

EC/EE/ME-101

DIFFERENTIAL EQUATIONS AND STATISTICS

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COURSE OBJECTIVES:

1. To provide knowledge on solving ordinary differential equations.
2. To provide knowledge on applications of first order ordinary differential equations.
3. To provide knowledge on solving higher order ordinary differential equations.
4. Focused in partial differential equations.
5. To provide knowledge on curve fitting, correlation and regression lines.

COURSE OUTCOMES:**After successful completion of the course, the students are able to**

1. demonstrate Ordinary differential equations, Partial differential equations, Method of least squares and Correlation and regression.
2. apply knowledge of first order differential equations to find complementary function of higher order equations.
3. evaluate particular integral and solve Cauchy and Legendre's equations.
4. solve partial differential equations.
5. select the appropriate normal equations to fit a curve and regression analysis.

UNIT I**(12)****Differential Equations of First Order :**

Definition - Formation of differential equation - Equations of first order and first degree : Linear equations, Bernoulli's equation.

Exact differential equations - Equations reducible to exact equations.

UNIT II**(12)**

Applications of differential equations of first order : Orthogonal trajectories, Newton's law of cooling, Growth and decay problems.

Higher order Linear Differential Equations : Definitions - Operator D - Rules for finding the complementary function.

UNIT III**(12)**

Inverse operator - Rules for finding Particular Integral - working procedure. Method of variation of parameters.

Equations reducible to linear equations with constant coefficients : Cauchy's and Legendre's Linear equations.

UNIT IV**(12)****Partial Differential Equations :**

Formation - Equations solvable by direct integration - Linear equations of first order- Lagrange's linear equation.

Linear Homogeneous partial differential equations of higher order with constant coefficients.

UNIT V**(12)**

Statistics : Method of least squares - Fitting of straight line and parabola.

Correlation, Co-efficient of correlation (direct method), Lines of regression.

LEARNING RESOURCES:

TEXT BOOK(s):

B.S.Grewal - Higher Engineering Mathematics, Khanna publishers, 40th edition, 2007.

REFERENCE BOOK(s):

Erwin Kreyszig - Advanced Engineering Mathematics, 8th edition, New Age International (P) Ltd., 2007.

WEB RESOURCES:

<http://nptel.iitm.ac.in/courses/>