

Program : <b>Diploma in Engineering and Technology</b>	
Course Code :	Course Title: <b>Mathematics II</b>
Semester : <b>2</b>	Credits: <b>4</b>
Course Category: <b>Basic Science</b>	
Periods per week: <b>4 (L: 3 T: 1 P: 0)</b>	Periods per semester: <b>60</b>

### Course Objectives:

- To give a comprehensive coverage at an introductory level to the subject of Determinants and Matrices, Integral Calculus, Basic elements of Vector Algebra and First Order Differential Equations as applicable to solve engineering problems.

### Course Prerequisites:

Topic	Course code	Course name	Semester
Complex Numbers, Coordinate Geometry, Trigonometry, Limits and Derivatives.		Mathematics I	1

### Course Outcomes:

On completion of the course, the student will be able to:

CO <sub>n</sub>	Description	Duration (Hours)	Cognitive Level
CO1	Make use of Determinants and Matrices in finding the solutions of a linear system.	12	Applying
CO2	Identify the concept of scalar and vector quantities and apply it in engineering problems.	16	Applying
CO3	Build the concept of integration as the inverse operation of differentiation.	18	Applying
CO4	Apply integration techniques to solve different engineering problems and differential equations.	12	Applying
	Series Test	2	

## CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3						
CO2	3						
CO3	3						
CO4	3						

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

## Course Outline

Module Outcomes	Description	Duration (Hours)	Cognitive Level
<b>CO1</b>	<b>Make use of Determinants and Matrices in finding the solutions of a linear system.</b>		
M1.01	Outline the second and third order determinants	5	Understanding
M1.02	Apply Cramer's Rule to solve a linear system of equations.	2	Applying
M1.03	Solve a system of equation in two unknowns by inverse matrix.	5	Applying
<p><b>Contents:</b></p> <p><b>Determinants and Matrices:</b> Definition of determinant by means of algebraic expression, Determinants of 2<sup>nd</sup> and 3<sup>rd</sup> order, Order of a determinant. Evaluation of determinants of 2<sup>nd</sup> &amp; 3<sup>rd</sup> order problems.</p> <p>Definition of matrices. Order of matrices. Different types of matrices. Equality, Addition, Subtraction and multiplication of matrices. Cramer's rule for three variables. Simple problems only on multiplication of Matrices, Inverse of a matrix, matrix inverse method to solve a system of linear equations in 2 variables only.</p>			
<b>CO2</b>	<b>Identify the concept of scalar and vector quantities and apply it in engineering problems.</b>		
M2.01	Compare the difference between vector and scalar quantities.	4	Understanding
M2.02	Explain the Operations on vectors, scalar product and vector product.	6	Understanding

M2.03	Apply the dot product and cross product in problems related to work and moment.	6	Applying
	Series Test – I	1	
<p><b>Contents:</b></p> <p><b>Vector Algebra:</b> Scalar and vector quantities, Definition of a vector, Different types of vectors, Algebra of vectors, Position vector, Scalar (dot) product and vector (cross) product-Simple problems. Simple problems related to work and moment.</p>			
<b>CO3</b>	<b>Build the concept of integration as the inverse operation of differentiation.</b>		
M3.01	Relate integration as the reverse operation of differentiation and rules of integration	3	Understanding
M3.02	Solve problems in integration (by substitution and by parts)	8	Applying
M3.03	Explain the concept of Definite integrals and solve problems related to it.	7	Applying
<p><b>Contents:</b></p> <p><b>Integral Calculus:</b> Integration as the inverse operation of differentiation, standard results, Simple problems using integration by substitution and by parts. Meaning and definition of Definite Integral. Problems of the same type as in indefinite integral.</p>			
<b>CO4</b>	<b>Apply integration techniques to solve different engineering problems and differential equations.</b>		
M4.01	Apply integration techniques to find the area bounded by a curve and the axes.	7	Applying
M4.02	Outline the concept of first order and first-degree differential equations and solve them.	5	Applying
	Series Test – II	1	
<p><b>Contents:</b></p> <p><b>Application of Integration and Differential Equations:</b> Applications of integration for evaluation of area bounded by a curve and the axes (Simple problems, no derivations). Solution of first order and first degree differential equation by variable separable method (simple problems) and linear differential equation.</p>			

**Text /Reference:**

<b>T/R</b>	<b>Book Title/Author</b>
T1	B.S.Grewal,HigherEngineeringMathematics,KhannaPublishers,NewDelhi,40 <sup>th</sup> Edition,2007.
R1	G. B. Thomas, R. L. Finney, Calculus and Analytic Geometry, Addison Wesley, 9 <sup>th</sup> Edition,1995
R2	ReenaGarg,EngineeringMathematics,KhannaPublishingHouse,NewDelhi(RevisedEd.2018)
R3	S.S. Sabharwal, Sunita Jain, Eagle Parkashan, Applied Mathematics, Vol. I & II,Jalandhar.

**Online Resources**

<b>Sl.No</b>	<b>Website Link</b>
1	e-books/e-tools/learning Mathematics software/websites etc.