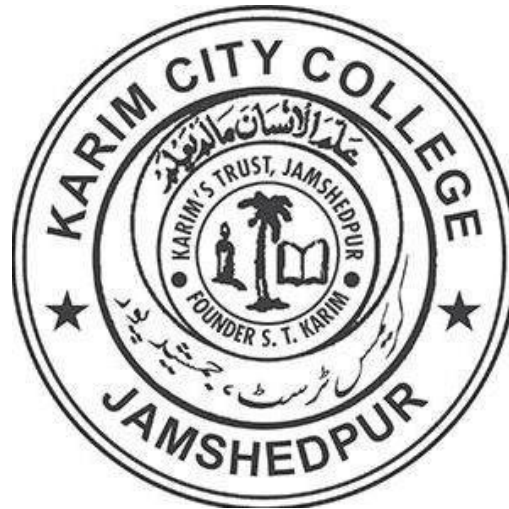


DEPARTMENT OF PHYSICS

KARIM CITY COLLEGE,

JAMSHEDPUR



Syllabus distribution 2024-2025

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Semester 1

Major 1

Dr. Md. Tufail Ahmad: Gravitation and central force motion, Special theory of relativity.

Dr. Asghar Khan: Elasticity, Fluid Motion, oscillations (a portion) and planetary motion.

Prof D. K. Singh: Rotational dynamics, oscillations(a portion).

Minor 1

Dr. Md. Tufail Ahmad: Vector, ordinary differential equation and relativity.

Dr. Asghar Khan: Elasticity, Oscillations and rotational motion.

Prof. D.K. Singh: Laws of motion, Momentum and energy, and gravitation.

Semester 2

Major 2

Dr. Md. Tufail Ahmad: Differential equation Calculus of Function of more than one variable.

Wronskian and general solution. Vector calculus, Dirac delta function. Special integrations.

Prof. D. K. Singh: Vector integration Curvilinear co-ordinates. Fourier series

Major 3

Dr. Asghar Khan: Electrostatics, dielectric properties of matter, transient current and magnetic properties of matter.

Prof. D. K. Singh: Electrical Circuits and network theorems

Minor 2A

Dr. Md. Tufail Ahmad:

(a) Electrical protection, electrical wiring.

(b) Basics of measurement, electronic voltmeter.

Dr. Asghar Khan:

(a) Basic Electricity Principle, Electrical Drawing and symbol.

(b) Uses of CRO, signal generator and analysis instruments.

Prof. D. K. Singh:

(a) Generator and transformer, electric motors, solid state devices.

(b) Impedance bridges and Q-meters, Digital instruments, digital multimeter.

Semester 3

Major 4

Dr. Asghar Khan: Wave motion, Velocity of wave, Superposition of collinear and two perpendicular harmonic oscillations, Superposition of two harmonic waves. Rotatory polarization.

Prof. D. K. Singh: Interference, interferometers, Fraunhofer and Fresnel diffractions. Polarization of electromagnetic waves,

Major 5

Dr. Md. Tufail Ahmad: Electrodynamics, Electromagnetic waves, Electromagnetic radiation.

Minor 1B

Dr. Asghar Khan: Electric field and electric potential, Dielectric properties of matter, Magnetic field, Magnetic properties of matter.

Prof. D. K. Singh: Electrical circuits, Ballistic Galvanometer, Maxwell equations, Electromagnetic wave propagation in unbounded media, Electromagnetic wave in bounded media.

Semester 4

Major 6

Dr. Md. Tufail Ahmad: Frobenius Method and Special Functions, Special Integrals, Partial Differential Equations, Integrals Transforms, Laplace Transforms

Prof. D. K. Singh: Fourier Series, Complex Analysis:

Major 7

Dr. Asghar Khan: Introduction to Thermodynamics, Entropy, Thermodynamic Potentials, Maxwell's Thermodynamic Relations. , Quantum Theory of Radiation, Bose-Einstein Statistics, Fermi-Dirac Statistics

Prof. D. K. Singh: Molecular Collisions, Real Gases, Classical Statistics.

Major 8:

Dr. Md. Tufail Ahmad: Introduction to Numerical computation software Scilab, Curve fitting, Least square fit, Goodness of fit, standard deviation, Generation of Special functions using User defined functions in Scilab. Solution of ODE First order Differential equation etc.

Minor 2B

Dr. Asghar Khan: Lasers, Fourier Optics, Holography, Fibre Optics.

Prof. D. K. Singh: Fourier Transform Spectroscopy

Semester 5

Major 9:

Dr. Md. Tufail Ahmad: Two-terminal Devices and their Applications, Bipolar Junction Transistors, Amplifiers, Feedback in Amplifiers, Oscillators, Digital Circuits, Boolean algebra, Arithmetic Circuits. Sequential Circuits, Timers, Shift registers, Counters

Major 10:

Dr. Asghar Khan: Quantum theory of Light, Quantum Uncertainty, Matter waves and wave amplitude, One dimensional infinitely rigid box, atomic nucleus, Radioactivity, Fission and fusion, Lasers

Major 11:

Dr. Md. Tufail Ahmad: Practical IV

Minor-1c

Dr. Asghar Khan: Two-terminal Devices and their Applications, Bipolar Junction Transistors, Amplifiers, Coupled Amplifier, Feedback in Amplifiers, Sinusoidal Oscillators, Operational Amplifiers and Applications, Conversion.

Prof. D. K. Singh: Digital Circuits, Boolean algebra, Arithmetic Circuits, Sequential Circuits, Timers, Shift registers, Counters

Semester 6

Major 12:

Dr Md. Tufail Ahmad: Time dependent Schrodinger equation, Time independent Schrodinger Equation, General discussion of bound states in an arbitrary potential, Quantum theory of hydrogen-like atoms, Atoms in Electric & Magnetic Fields, Single and Many electron atoms:

Major 13:

Prof. D. K. Singh: Crystal Structure, Elementary Lattice Dynamics, Magnetic Properties of Matter, Dielectric Properties of Materials, Ferroelectric Properties of Materials, Elementary band theory, Superconductivity

Major 14:

Dr. Asghar Khan: General Properties of Nuclei, Nuclear Models, Radioactive Decay, Nuclear Reactions, Interaction of Nuclear Radiation with matter, Nuclear Radiation Detectors, Particle Accelerators, Particle Physics

Major 15:

Dr Md. Tufail Ahmad: Scilab for solving problems.

Prof. D. K. Singh: Practical of solid state physics.

Minor-2c

Dr Md. Tufail Ahmad: Electromagnetic Energy Harvesting, Carbon captured technologies, Environmental issues,

Application of nuclear techniques

Dr. Asghar Khan: Fossil fuels and Alternate Sources of energy, Solar energy, Wind Energy harvesting, Ocean Energy, Tide characteristics and Statistics, Piezoelectric Energy harvesting

Prof. D. K. Singh: Basics of Atomic and Nuclear Physics, Interaction of Radiation with matter, Radiation detection and monitoring devices, Radiation safety management

Semester 7**Major 16:**

Dr. Asghar Khan: Classical Mechanics of Point Particles, Small Amplitude Oscillations, Special Theory of Relativity, Fluid Dynamics,

Major 17:

Dr Md. Tufail Ahmad: Matrices and Tensors, Green's Function, Abstract group theory, Representation theory

Major 18:

Prof. D. K. Singh: Mathematical Foundation of Quantum Mechanics, Quantum Dynamics, Angular Momentum, Invariance Principle and Conservation Laws, Crystal Physics, Electronic Properties, Magnetism, Superconductivity.

Major 19: Practicals

Dr Md. Tufail Ahmad: Studies with Michelson's Interferometer. Studies with Fabre-Perot Etalon. Verification of Rayleigh's criterion for the limit of resolution of spectral lines

Dr. Asghar Khan: Studies on Zeeman effect, Experiments using He-Ne laser source.

Prof. D. K. Singh: Studies of phenomena with polarized light.

Minor-1D

Dr Md. Tufail Ahmad: Crystal Structure, Elementary Lattice Dynamics:

Dr. Asghar Khan: Magnetic Properties of Matter, Dielectric Properties of Materials, Ferroelectric Properties of Materials,

Prof. D. K. Singh: Elementary band theory, Superconductivity

Semester 8

Major 20:

Dr Md Tufail Ahmad: Atomic Spectra, The Rotation of the Molecule, Molecular Spectra, Resonance Spectroscopy,

Dr. Asghar Khan: Laser and Holography

AMJ-1

Dr Md Tufail Ahmad: Approximation Methods, Theory of Scattering, Identical Particles, Relativistic Quantum Mechanics.

AMJ-2

Dr. Asghar Khan: Solid State nuclear Detectors, High Energy Particle Detectors, Fundamentals of Nuclear Fission, Diffusion of neutrons, Neutron Moderation, Criticality of an Infinite Homogenous Reactor.

AMJ-3: Practicals (Classes are equally divided)

Minor-2D.

Prof. D. K. Singh: Embedded system introduction, Review of microprocessors, 8051 microcontroller, 8051 I/O port programming, Programming, Timer and counter programming, Serial port programming with and without interrupt, Interfacing 8051 microcontroller to peripherals. Programming Embedded Systems, Embedded system design and development, Introduction to Arduino.