

Semester : III	
Course No. : AE-MATH-232	Credit Hrs. : 3(3+0)
Course Title : Engineering Mathematics - I	

SYLLABUS

Objectives : To make the students acquainted with the Basic Mathematics applied in Engineering and their applications in solving engineering problems

THEORY

Differential Equations: first order differential equations, exact and reducible to exact form by integrating factors, linear differential equation and Bernoulli's equation, equations of first order and higher degree, Clairaut's equation.

Higher order differential equations: methods/rules of finding complementary functions and particular integrals, methods of variation of parameters, Cauchy's and Legendre's linear equations, simultaneous linear differential equations with constant coefficients.

Differential calculus: Taylor's and Maclaurin's expansions, Maxima and minima for function of one variable, functions of two or more variables, partial derivative and total derivative, homogeneous functions and Euler's theorem.

Partial differential equations: Formation of PDE, higher order linear PDE with constant coefficients, solution of non-linear PDE, Charpit's method.

Integral calculus: Double integrals, change of order of integration, triple integrals, application of double and triple integrals to find area and volume.

Matrices: Elementary transformations, Gauss-Jordan method to find the inverse of a matrix, rank of a matrix, solution of linear equations, Gauss elimination Method, linear transformation, Eigen values and Eigen vectors, Cayley Hamilton Theorem- it's use to find inverse of the matrix, diagonalization of matrices.

Suggested Readings [AE-MATH-232]:

1. Grewal B.S., 2015; Higher Engineering Mathematics. Khanna Publishers Delhi. (43rd Edn.)
2. Narayan, S. 2016. A Text Book of Vector. S. Chand and Co. Ltd. New Delhi.
3. Narayan, S. 2016. Differential Calculus. S. Chand and Co. Ltd. New Delhi.
4. Narayan, S. 2016. Integral Calculus. S. Chand and Co. Ltd. New Delhi.

TEACHING SCHEDULE

THEORY [AE-MATH-232]

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1 - 10	Differential Equations	First order differential equations Linear differential equation Bernoulli's differential equation Exact differential equation: Definition, Necessary and sufficient condition for exactness and solution of exact equation Equations reducible to exact form by Integrating factor Equations of the first order and higher degree: Clairaut's form	20
11 - 17	Higher Order Differential Equations	Linear differential equations with constant coefficients: Methods / Rules for finding complementary functions Method / Rules for finding the Particular integral Methods of variation of parameters Cauchy's and Legendre's linear equations Simultaneous linear differential equations with constant coefficients	15
18 - 27	Differential Calculus	Maclaurin's and Taylor's Expansion Maxima and minima Partial Differentiation: functions of two or more variables Partial derivatives Homogeneous function & Euler's Theorem Total derivative	20
28 - 32	Partial Differential Equations	Formation of PDE, Higher order linear PDE with constant coefficient Solution of non-linear PDE Charpit's method	10
33 - 38	Integral Calculus	Double integrals, Change of order of integration Triple integrals, Application of double and triple integrals to find area and volume	15
39 - 48	Matrices	Rank of a Matrix Elementary transformations Gauss-Jordan method to find the inverse of a matrix Solution linear equations Gauss elimination Method Linear transformation, Eigen values and Eigen vectors Cayley Hamilton Theorem - it's use to find inverse of the matrix Diagonalization of matrices	20
Total =			100

[Note: In some topics, re-arrangement of points is done for smooth teaching as per the books suggested.]