

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

### **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. (43<sup>rd</sup> 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	20
		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	
11 - 17	Higher Order Differential Equations	Linear differential equations with constant coefficients: Methods / Rules for finding complementary functions	15
		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	
18 - 27	Differential Calculus	Maclaurin's and Taylor's Expansion	20
		Maxima and minima	
		Partial Differentiation: functions of two or more variables	
		Partial derivatives	
		Homogeneous function & Euler's Theorem	
		Total derivative	
28 - 32	Partial Differential Equations	Formation of PDE,	10
		Higher order linear PDE with constant coefficient	
		Solution of non-linear PDE	
		Charpit's method	
33 - 38	Integral Calculus	Double integrals,	15
		Change of order of integration	
		Triple integrals,	
		Application of double and triple integrals to find area and volume	
39 - 48	Matrices	Rank of a Matrix	20
		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	
Total =			100

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