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Syllabus 2023-24
Panjab University

BA/BSc
(MATHS)

SECOND SEMESTER

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MATHEMATICS

SEMESTER – II

Paper-I : SOLID GEOMETRY

Max. Marks : 30
Time : 3 Hours

Note:
1. The syllabus has been split into two Units: Unit-I and Unit-II. Four questions will be set from each Unit.
2. A student will be asked to attempt five questions selecting at least two questions from each Unit. Each question will carry 6 marks.
3. The teaching time shall be five periods (45 minutes each) per paper per week including tutorial.
4. If internal assessment is to be conducted in the form of written examinations, then there will be only one written examination in a Semester

Unit-I

Transformation of axes:
Shifting of origin and rotation of axes.

Sphere:
Section of a sphere and a plane, spheres through a given circle, intersection of a line and a sphere, tangent line, tangent plane, angle of intersection of two spheres and condition of orthogonality, power of a point w.r.t. a sphere, radical axis, radical center, co-axial family of spheres, limiting points.

Cylinder:
Cylinder as a surface generated by a line moving parallel to a fixed line and through a fixed curve, different kinds of cylinders such as right circular, elliptic, parabolic and hyperbolic cylinders in standard forms, enveloping cylinders.

Unit-II

Cone:
Cone with a vertex at the origin as the graph of a homogeneous equation of second degree in x,y,z, cone as a surface generated by a line passing through a fixed curve and a fixed point outside the plane of the curve, reciprocal cones, right circular and elliptic cones, right circular cone as a surface of revolution obtained by rotating the curve in a plane about an axis, enveloping cones.

Conicoid:
Equations of ellipsoid, hyperboloid and paraboloid in standard form. Reduction of second degree equation in three variables in standard form.

References:

1. P.K.Jain and Khalil Ahmad : A Text Book of Analytical Geometry of Three Dimensions, Wiley Eastern Ltd., 1999.
2. Shanti Narayan and P. K. Mittal : Analytical Solid Geometry, Seventeenth Revised Edition, S. Chand & Co., New Delhi, 2006.
3. R.J.T. Bill : Elementary Treatise on Coordinate Geometry of Three Dimensions, Macmillan India Ltd., 1994.

Paper-II : CALCULUS - II

Max. Marks : 30
Time : 3 Hours

Note:
1. The syllabus has been split into two Units: Unit-I and Unit-II. Four questions will be set from each Unit.
2. A student will be asked to attempt five questions selecting at least two questions from each Unit. Each question will carry 6 marks.
3. The teaching time shall be five periods (45 minutes each) per paper per week including tutorial.
4. If internal assessment is to be conducted in the form of written examinations, then there will be only one written examination in a Semester

Unit-I

Concavity, convexity and points of inflexion, Multiple points, Asymptotes, Tracing of curves (Cartesian and parametric co-ordinates only).

Curvature:
Curvature of a curve at a point, radius of curvature of cartesian, parametric, polar curves and for implicit functions , evolute and involute, chord of curvature.

Unit-II

Integral calculus:
Integration of hyperbolic and inverse hyperbolic functions. Reduction Formulae.

Numerical Integration: Trapezoidal, Prismoidal and Simpson Rules.

Application of definite integral: Summation of Series, Quadrature, rectification, volumes and surfaces of solids of revolution (Cartesian co-ordinates only)

References:

1. G. B. Thomas & R. L. Finney : Calculus and Analytic Geometry (Ninth edition), Pearson Publication.
2. Gabriel Klambauer : Mathematical Analysis, Marcel Dekkar, Inc. New York, 1975.
3. N. Piskunov : Differential and Integral Calculus, Peace Publishers, Moscow.
4. P. K. Jain and S. K. Kaushik : An Introduction to Real Analysis, S. Chand & Co. New Delhi, 2000.

Paper III: THEORY OF EQUATIONS

Max. Marks : 30
Time : 3 Hours

Note:
1. The syllabus has been split into two Units: Unit-I and Unit-II. Four questions will be set from each Unit.
2. A student will be asked to attempt five questions selecting at least two questions from each Unit. Each question will carry 6 marks.
3. The teaching time shall be five periods (45 minutes each) per paper per week including tutorial.
4. If internal assessment is to be conducted in the form of written examinations, then there will be only one written examination in a Semester

Unit-I

Euclid's algorithm, synthetic division, roots and their multiplicity. Complex roots of real polynomials occur in conjugate pairs with same multiplicity. Relation between roots and co-efficients. Transformation of equations. Descartes' Rule of Signs.

Unit-II

Newton's method of divisors, Solution of cubic and bi-quadratic equations, Cardan's method of solving a cubic, discriminant and nature of roots of real cubic, trigonometric solutions of a real cubic with real roots. Descarte's and Ferrari's method for a bi-quadratic.

References:

1. S.R. Knight and H.S. Hall : Higher Algebra, H. M. Publications, 1994.

2. Chandrika Prasad : Text Book on Algebra and Theory of Equations, Pothishala Private Ltd., Allahabad.
