INSTITUTE	**DIPLOMA STUDIES**
PROGRAM	**DIPLOMA ENGINEERING (MECHANICAL ENGINEERING)**
SEMESTER	**4**
COURSE TITLE	**MATHEMATICS-IV**
COURSE CODE	**09MA0402**
COURSE CREDITS	**4**

Objective:

1 Students are intended to understand the basic engineering concepts of Algebra, Geometry such as Complex Number, Co-ordinate Geometry, Integration and Differential Equation (First order and first degree). 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 Complex Number,Co-ordinate Geometry, Integration and Differential Equation (First order and first degree), to solve given engineering problems.

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

1 Learn complex numbers and their properties and able to solve the quadratic equations with complex roots.

2 Find the distance between two points and mid-point of two points.

3 Understand the relation between parallel and perpendicular lines, find the equations of different kind of lines.

4 Learn about the centre point and radius of the circle and find its equation from them.

5 Find the integration of different kind of functions by different methods.

6 Classify the degree and order of differential equation and solve the differential equation with first order and first degree.

Pre-requisite of course:NA.

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
2	2	0	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	**Complex Number** Concept, Geometric meaning of complex number , Modulus, Amplitude, Square root of complex numbers, Polar form complex numbers	6

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Contents : Unit	Topics	Contact Hours
2	**Co-ordinate Geometry** Point : Distance formula, Mid-point formula, Straight Line : Forms of equations of straight lines : Slope-Point form, Two points form, Intercept form, Parallel and perpendicular lines, Circle : Equation of a circle, Centre and radius form	8
3	**Integration** Definition and concept, Some particular integrals, Integration by substitution method, Integration by parts, Integration by partial fraction (for linear factors), Integration of some special types of functions	8
4	**Differential Equations (First Order First degree)** Definition, Order and degree of a differential equation, Solution of first order differential equation by Separable, Homogeneous and Integrating factor methods	6
Total Hours		**28**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Complex Number** Concept, Modulus, Amplitude, Square root of complex numbers, Polar form of complex numbers	6
2	**Co-ordinate Geometry** Point : Distance formula, Mid-point formula, Straight Line : Forms of equations of straight lines : Slope-Point form, Two points form, Intercept form, Parallel and perpendicular lines, Circle : Equation of a circle, Centre and radius form	8
3	**Integration** Some particular integrals, Integration by substitution method , Integration by parts, Integration by partial fraction and integration of some special types of functions	8
4	**Differential Equations (First Order First degree)** Definition, Order and degree of a differential equation, Solution of first order differential equation by Separable, Homogeneous and Integrating factor methods	6
Total Hours		**28**

Textbook :

1 NCERT Class-XI science Mathematics, -, NCERT, 2022

2 NCERT Class-XII science Mathematics Part=I, -, NCERT, 2022

3 NCERT Class-XII science Mathematics Part=II, -, NCERT, 2022

4 B.S. Grewal, Higher Engineering Mathematics,, -, Khanna Publishers, New Delhi, 40th Edition, 2007

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References:

1 B.S. Grewal, Higher Engineering Mathematics, B.S. Grewal, Higher Engineering Mathematics, -, Khanna Publishers, New Delhi, 40th Edition, 2007

2 NCERT Class-XI science Mathematics, NCERT Class-XI science Mathematics, -, NCERT, 2022

3 NCERT Class-XII science Mathematics Part=I , NCERT Class-XII science Mathematics Part=I , -, NCERT, 2022

4 NCERT Class-XII science Mathematics Part=II, NCERT Class-XII science Mathematics Part=II, -, NCERT, 2022

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as 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 / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking
30.00	30.00	30.00	10.00		

Instructional Method:

1 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.

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

Supplementary Resources:

1 https://ncert.nic.in/textbook.php?kemh1=0-16

2 https://ncert.nic.in/textbook.php?lemh1=0-6

3 https://ncert.nic.in/textbook.php?lemh2=0-7

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