

INSTITUTE	FACULTY OF TECHNOLOGY
PROGRAM	MASTER OF TECHNOLOGY in CHEMICAL ENGINEERING
SEMESTER	1
COURSE TITLE	MATHEMATICAL AND STATISTICAL METHODS
COURSE CODE	01CM0111
COURSE CREDITS	3

Objective:

- 1 To The Course aims to enable students to apply advanced Mathematical and Statistical methods to solve core engineering and real-world problems.

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

- 1 Know the role of Ordinary Differential Equations in representation and solution of engineering problems
- 2 Apply the methods to solve Higher ordered Differential equations in various filed of Engineering like Control Theory, Vibration analysis etc
- 3 Apply the suitable methods to solve various linear and non-linear Partial Differential Equations.
- 4 Analyze various Engineering problems using Statistical Methods

Pre-requisite of course:Basic knowledge of mathematics.

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	0	50	30	20	0	0

Contents : Unit	Topics	Contact Hours
1	Ordinary First Ordered Differential Equations: First Ordered Differential Equations and its solutions. First Ordered differential Equation, Linear and Non-linear differential equations Types of Solution of Differential Equations, Exact and Non- Exact First Ordered Differential Equations and its Solutions.	8
2	Higher Ordered Differential Equations Order and Degree of Linear Higher Ordered Differential Equation., Homogeneous and Non-Homogeneous Differential Equation., Complementary Functions and Particular Integral. Methods to solve Higher Ordered Linear Differential Equations, Method of Variation of Parameters.	8

Contents : Unit	Topics	Contact Hours
3	Partial Differential Equations: First and Second Ordered Partial Differential Equations, Order and degree of Partial Differential Equations, Nature of PDEs (Parabolic, Hyperbolic and Elliptic Partial Differential Equations)	8
4	Statistical Methods Central Tendencies, Standard deviation, Variance., Curve fitting, Linear and Non-Linear Curve fitting, Empirical rule, Random variable and its types, Distributions related to Discrete random variables,, Expected value of discrete random variables and its applications in real world.	8
Total Hours		32

Textbook :

- 1 Advanced Engineering Mathematics, , 8th Ed.,, Erwin Kreyszig, Jhon Wiley & Sons, India, 1999

References:

- 1 Mathematical Statistics, Mathematical Statistics, H.C. Saxena & J. N. Kapur, S Chand Publishing, 1960
- 2 Thomas' Calculus: Early Transcendentals, Thomas' Calculus: Early Transcendentals, Thomas, G. B., Weir, M. D., Hass, J., & Giordano, F. R., Pearson Addison-Wesley, 2008

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
10.00	20.00	25.00	25.00	10.00	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 white board, may also use any of tools such as collaborative learning, demonstration, roleplay, Quiz, brainstorming, MOOCs, Active Learning Assignments etc.
- 2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
- 3 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.
- 4 Students will use supplementary resources such as online videos, Virtual Laboratory NPTEL videos, e-courses.

Supplementary Resources:

- 1 <http://mathworld.wolfram.com/>
- 2 <http://en.wikipedia.org/wiki/Math>