Semester – IV

Subject Name: Mathematics-IV

Subject Code: 09MA0402

Diploma Branches in which this subject is offered: All Branches

Objective: 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.

Credits Earned: 4 Credits

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

- ➢ learn complex numbers and their properties and able to solve the quadratic equations with complex roots.

- ➢ find the distance between two points and mid-point of two points.

- ➢ understand the relation between parallel and perpendicular lines, find the equations of different kind of lines.

- ➢ learn about the centre point and radius of the circle and find its equation from them.

- ➢ find the integration of different kind of functions by different methods.

- ➢ 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

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE	IA	CSE	Viva	Term work	
2	2	0	4	50	30	20	25	25	150

Contents

Unit	Topics	Lab Hours	Lecture Hours
1	**Complex Number** 1. Concept 2. Geometric meaning of complex number 3. Modules and Amplitude form, Root of complex number 4. Convert complex number into polar form	6	6
2	**Co-ordinate Geometry** 1. **Point** : Distance Formula, Mid-point 2. **Straight Line** : Forms of Equation of Straight Lines : Slope Point Form, Two Point Form, Intercept Form, Parallel and Perpendicular lines 3. **Circle** : Equation of Circle, Centre and radius form	8	8
3	**Integration** 1. Definition and concept 2. Some particular integrals 3. Integration by substitution method 4. Integration by parts 5. Integration by partial fraction (for linear factors) 6. Integration of some special types of functions	8	8
4	**Differential Equations (First Order First degree)** 1. Definition, Order and degree of Differential Equation 2. Solution of First Order differential equation by separable, Homogeneous and Integrating Factor Methods	6	6
Total		**28**	**28**

List of Tutorials:

Topics	Lab Hours
Complex Number	
1. Concept	2
2. Modules and Amplitude form, Root of complex number	2
3. Convert complex number into polar form	2
Co-ordinate Geometry	
1. **Point -** Distance formula , Mid-point	2
2. **Straight Line -** Forms of Equation of Straight line: Slop point Form, Two Point Form, Intercept Form, Parallel and perpendicular lines	4
3. **Circle -** Equation of circle, Center and radius form, Tangent an normal to the circle.	2
Integration	
1. Some particular integrals	2
2. Integration by substitution method	2
3. Integration by parts	2
4. Integration by partial fraction and integration of some special types of functions	2
Differential Equations (First Order First degree)	
1. Definition, Order and degree of Differential Equation	2
2. Solution First Order by differential equation separable, Homogeneous and Integrating Factor Methods	4
TOTAL	28

Reference Books :

Sr no.	Title of books	Book Link	Publication
1	NCERT Class-XI science Mathematics	https://ncert.nic.in/textbook.php?kemh1=0-16	NCERT
2	NCERT Class-XII science Mathematics Part=I	https://ncert.nic.in/textbook.php?lemh1=0-6	NCERT
3	NCERT Class-XII science Mathematics Part=II	https://ncert.nic.in/textbook.php?lemh2=0-7	NCERT
4	B.S. Grewal, Higher Engineering Mathematics,	–	Khanna Publishers, New Delhi, 40th Edition, 2007.

References Links:

1. https://www.mathsisfun.com/numbers/complex-numbers.html

2. https://www.cuemath.com/geometry/coordinate-geometry/

3. https://www.cuemath.com/calculus/integration/

4. https://www.cuemath.com/calculus/differential-equation/

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	Analyse	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

c. Instrument 1. Simple Calculator 2. Internet 3. LCD Projector