Syllabus for Diploma Engineering

All Branch

Semester – IV

Subject Name: Engineering Mathematics

Subject Code: 09MA1401

Diploma Branches in which this subject is offered: All Branch

Objective: Students are intended to understand the basic engineering concepts of Algebra, Geometry such as Determinant and Matrices, co-ordinate Geometry, Differential Equation (First order and first degree), Logarithm, Complex Number and vector. The knowledge of Algebra, Geometry can help to understand and solve problems related to Engineering fields. The course will help students to understand Engineering principles and concepts. Main objective of the course is to apply concepts of Determinant and Matrices, co-ordinate Geometry, Differential Equation (First order and first degree), Logarithm, Complex Number and Vector to solve given engineering problems.

Credits Earned: 3 Credits

Course Outcomes: After completion of this course, student will be able to

1. Learn and find Determinant of Matrices.
2. Learn the algebraic properties of Matrices.
3. Find the Equation of point, Straight line and circle.
4. Classify first order differential equation and identify the Order and degree of differential equation.
5. Solve the problem of DE of first order.
6. Learn the properties of logarithms and vectors.
7. Learn algebraic properties of complex numbers and De. Moivre's Theorem.

Pre-requisite of course: Mathematics-1, Mathematics-2, Basic Calculus

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE	IA	CSE	Viva	Term work	
2	2	0	3	50	30	20	25	25	150

Contents

Unit	Topics	Lab Hours	Lecture Hours
1	**Determinants and Matrices** • Learn and find the Determinant of Matrix • Addition, Subtraction, Product, inverse up to 3×3 matrix • Solution of Simultaneous Equation (up to 3 variable)	**6**	**8**
2	**Co-ordinate Geometry** • **Point-** Distance formula , Mid-point formula • **Straight Line-** Forms of Equation of Straight line: Slope point Form, Two Point Form, Intercept Form, Parallel and perpendicular lines • **Circle-** Equation of circle, Center and radius form, Tangent and normal to the circle.	**6**	**5**
3	**Differential Equations (First Order First degree)** • Definition, Order and degree of Differential Equation • Solution of First Order differential equation by separable, Homogeneous and Integrating Factor Methods	**5**	**5**
4	**Logarithms and vectors** • Properties of logarithms • Different based logarithms • Algebraic properties of vectors • Basic concept and Geometric meaning of • Scalar and Vector product • Angle between two vectors	**7**	**6**
5	**Complex Number** • Concept • Modules and Amplitude form, Root of complex number • De Moivre's1st Theorem • Apply concept of complex number in simple engineering problem	**4**	**4**
Total		**28**	**28**

List of Tutorials:

	LAB HOURS
Determinants and Matrices	
• Idea of Determinant and Matrix	**2**
• Addition, Subtraction, Product, inverse up to 3×3 matrix	**2**
• Solution of Simultaneous Equation (up to 3 variable)	**2**
Co-ordinate Geometry	
• **Point-** Distance formula , Mid-point, locus of point	**2**
• **Straight Line-** Forms of Equation of Straight line: Slop point Form, Two Point Form, Intercept Form, Parallel and perpendicular lines	**2**
• **Circle-** Equation of circle, Center and radius form, Tangent an normal to the circle.	**2**
Differential Equations (First Order First degree)	
• Definition, Order and degree of Differential Equation	**1**
• Solution First Order by differential equation separable, Homogeneous and Integrating Factor Methods	**2**
Logarithm and vectors	
• Properties of logarithms	**1**
• Different based logarithm	**1**
• Algebraic properties of vectors	**1**
• Basic concept and Geometric meaning of Scalar and Vector product	**1**
• Angle between two vectors	**1**
Complex Number	
• Concept	**1**
• Modules and Amplitude form, Root of complex number	**1**
• De Moivre's Theorem	**1**
• Apply concept of complex number in simple engineering problem	**1**
TOTAL	**28**

Suggested Theory distribution:

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
30%	30%	30%	10%	---	---

Instructional Method:

a. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, Quiz, brainstorming.

b. The internal evaluation will be done on the basis of continuous evaluation of students in the class-rooms

References:

Sr no.	Author	Title of books	Publication
1	George D Thomas, Mavrice D Weir ,Joel Hass	Thomas calculus 12th edition	Pearson Publication
2	Anton and Rorres	Elementary linear Algebra	Wiley India Publication
3	Dr.R.S Aggarwal	Quantitative Aptitude	S.Chand Publication

Supplementary resources:

1. https://brilliant.org/wiki/expansion-of-determinants/
2. https://en.wikipedia.org/wiki/Analytic_geometry
3. https://en.wikipedia.org/wiki/Differential_equation
4. https://en.wikipedia.org/wiki/Logarithm
5. https://en.wikipedia.org/wiki/Complex_number