

SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar
SYLLABUS FOR B.Sc. (MATHEMATICS)
SEMESTER -II
FSMA-201
(ANALYTICAL SOLID GEOMETRY)
TWO HOURS PER WEEK (2 CREDIT)
Effective from June 2010.
Marks:-100 (30 internal+70 external)

Unit 1

Sphere, circles, family of spheres Passing through a circle, tangent planes and normal lines to a sphere.

Unit 2

Quadric surfaces: conicoids, their identifications, plane sections. Spherical and cylindrical polar coordinates; their relation with Cartesian coordinates, Jacobian.

Unit 3

Definition of a cone, vertex, guiding curve and generators; equations Cones, enveloping cone of a sphere; conditions for a cone to have three mutually perpendicular generators; tangent lines and plane at point.

Unit 4

Condition for tangency (statement only), reciprocal cones; intersection of two cones with a common vertex, Definition of a cylinder, its equations; enveloping cylinder of a sphere; the right circular cylinder and its equation.

Recommended Texts:

1. Vasavada H.M., Analytical geometry of two and three dimensions, 1992
Chapter 8, Chapter 6(article 3,4 only)
2. Shanti Narayan and Mittal P.K., Analytical solid Geometry, S. Chand And Co. New Delhi, 2002(16th Revised edition). Chapter 7(7.1,7.2,7.3,7.4,7.5,7.7,7.8)
3. Introduction to calculus and differential equations, By D J Karia,
N Y Patel, B P Patel, M L Patel. Article 30 (only)
4. Dipak Chetterjee, Analytic Solid Geometry. Prentice-Hall of India Pvt.Ltd. New Delhi.

SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar
SYLLABUS FOR B.Sc. (MATHEMATICS)
SEMESTER -II
FSMA-202
(MATRIX ALGEBRA AND DIFFERENTIAL EQUATIONS)
TWO HOURS PER WEEK (2 CREDIT)
Effective from June 2010.
Marks:-100(30 internl+70 external)

Unit 1

Review of matrix theory, algebra of matrices, special types of matrices, submatrices, determinant and minors of matrices.

Unit 2

Characteristic equation of a matrix; and Cayley-Hamilton theorem, eigenvalue and eigenvector of square matrices, eigenvalue of special type of matrices, The construction of orthogonal matrices.

Unit 3

Linear differential equations with constant coefficients; complementary function and particular integral; operators; Products of operators, Determination of complementary function. Inverse operators; determination of Particular integral and working rules for $f(D)y=e^{mx}$.

Unit 4

Determination of Particular integral and working rules for $f(D)y=X$ where $X = \sin mx, \cos mx, x^m, e^{ax}V, xV$ (where V is a function of x only). Homogeneous linear differential equations. Method of variation of parameters for solving second order nonhomogeneous differential equation.

Recommended Texts:

1. Shanti Narayan and Mittal P.K., A textbook of Matrices, S. Chand and Co. New Delhi, 2005, 11th revised edition.
Chapter 1 (1.4 to 1.9), Chapter 2 (2.1 to 2.5, 2.7 to 2.10),
Chapter 11 (11.1, 11.2 (only statements), 11.3, 11.6, 11.11)
2. Introduction to calculus and differential equations.
-D J Karia, N Y Patel, B P Patel, M L Patel. Article: 63, 64, 65, 66
3. Shanti Narayan. Differential calculus. Fourteenth Edition,
Shamlal charitable trust, New Delhi, 1996
4. Advanced Engineering Mathematics, Fifth Ed.- Kreyszig E. [New Age International Publishing Co.]
5. Higher Engineering Mathematics, Thirty-fifth edition.
Grewal, B.S. [Khanna Publ]

SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar
SYLLABUS FOR B.Sc. (MATHEMATICS)
SEMESTER -II
FSMA-203
(PROBLEMS AND EXERCISES IN MATHEMATICS)
FOUR HOURS PER WEEK (2 CREDIT)
Effective from June 2010.
Marks:-100(30 internl+70 external)

- Integration of rational function of x and a linear surd $(Ax + B)(ax^2 + bx + c)^{-1/2}$ and $(Ax + B)(ax^2 + bx + c)^{1/2}$.
- Reduction formulae for integration of $\sin^n x$, $\cos^n x$, $\sin^p x \cos^q x$
- Solution of System of linear homogeneous algebraic equations
- Solution of System of linear non homogeneous algebraic equations
- Descarte's rule of sign
- Solution of cubic equations (Cardan's method)
- Solution of biquadratic equations (Ferarri's method)
- Spheres
- Sketching of Quadric surfaces
- Cone
- Cylinder
- Rank of a matrix
- Normal form of matrix
- Elementary matrices and its relation with elementary operations
- Inverse of a nonsingular matrix by elementary row operation
- Eigenvalue and eigen vector of square matrices
- General solution of Linear differential equations $f(D)y=X$ where $X= \sin mx, \cos mx, x^m, e^{ax}V, xV$ (where V is a function of x only).

NOTE:-

- Problem solving skill in mathematics is an important aspect in the teaching of mathematics.
- There would be a batch of problem solving session will be of four hours per week and they will be conducted in batches of students of size 25 per batch.

Recommended Texts:

1. Vasavada H.M., Analytical geometry of two and three dimensions, 1992
2. Shanti Narayan. Differential calculus. Fourteenth Edition, Shamlal charitable trust, New Delhi, 1996
3. Shanti Narayan and Mittal P.K., Analytical solid Geometry, S. Chand And Co. New Delhi, 2002
4. Dipak Chetterjee , Analytic Solid Geometry. Prentice-Hall of India Pvt.Ltd. New Delhi.
5. Introduction to calculus and differential equations by D J Karia, N Y Patel, B P Patel, M L Patel
6. Grewal,B.S.,Higher engineering mathematics,Thirty fifth edition, Khanna publ. 2000.

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TWO HOURS PER WEEK (2 CREDIT)
Effective from June 2010.
Marks:-100(30 internal+70 external)

Unit-1

Limit: Definition & examples(without ϵ - δ), Limit of Polynomial functions, rational functions, trigonometric functions.

Differentiation: Definition and examples, working rule of derivative, chain rule, derivative of inverse function, implicit function, parametric function, exponential function and logarithmic function .

Unit-2

Integration: Definition and examples, method of substitution for integration (trigonometric substitution), Integration by parts.

Unit-3

Definite Integration, Fundamental principle of definite integration.

Unit-4

Differential equations: Definition, Order & degree of differential equation, Solution of differential equation, differential equation of 1st order and 1st degree, variable separable method.

Recommended Texts:

1. College Algebra, 2nd Edition, By Spiegel M.R., Moyer R.E., Tata Macgrows-hill Publishing Co. Ltd.
2. Analytic Calculus, Fuller and Parker.
3. Integral Calculus, By Shanti Narayana, S.Chand Publishing co.,
4. Differential Calculus, By Shanti Narayana, S.Chand Publishing co.,