra of molecules, nonlinear photophysical properties of biological systems, chemical kinetics, biothermodynamics , self assembly, theory of energy transfer in biosystems, theory of electron transfer in biosystems, membrane physics.

Couse ID: 102773 **Description:** Structure and Properties of Materials

Full Course Description: Classification of materials, crystalline structure, principle of crystalline structure determination, phase diagrams, X-rays, neutron and electron diffraction, defects in solids, mechanical properties, electrical properties, thermal properties, optical properties, magnetic properties .

Couse ID: 102774 **Description:** Nondestructive Testing

Full Course Description: Introduction to experimental techniques in materials that includes optical and electron microscopes (transmission, scanning and electron microprobe), spectroscopic characterization of materials (UV, IR radiation and nuclear magnetic resonance), thermal analysis and characterization, X-ray techniques .

Couse ID: 102775 **Description:** Material Characterization

Full Course Description: Introduction to experimental techniques in materials that includes optical and electron microscopes (transmission, scanning and electron microprobe), spectroscopic characterization of materials (UV, IR radiation and nuclear magnetic resonance), thermal analysis and characterization, X-ray techniques .

Courses Description

College: Science

Department: Physics

Couse ID: 102776 **Description:** Advanced Semiconductor Physics

Full Course Description: Electronic energy bands, vibrational properties of semiconductors, electron-photon interaction, electronic properties of crystal lattice defects, properties of electrical transport, optical properties of semiconductors, semiconductor devices, semiconductor growth techniques .

Couse ID: 102782 **Description:** Mathematical Physics

Full Course Description: Tensor analysis Group theory discrete groups, generators, functions of a complex variable Cauchy-Riemann conditions, Cauchy's integral theorem and integral formula, Laurent expansion, conformal mapping, calculus of residues, differential equations, Green's functions, Sturm-Liouville theory, Bessel functions, Chebyshev polynomials, hypergeometric functions Fourier transforms .

Couse ID: 102799 **Description:** Thesis

Full Course Description:

Couse ID: 2102741 **Description:** Thermodynamics and Statistical Physics

Full Course Description: Tensor analysis, Group theory, discrete groups, generators, functions of a complex variable, Cauchy-Riemann conditions, Cauchy's integral theorem and integral formula, Laurent expansion, conformal mapping, calculus of residues, differential equations, Green's functions, Sturm-Liouville theory, Bessel functions, Chebyshev polynomials, hypergeometric functions Fourier transforms

Couse ID: 2102761 **Description:** Quantum Mechnics

Full Course Description: General review: Dirac notation, operators and observables, matrix representation of operators, quantum dynamics, theory of angular momentum, approximation methods : variational method, stationary perturbation method, time dependent perturbation method, scattering theory : stationary scattering states, Lippmann-Schwinger equation, Born approximation, scattering by a central potential, method of partial waves, second quantization

Couse ID: 2102762 **Description:** Radiation Physics

Full Course Description: Radiatioactivity, radioactivity decay laws, types of ionizing radiation, interaction of ionizing radiation with matter, neutron physics, nuclear accelerators, radioisotopes production, radioisotopes applications (medical, environmental, geological and industrial) , radiation shielding, radiation protection

Couse ID: 2102764 **Description:** Environmental Radiation Physics

Full Course Description:

Couse ID: 2102765 **Description:** Atomic and Molecular Structure and Dynamics

Full Course Description: Angular momentum coupling: Clebsch-Gordan coefficients; the Wigner 3nj-symbols; the algebra of irreducible tensor operators; Wigner-Eckart theorem. The structure and spectra of two- and many-electron atoms and their interactions with electromagnetic radiation and static fields. Molecular structure and spectra. Atomic collisions: electron-atom, electron-ion, and ion-atom collisions.

Couse ID: 2102771 **Description:** Solid State Physics

Full Course Description: Crystal structure and symmetry operations, defects in crystals, energy bands in crystalline solids, Brillouin zones, calculation of energy bands, semiconductor crystals, Fermi surfaces, optical properties of solids

Courses Description

College: Science

Department: Physics

Couse ID: 2102773	**Description:** Structure and Properties of Materials
Full Course Description:	Classification of materials, crystalline structure, principle of crystalline structure determination, phase diagrams, X-rays, neutron and electron diffraction, defects in solids, mechanical properties, electrical properties, thermal properties, optical properties, magnetic properties
Couse ID: 2102775	**Description:** Experimental techniques in physics
Full Course Description:	Introduction to experimental techniques in materials that includes optical and electron microscopes (transmission, scanning and electron microprobe), spectroscopic characterization of materials (UV, IR radiation and nuclear magnetic resonance), thermal analysis and characterization, X-ray techniques .
Couse ID: 2102776	**Description:** Semiconductor Physics
Full Course Description:	Electronic energy bands, vibrational properties of semiconductors, electron-photon interaction, electronic properties of crystal lattice defects, properties of electrical transport, optical properties of semiconductors, semiconductor devices, semiconductor growth techniques
Couse ID: 2102781	**Description:** Computational Physics
Full Course Description:	Revision of programming with FORTRAN, and C++, introduction to Linux as an operating system, solving physics problems that include the following : interpolation, extrapolation, curve fitting, numerical differentiation, numerical integration, matrix operations, methods of solving physics problems including ordinary and partial differential equations and special function
Couse ID: 2102794	**Description:** Special Topics
Full Course Description:	This course addresses topics relevant to current research activities in the department or contemporary topics in physics not covered in courses offered by the department
Couse ID: 3102794	**Description:** Special Topics
Full Course Description:	This course addresses topics relevant to current research activities in the department or contemporary topics in physics not covered in courses offered by the department.
Couse ID: 3102799	**Description:** thesis
Full Course Description:	
Couse ID: 6102799	**Description:** thesis
Full Course Description:	
Couse ID: 9102799	**Description:** thesis
Full Course Description:	