DIFFERENTIAL EQUATIONS AND APPLICATIONS (THEORY) BS-111

Pre-requisite: Applied CalculusCredit Hours03Contact Hours48

RECOMMENDED BOOKS

Advanced Engineering Mathematics by Erwin Kreyszig, 10th Ed. Willey 2014. ISBN 978-0-470-91361-1.

REFERENCE BOOKS

• Differential Equations with boundary value problems, 8th edition by Dennis G. Zill, Warren S. Wright

OBJECTIVE OF COURSE

The objective of this course is to model the problems arising in different areas of science and engineering in the form of differential equations. Solve the linear 1st order & 2nd order differential equations that appear in Electrical Engineering using different techniques. Apply 1st order & 2nd order differential equations to the variety of theoretical problems and understand the meaning, use and applications of the system of differential equations.

S.NO	CLO/PLOS MAPPING	DOMAIN	PLO
01	Apply 1 st order & 2 nd order differential equations to the variety of theoretical problems.	C3	01,02
02	Interpret the practical problems arising in field of electrical engineering.	C6	01,04
03	Apply a simulation tool to implement various numerical methods.	C3	05

COURSE CONTENTS

First Order Differential Equations

- Variables separable forms.
- Homogenous equations.

- Non-homogenous equations.
- Exact equations.
- Linear equations.
- Solution by substitutions.

Applications of First Order DE's

- Modeling with the first order differential equations.
- Population dynamics.
- Applications of linear equations.
- Applications of non-linear equations

Higher Order Linear Differential Equations

- Introduction and preliminary theory.
- Initial-value and boundary-value problems.
- Homogenous and non-homogenous equations.
- Method of undetermined coefficients.
- Method of variation of parameters.
- System of Differential Equation.
- Power series solution

Applications of the Second Order Differential Equations

- Spring mass problems
- RLC Circuit
- Modeling of Physical System