

Post

ماجستير فيزياء
مستوى 400

Course Title	Atomic and Nuclear Physics
Course Code	PME401

Contents:

Topic
Atomic structure. Thomson's model of the atom.
Rutherford's theory of α -particles scattering.
The special theory of relativity: Michelson-Morley experiment.
The Compton effect. The hydrogen atom.
Multi-electron atoms. Isotopes
α -decay. β -decay. γ rays and γ -decay.
Elementary particles.
nuclear structure
Nuclear reactions. Nuclear forces

Course Title	Electromagnetic Wave Theory
Course Code	PME405

Contents:

Topic
Vector analysis. Electrostatics. Boundary conditions in electrostatics
Magnetostatics.
Multiple poles. Dielectrics
The magnetic field due to a steady current in free-space.

The magnetic field in the presence of matter.
Magnetic energy method of solving field problems subjected to certain boundary conditions .

Course Title	Material Science and Technology
Course Code	PME406

Contents:

Topic
Structure and Behavior of solids and its related physical approaches .
Characterization of matter, phase instability and phase equilibrium.
Physical response of the matter to mechanical forces (static and dynamic loads)
Transformations of matter and its electromagnetic properties.
Study of Non-ferrus alloys, preparation, structure and physical properties.
Amorphous material structure and properties, glasses as a case study.
Advanced technologies in material composites preparation. Chemical methods, physical approaches.
Concepts and basics of Nanomaterials. Structure differences from normal material structure and its properties.
Study of nanomaterials preparation and some applications .

مستوی 600

Course Title	Nuclear and Radiation Physics(1)
Course Code	PME606

Contents:

Topic
Nuclear Energetic
Radioactivity and Nuclear Reactions
Particulate Radiation
Electromagnetic Radiation
Gas Ionization Detectors
Solid state nuclear track Detectors

Semiconductor Detectors
Optical Radiation
Radiation Safety Guides

Course Title	Hydrogen Energy Technologies
Course Code	PME607

Contents:

Topic
The physical and chemical properties of hydrogen
The hydrogen production technology from fossil fuels
The hydrogen production technology from biomass
The hydrogen production technology from water
The energy storage: gaseous storage
energy storage: liquid storage
energy storage: metal hydrides
The hydrogen conversion technologies
Applications

Course Title	Electrodynamics
Course Code	PME601

Contents:

Topic
The Maxwell's equations
The conservation of energy and momentum
The planar electromagnetic waves
The wave propagation, simple radiation systems, scattering and diffraction
The magnetohydrodynamics

The plasma physics
dynamics of relativistic particles and radiation by moving charges
The multipole fields
Electromagnetic properties of superconductors

Course Title	Optoelectronics
Course Code	PME603

Contents

Topics
Atomic transitions
Semiconductor devices
Superconducting electronics
Optoelectronic modification of lasers
Optical fibers
Masers and Ferrites
Liquid crystals
Applications

ماجستير رياضيات
مستوى 400

Course Title	Linear Algebra
Course Code	PME410

Contents:

Topics
Linear vector space
Linear independence and dependence
Eigen values and Eigen vectors
Linear transformation
Linear programming

Course Title	Numerical Analysis
Course Code	PME411

Contents

Topics
Solution of algebraic equations
Interpolation
Numerical integration and numerical differentiation
Numerical solution of ordinary differential equation
Numerical solution of partial differential equation
Approximation theory - Error bound
Application of computer in numerical analysis.
Solution of algebraic equations

Course Title	Differential Equation
Course Code	PME413

Contents:

Topics
Existence and uniqueness.
Linear system.
Analytic system.
Stability theory.
Sturm- Liouville theory.
Introduction in partial differential equations.

مستوی 600

Course Title	Advanced Probability Theory
Course Code	PME 623

-Contents:

Topics
Basics of probability
Conditional probability
Model of probability and its distribution
sampling theory
Estimating theory

Course Title	Algebraic Topology
Course Code	PME622

Contents:

Topics
Basics groups
Singular Homology theory and its application
Komology theory and Homotopy theory
Relation between Homology and Homotopy
Duality theory
Applications

Course Title	Advanced linear algebra
Course Code	PME613

Contents:

Topics
The theory of Advanced linear Algebra
The Basis of Advanced linear Algebra
existence and uniqueness of solution of Advanced linear Algebra
Various types of Advanced linear Algebra
Application on Advanced linear Algebra

Course Title	Fractional Differential Equations (1)
Course Code	PME614

Contents:

Topics
Introduction
Different types of fractional derivatives and fractional integrals
Ordinary fractional differential equation
Theory of existence and uniqueness of solutions
Methods for explicitly solving fractional ODEs

Course Title	Advanced Ordinary Differential Equations
Course Code	PME619

Contents:

Topics
Existence and uniqueness of solutions
Linear systems
Self adjoint eigenvalue problems
Stability theory and Lyapunov functions
Singularity of autonomous systems
Stability of autonomous systems
Stability of non autonomous systems

Course Title	Mechanical Fluids and Elasticity
Course Code	PME617

Contents

Topics
Algebra of Vectors and Tensors
Calculus of Vector Fields
Vector Field Theory
Introduction to Continuum Mechanics
Hydrostatic Equilibrium
Flow of Ideal Fluids
Applications

Course Title	Differential Dynamics
Course Code	PME625

Contents

Topics
Introduction of differential dynamics
convergence theorem
vector of stationary fixed points
stable and unstable manifold
attractive bodies classification
Orbits saddle nodes
Applications