

DYNAMICS OF RIGID BODIES & ANALYTICAL DYNAMICS

Moment of inertia & product of inertia, D'Alembert's Principle, Motion of a rigid body in two dimensions under finite and impulsive forces. Kinetic energy and moment of momentum in two dimensions. Conservation of energy and momentum.


Hamilton's variables, Hamilton canonical equations, Cyclic coordinates. Routh's equations.

Hamilton's Principle, Principle of least action, Hamilton-Jacobi equation, Jacobi theorem, Method of separation of variables, Lagrange Brackets, Poisson Brackets, Invariance of Lagrange Brackets and Poisson Brackets under canonical transformations.
M.A./M.Sc. (Final)
Mathematics
PAPER-III
OPERATIONS RESEARCH


Transport and Assignment Problems, Problems of sequencing n jobs on 2 machines, 2 jobs on m machines.


Game Theory- Two-Person zero-sum Games, Games with mixed strategies. Graphical solution. Solution by Linear Programming.

Integer Programming- Branch and Bound Technique.


M.A./M.Sc. (Final)
Mathematics
PAPER-IV (Optional)

Any one of the following papers-

M.A./M.Sc. (Final)
Mathematics
PAPER-IV (A)

PROGRAMMING IN JAVA


Object oriented programming, Robust, Multithreaded Architecture, concept of OOP's, control statements, data types, operators, loops, introduction to classes, subclasses, base classes, derived classes, arrays, nested loops, string.
Constructors and its types, declaring objects, introduction to methods with parameters and return value.

Inheritance and its types, interface, abstract class, method overriding, use of final with inheritance, packages.

Exception handling, types of exception, use of try and catch, built-in functions, string handling, multi-threading, file handling.

M.A./M.Sc. (Final)
Mathematics
PAPER-IV (B)
ADVANCED FUNCTIONAL ANALYSIS

Definition and example of topological vector spaces, Convex and absorbing sets and their properties, Minkowski's functional subspace, product space and quotient space of a topological vector space.

Locally convex topological vector spaces, Normable and metrizable topological vector spaces, complete topological vector spaces and Frechet spaces.


Extreme points and External sets. Krein-Milman's theorem.


M.A./M.Sc. (Final)
Mathematics
PAPER-IV (C)
MAGNETO FLUID DYNAMICS


MFD Applications- Astrophysical and geophysical applications. MFD ejectors. MFD accelerators. MFD Lubrication. MFD power generation.

M.A./M.Sc. (Final)
Mathematics
PAPER-IV-(D)

FUZZY SETS AND THEIR APPLICATIONS


An introduction to fuzzy control—Fuzzy controllers. Fuzzy rule base. Fuzzy inference engine. Fuzzification, Defuzzification and the various defuzzification methods (the centre of area, the centre of maxima and the mean of maxima methods).

M.A./M.Sc. (Final)
Mathematics
PAPER-V (Optional)

Any one of the following papers:

M.A./M.Sc. (Final)
Mathematics
PAPER-V(A)

PROGRAMMING WITH VISUAL BASIC

Data type, constants, operators, control statements, loop instructions, arrays, input-output instructions, functions and subroutines, predefined functions, debugging of the program, sequential and random files. Fundamentals of graphics, screen scales, lines and boxes, circles, ellipse and pie charts.

M.A./M.Sc. (Final)
Mathematics
PAPER-V(B)

ADVANCED RIEMANNIAN GEOMETRY


Lie derivative: Infinitesimal transformation. The notion of Lie derivative. Lie derivative of metric tensor and connection. Motion and affine motion in Riemannian spaces.

M.A./M.Sc. (Final)
Mathematics
PAPER-V(C)
GENERAL RELATIVITY AND COSMOLOGY


Cosmology- Mach’s principle, Einstein modified field equations with cosmological term static Cosmological models of Einstein and De-Sitter, their derivation, properties and comparison with the actual universe.

Hubble’s law, cosmological principles, Weyl’s postulate, derivation of Robertson-Walker metric, Hubble and deceleration Parameters. Redshift, Redshift versus distance relation, Angular size versus redshift relation and source counts in Robertson-Walker space time.

Friedman models. Fundamental equations of dynamical cosmology. critical density, closed and open universes. Age of the Universe. Matter dominated ear of the universe. Einstein-de-Sitter model. Particle and even horizons.

M.A./M.Sc. (Final)
Mathematics
PAPER-V(D)
APPLICATION OF MATHEMATICS IN FINANCE


Meaning of returns: Return as Internal Rate of Return (IRR). Numerical methods like Newton-Raphson method to calculate IRR. Measurement of returns under uncertainty situations.


M.A./M.Sc. (Final)
Mathematics
PAPER-VI
Viva-voce

[Signatures and dates]