



Pimpri Chinchwad Education Trust's  
**Pimpri Chinchwad College of Engineering**  
Sector No. 26, Pradhikaran,  
Nigdi, Pune – 411 044



## COURSE OUTLINE

Department: Mechanical Engineering  
Class: T.E. Mechanical

A.Y.:2021-22 Sem-I

Date: 25/07/2021

Name of the Course: Numerical and Statistical Methods

### Relevance of the course:

This course bridges the fields of mathematics and engineering. Numerical methods in engineering are in the first part of the course. Among the main topics covered are linear equations, roots equation, interpolation, regression, derivational and numerical integrations, and the solution to differential equations. This subject integrates the theory and application of numerical methods in solving engineering problems. The second part of the subject introduces statistics as an approach to help solve problems based on data collection and sampling. The main topics under this course include; probability, random variables, probabilistic density functions, probabilistic distributions, mean and variance, random and systematic error analyses, probabilistic distribution and density, uniform probabilistic distribution, exponent and normal distributions, mean and variance parameter estimations, point and interval estimations, sampling, significance testing and hypothesis, also regression and correlation.

### Course Outcomes

CO No	CO Statement	No. of Lectures Planned	No. of Practical planned	Content Delivery method	Assessment tools Planned
1.	<b>SOLVE</b> system of equations using direct and iterative numerical methods	7	2	Lecture with interaction; demonstration; presentation	UT1, In-Semester Exam, Tutorial assignment 1, 2
2.	<b>ESTIMATE</b> solutions for differential equations using numerical techniques.	8	2	Lecture with interaction; demonstration; presentation	UT1, In-Semester Exam, Tutorial assignment 3, 4
3.	<b>DEVELOP</b> solution for engineering applications with numerical integration	6	1	Lecture with interaction; demonstration; presentation	UT2, End-Semester Exam, Tutorial assignment 5
4.	<b>DESIGN</b> and <b>CREATE</b> a model using a curve fitting and regression analysis	8	2	Lecture with interaction; demonstration; presentation	UT2, End-Semester Exam, Tutorial assignment 6, 7; Mini Project
5.	<b>APPLY</b> statistical Technique for quantitative data analysis.	8	1	Lecture with interaction; demonstration; presentation	End-Semester Exam, Tutorial assignment 8, Mini Project
6.	<b>DEMONSTRATE</b> the data, using the concepts of probability and linear algebra.	8	1	Lecture with interaction; demonstration; presentation	End-Semester Exam, Tutorial assignment 9; Mini Project

**Assignment:**

Assignment Planned	CO Mapped	Tentative schedule
Program on Roots of equation	CO-1	28/06/2021
Program on Simultaneous equations	CO-1	05/07/2021
Ordinary differential equation / Partial differential equation	CO-2	12/07/2021
A program for Numerical Integration	CO-3	19/07/2021
Program for Curve fitting using least square technique	CO-4	02/09/2021
Regression analysis	CO-4	09/09/2021
Determine statistical measures	CO-5	23/09/2021
A program for Probability distribution	CO-6	07/10/2021
One program based mini project using mechanical engineering application dataset	CO-4, CO-5 or CO-6	30/09/2021

**Mini Project topics offered:**

- Program based mini project using mechanical engineering application dataset
- Program based mini project using the data available in public domain on internet like, <https://data.gov.in/>, [www.kaggle.com](http://www.kaggle.com), <https://datasetsearch.research.google.com>

**Industry visit/ Case studies planned:** NIL

**Guest Lecture/ Co Teaching:** NIL



**Dr. R. B. Patil**  
Course Faculty TE A



**Mr. S. B. Matekar**  
Course Faculty TE B  
and  
Course Coordinator



**Dr. R. B. Patil**  
Course Faculty TE C