INSTITUTE	**DIPLOMA STUDIES**
PROGRAM	**DIPLOMA ENGINEERING (CIVIL ENGINEERING)**
SEMESTER	**3**
COURSE TITLE	**MATHEMATICS-III**
COURSE CODE	**09MA0302**
COURSE CREDITS	**4**

Objective:

1 Students are intended to understand the basic concepts of calculus such as Permutation and Combination, Probability, Binomial Theorem, Differentiation and Vectors. The knowledge of calculus 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 Binomial Theorem, Differentiation and Vectors to solve given engineering problems.

2 Students are intended to understand the basic concepts of calculus such as Permutation and Combination, Probability, Binomial Theorem, Differentiation and Vectors. The knowledge of calculus 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 Binomial Theorem, Differentiation and Vectors to solve given engineering problems.

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

1 Apply the concepts of permutation and combination to solve problems involving order and selection of objects in real-life and mathematical scenarios

2 Apply the basic principles of probability to determine the likelihood of outcomes in various experiments and situations

3 Use the binomial theorem to expand expressions with higher-degree terms and solve related algebraic problems

4 Apply differentiation techniques to various types of functions to find rates of change and slopes in mathematical and applied contexts

5 Apply vector operations to distinguish between scalar and vector quantities, analyse their properties, and calculate the angle between vectors

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

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DR. RAJESHKUMAR MEGHAJIBHAI PATEL
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Contents : Unit	Topics	Contact Hours
1	**Permutation and Combination** Introduction, Basic permutation, Basic combination	4
2	**Probability** Introduction, Classical probability, Compliment of event	4
3	**Binomial Theorem** Binomial theorem (without proof) for positive integral index (expansion and general form), Binomial theorem for any index (expansion without proof) first and second binomial approximation with applications to engineering problems	4
4	**Differentiation** Definition, Some properties, Derivative of some important functions, Chain rule, Derivative of implicit function, Derivative of parametric function, Logarithmic differentiation, Second order Derivative	10
5	**Vectors** Basic concept of Vector and Scalar, addition & subtraction, Product of Vectors, Geometric meaning of Scalar and Vector Product, Applications of Dot (scalar) and Cross (vector) product, Angle between two vectors	6
Total Hours		**28**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Permutation and Combination** Combination, Permutation	4
2	**Probability** Classical probability , Compliment of event	4
3	**Binomial Theorem** Binomial theorem for positive integral index , Binomial theorem for any index	4
4	**Differentiation** Some properties and Derivative of some important function, Chain rule, Derivative of implicit function and parametric function, Logarithmic differentiation, Second order Derivative	10
5	**Vectors** Algebraic properties of vectors, Basic concept and Geometric meaning of Scalar and Vector product, Angle between two vectors	6
Total Hours		**28**

Textbook :

1 Higher Engineering Mathematics, B.S. Grewal, Khanna Publishers, New Delhi, 2007

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

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

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Textbook :

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

5 NCERT Class-X Mathematics, -, NCERT, 2022

References:

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

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

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

4 NCERT Class-X Mathematics, NCERT Class-X Mathematics, NCERT, NCERT, 2022

5 Higher Engineering Mathematics, Higher Engineering Mathematics, B.S. Grewal, Khanna Publishers, New Delhi, 2007

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 / Creative**
30.00	30.00	30.00	10.00	0.00	0.00

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://www.mathsisfun.com/combinatorics/combinations-permutations.html

2 https://en.wikipedia.org/wiki/Binomial_theorem

3 https://en.wikipedia.org/wiki/Derivative

4 https://en.wikipedia.org/wiki/Integral

5 https://www.mathsisfun.com/calculus/integration-introduction.html

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