

Bachelor of Arts/Science (Applied Mathematics)

5th SEMESTER

DISCIPLINE SPECIFIC ELECTIVE COURSE (DSE)

OPTION-II

AMM520DA: METHODS OF APPLIED MATHEMATICS-I CREDITS THEORY-4, TUTORIAL: 22

THEORY (4 CREDITS: 60 HOURS)

MAXIMUM MARKS: 60, MINIMUM MARKS: 24

Objectives: To study the different sections of a cone (as conic section) and properties.

ii). To study the properties of sphere, cone and cylinder.

iii). To introduce the students to the basic concepts of graph theory and its applications.

UNIT-1 (15 HOURS)

Parabola, tangents and normals, pole and polar, parametric equations of a parabola, ellipse, tangents and normals, pole and polar, parametric equations of ellipse, diameters, conjugate diameters and their properties. Hyperbola, tangents and normals, equation of hyperbola referred to asymptotes as axes, rectangular and conjugate diameters and their properties, tracing of conics (Cartesian co-ordinates only), general second degree equation in x and y , conditions under which a general second degree equation represents a conic and determination of equation of the corresponding conic.

UNIT-2 (15 HOURS)

Sphere, radical plane, coaxial system, cone, vertex, guiding curve, generator, equation of cone with vertex as origin or a given vertex and guiding curve, condition that the general equation of the second degree should represent a cone, necessary and sufficient conditions for a cone to have three mutually perpendicular generators, cylinder, equation of the cylinder whose generators intersect a given conic and are parallel to given line.

UNIT-3 (15 HOURS)

Introduction to graphs, paths and cycles, operations on graphs, bipartite graphs and Konig's Theorem, Euler graphs and Euler's Theorem, Konigsberg bridge problem, Hamiltonian graphs, degree sequences. Tress and their properties, centers in tress, binary and spanning trees, cut vertex and cut edge in graphs, incidence and adjacency matrix in graphs, directed graphs.

UNIT-4 (15 HOURS)

Definition, examples and basic properties of ordered sets, maps between ordered sets, duality principle, maximal and minimal elements, lattices ordered sets, complete lattices, lattices as algebraic structures, sublattices, products and homomorphisms. Definition, examples and properties of modular and distributive lattices, lattices, Boolean Algebras, Boolean polynomials, minimal forms of Boolean

polynomials, Quinn-McCluskey method, Karnaugh diagrams, switching circuits and applications of switching circuits.

TUTORIALS (2 CREDITS: 30 HOURS)

Maximum Marks: 30 Minimum Marks: 12

Credit 1: Tutorials based on Unit I & II and **Credit 2:** Tutorials based on Unit III & IV.

Text Books Recommended

1. P. Balasubrahmanyam, K.G. Subramanian and G.R. Venkataraman, Coordinate Geometry of two and three Dimensions.
2. S.Pirzada and T.A.Chishti, Analytical Solid Geometry, Universities Press, Orient Blackswan, 2007.
3. Shanti Narayan, Analytical Solid Geometry.
4. Scham's Outline Series, Discrete Mathematics.
5. J.E. Whitesitt, Boolean Algebra and its Applications.

Bachelor of Arts/Science (Applied Mathematics)

5th SEMESTER

DISCIPLINE SPECIFIC ELECTIVE COURSE (DSE)

OPTION-I

AMM520DB: MECHANICS

CREDITS THEORY-4, TUTORIAL: 2

THEORY (4 CREDITS: 60 HOURS)

MAXIMUM MARKS: 60, MINIMUM MARKS: 24

Objectives: To develop the capacity to predict the effects of force and motion while carrying out the creative design functions of the engineering.

UNIT-1 (15 HOURS)

Resultant forces, acting at a point, parallelogram law of forces, resultant of two forces, components of a force, Triangle law of forces, Lame's Theorem, Polygon law of forces, Theorem of resolved parts, resultant of a number of forces acting at a point, conditions for equilibrium of any number of forces acting on a particle, equilibrium of bodies resulting on a smooth inclined plane.

UNIT-2 (15 HOURS)

Parallel forces, resultant of two parallel forces, equilibrium of three parallel forces, moments, geometrical representations, Varignon's Theorem, resultant of a number of co-planer forces acting on a rigid body, centre of a number of parallel forces, moments of a force about a line couples, equilibrium of two couples, couples in parallel planes, resultant of a number of coplanar couple, resultant of a force and a couple, resultant of a system of a coplanar forces.

UNIT-3 (15 HOURS)

Velocity and Acceleration, motion in a straight line, motion with constant acceleration, Bodies falling vertically, Bodies projected vertically upward, space average and time average, Newton's Laws of motion, motion of connected particles, motion with variable acceleration.

UNIT-4 (15 HOURS)

Simple Harmonic motion of a particle attached to an electric string, motion on an inclined plane, equation of motion of a particle varying in a plane, motion of a projectile, range on an inclined plane.

TUTORIALS (2 CREDITS: 30 HOURS) Maximum Marks: 30 Minimum Marks: 12

- Tutorials based on Unit I & II - 1 credit
- Tutorials based on Unit III & IV - 1 credit.

Books recommended

1. S.R.Gupta, Elementary Analytical Dynamics of a Particle of Rigid bodies.
2. K.R.Chaudhary and D.R.Jain, Elements of Statistics.
3. M.K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical methods for scientific and Engineering computation, Wiley Eastern (1993) □