

Course Document		Academic Year:2016-17	
Department of Mathematics			
Course Title : <b>ENGINEERING MATHEMATICS-I</b>			Credits: 04
Course Code : 16MAT11			L:T:P -3 – 1– 0
Course Type: BS	Semester : I	Div:	CIE marks: 50
Hours/week: 05	Total Hours: 50		SEE marks: 50

**Pre-requisites:**

1. Basic Differentiation and Integration
2. Trigonometry
3. Matrix and Determinant operations
4. Vector algebra

**Course Objectives:** Introduce  $n^{\text{th}}$  derivative of standard functions. Know the angle between curves and radius of curvature. Use of Taylor's and Maclaurin's theorem Introduce partial and total derivatives derivatives. To find Maxima & minima of functions of two variables. Understanding the concept of elementary, linear and orthogonal transformations. Reduction of a given matrix to echelon and normal forms. Defining rank of a matrix and solve system of linear equations by different methods. Determining the eigen values and eigen vectors. Reduction to diagonal and quadratic form. . Deduce reduction formulae and discuss tracing of curves and applications. Understanding the concept of scalar and vector point function, Determining vector identities..

**Course Outcomes(COs) : At the end of the course, the student will be able to**

CO No.	Course Outcomes ( <i>Action verb should be in italics</i> )	Blooms Taxonomy	Bloom's Level
CO-1	<i>List</i> $n^{\text{th}}$ derivatives of different functions and <i>Solve</i> relevant problems	Knowledge/ Apply	L 1, L3
CO-2	<i>Demonstrate</i> the concept and use of partial differentiation in various problems.	Apply	L3
CO-3	<i>Interpret</i> the various solutions of system of equations and <i>Solve</i> them	Apply	L3
CO-4	<i>Find</i> Integration of Trigonometric functions involving positive integral powers	Apply	L3
CO-5	<i>Identify</i> the rough <i>sketch</i> of curves in various coordinate systems	Understanding/ Apply	L2, L3
CO-6	<i>Explain</i> the concept of Vector Differentiation	Understanding	L2

<b>Title of the Chapter : Differential Calculus</b>		<b>Unit No. : 1</b>
		<b>Duration: 10 Hrs.</b>
<b>Outcomes of this chapter:</b> At the end of the Chapter, the student will be able to		
<b>S.No.</b>	<b>Outcomes</b>	<b>Bloom's Level</b>
1	Use Leibnitz Theorem to determine the $n^{\text{th}}$ derivative of product of functions	L2
2	Develop series expansion by Taylor's and Maclaurin's series	L3
3	Identify angle between the polar curves	L2

<b>Title of the Chapter : Partial Differentiation</b>		<b>Unit No. : 2</b>
		<b>Duration: 10 Hrs.</b>
<b>Outcomes of this chapter:</b> At the end of the Chapter, the student will be able to		
<b>S.No.</b>	<b>Outcomes</b>	<b>Bloom's Level</b>
1	Differentiate the function of more than one variable of any order	L3
2	Distinguish between ordinary derivative and partial derivative	L4
3	Apply chain rule to find partial derivatives	L3
4	Define Jacobians	L2
5	Examine the function for maxima and minima and discover its extreme value	L3

<b>Title of the Chapter : Linear Algebra</b>		<b>Unit No. : 3</b>
		<b>Duration: 10 Hrs.</b>
<b>Outcomes of this chapter:</b> At the end of the Chapter, the student will be able to		
<b>S.No.</b>	<b>Outcomes</b>	<b>Bloom's Level</b>
1	Apply elementary transformations to reduce the matrix to Echelon and normal form and determine its rank	L3

2	<b>Interpret the various solutions of system of linear equations</b>	<b>L3</b>
3	<b>Describe the linear transformation and examine the existence of inverse linear transformation</b>	<b>L2</b>
4	<b>Employ orthogonal transformations to express the matrix to diagonal and quadratic form to canonical form</b>	<b>L2</b>
5	<b>Employ power method to find the largest eigen value of a matrix</b>	<b>L3</b>

<b>Title of the Chapter : Integral Calculus</b>		<b>Unit No. : 4</b>
		<b>Duration: 10 Hrs.</b>
<b>Outcomes of this chapter:</b> <b>At the end of the Chapter, the student will be able to</b>		
<b>S.No.</b>	<b>Outcomes</b>	<b>Bloom's Level</b>
1	<b>Develop reduction formulae</b>	<b>L2</b>
2	<b>Evaluate integral values by appropriate reduction formula</b>	<b>L3</b>
3	<b>Sketch standard curves</b>	<b>L3</b>
4	<b>Apply integral formulae to estimate length, area, surface area and volume of revolution of a curve</b>	<b>L3</b>

<b>Title of the Chapter : Vector Calculus</b>		<b>Unit No. : 5</b>
		<b>Duration: 10 Hrs.</b>
<b>Outcomes of this chapter:</b> <b>At the end of the Chapter, the student will be able to</b>		
<b>S.No.</b>	<b>Outcomes</b>	<b>Bloom's Level</b>
1	<b>Recognize scalar and vector functions. Evaluate Gradient, Divergence and Curl of a point function depending upon its nature</b>	<b>L2, L3</b>
2	<b>Identify Solenoidal and Irrotational Vector fields</b>	<b>L3</b>
3	<b>Demonstrate the use of vector identities in problem solving</b>	<b>L3</b>

**Books:**

**Text Books:**

1. B.S. Grewal – Higher Engineering Mathematics, Khanna Publishers, 42<sup>nd</sup> Edition, 2012.
2. P.N. Wartikar & J.N. Wartikar – Applied Mathematics (Volume I and II) Pune Vidyarthi Griha Prakashan, 7<sup>th</sup> Edition 1994.

**Reference Books:**

1. Erwin Kreyszig – Advanced Engineering Mathematics, John Wiley & Sons Inc., 9<sup>th</sup> Edition, 2006
2. Peter V. O' Neil – Advanced Engineering Mathematics, Thomson Brooks/Cole, 7<sup>th</sup> Edition, 2011.
3. Glyn James – Advanced Modern Engineering Mathematics, Pearson Education, 4<sup>th</sup> Edition, 2010.

**Activities planned for achievement of outcomes:**

Activities to be selected from following list (Partial list, more activities can be added by faculty)	Tick mark
1. Assignments	
2. Quizzes	
3. Internal Assessment Tests	
4. Course Seminar	
5. Course Project (Mini project)	
6. Case Studies	
7. Viva-Voce	

Course Outcomes	Activities (Mention the S.No.)	Program Outcomes											
		1	2	3	4	5	6	7	8	9	10	11	12
CO-1													
CO-2													
CO-3													
CO-4													
CO-5													
CO-6													

**Mapping of COs and POs**

**Mapping of COs and PSOs**

Course Outcomes	Activities (Mention the S.No.)	Program Specific Outcomes			
		PSO1	PSO2	PSO3	...
CO-1					
CO-2					
CO-3					
CO-4					
CO-5					
CO-6					

Note:

1. Enter correlation levels 1, 2 or 3 as defined below:

**1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)**

**It there is no correlation, put " - "**

**Name and signature of the faculty member**