VEER NARMAD SOUTH GUJARA1 UNIVERSITY, SURAT

F.Y. B.Sc.

Mathematics

MATH 101
(TRIGONOMETRY, MATRICES AND VECTOR CALCULUS)
(To be in force from June 2006)

-TRIGONOMETRY :

De'Moivre's theorem and its applications, Hyperbolic functions of real variables, Circular and I Ivperbolic functions of complex variables, Logarithm of complex quantities, Expansion of Trigonometric and Exponential functions.

MA-TRICES RES:

Matrices, Definitions, Different types of matrices, Operations on matrices, Addition and Multiplication of two matrices, Scalar multiplication, Properties of operations of matrices.
I elementary Row operations, Row -reduced echelon form, Linear independence of Rows, Row rank. Rank of a matrix, Inverse of matrix by Gauss-Elimination method. Eigen values and Eigen vectors of a matrix. Characteristic equation of a matrix. Cayley-I Hamilton theorem and its applicat on to find inverse of a matrix.

VECTOR CALCULUS ;

Orientation of Vectors.
Vector differentiation, their propeᵗties and their physical interpretaations, Gradient of a scalar functions, Divergence and curl of a vector functions, their properties, Directional derivatives: (Green's, Stokes and Gauss' Theorems. only statement with simple applications]

The course is covered by the following reference books :

1. Shantinarayan : Text (hook of Matrices, S.Chand and Co.
2. S.K. Jain. A. (Gunawardana\ P.B. Bhattacharya : Basic linear Algebra, (2"ˋʳ ed.). Cambridge University Press. Indian Edition 1997.
3. S.1,. Loney : Plane trigonometry. Part I and II, McMillan &-Co. London.
4. R.S. Verma & K .S. Shukla : 'Text hook of trigonometry., Pothishala Pvt. Ltd. Allhabad.
5. N.P.Bhamore & et el: Adhunik (ianitshashtra, Part -- I, Popular Prakashan, Surat.
6 Shantinarayan :Text Book of vector calculus, S. Chand & Co. New Delhi.

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Mathematics

MATH 102
(CALCULUS AND DIFFERENTIAL EQUATIONS)

DIFFERENTIAL CALCULUS

Successive differentiation: Calculation of nth derivatives of some standard functions (rational . functions and product of powers (I' sine & cosine functions), Leibnitz theorem.

Mean Value Theorems: Rolle's and Lagrange's Theorems their geometrical interpretations, - Cauchy theorem, Indeterminate Corms, L' Hospital Rule, Maclaurin & Taylor series expansions.
Curvature, Test of Concavity & Convexity, Points of Inflexion, Asymptotes.

IN I LORAL CALCULUS

Reduction formula for integration of $\sin^n x$, $\mathrm{Cos}^n x$, $\tan^n x$, $\cot^n x$, $\sec^n x$, $\mathrm{cosec}^n x$, $\sin^p x \cos^q x$, x^m cOsflx, x^m SINNX

ORDINARY DIFFERENTIAL

Equations of first order and first de^{g}ree : equations having separable variables, Homogenous equations, Exact equations, Lineal equations and Bernoulli's equations.
Differential equations of first older and higher degree. solvable for x, y, p. Lagrange's equation, Clairaut's equation.

'The course is covered b\ the following reference books :

1. Shantinarayan : Differential & Integral Calculus, S. Chand & Co. New Delhi.
2. Shantinarayan : Integral Calcul Is. S. Chand & Co. New Delhi.
3. Gorakhprasad : Differential Calculus, Pothishala Pvt. Ltd. Allhabad.
4. (Gorakhprasad : Integral Calculus, Pothishala Pvt. Ltd. Allhabad
5. N.P.Bhamore & et el : Adhunik Ganitshashtra, Part — 2, Popular Prakashan, Surat.
6. D.A. Murray : Differential Equations. 'Tata McGraw Hills.
7. Gorakhprasad : 1)i Differential Equations, Pothishala Pvt. Ltd. Allhabad.

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Mathematics

MATH 103 (P)

(PRACTICAL)One practical of 3 periods per division per week]

1. Applications of De Moivre s Theorem.
2. Logarithm of Complex quantities.
3. Row-Reduced Echelon form of a matrix.
4. Rank of matrix.
5. Inverse of matrix using Row-Reduction method.
6. Eigen values and Eigen Vectors of a matrix.
7. Inverse of a matrix using Civics -Hamilton Theorem.
8. Consistency and solution of the system of linear homogenous equations.
9. Consistency and solution of the system of linear non-homogenous equations.
10. Applications of Gradient. Divergence and Curl.
11. Problems on Green's, Stoke's and Divergence Theorems.
12. Successive derivatives.
13. Applications of I eihnit/'s I Theorems.
14. Increasing and decreasing functions.
15. Taylor's and Maclaurine`Series expansion of a function of single variable.
16. Points of Inflexion. Cancan it\ and Convexit\.. Asymptotes.
17. Intrinsic equations and length of the arc.
18. Area under the curve, volune of the surface of revolution about the co-ordinate axes.
19. Reduction formulae.
20. Mathematical models leading to the first order and first degree ordinary differential equations :
    i) Nevvton"s laV1 Cooling. IC-circuit.