

SRI VENKATESWARA UNIVERSITY - TIRUPATI

B.S.c., (Honours) in **MATHEMATICS**

FIRST YEAR – II SEMESTER

(W.E.F. Academic Year 2023 - 24)

(MINOR)

COURSESTRUCTURE

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
I	II	1	Differential Equations & Problem Solving Sessions	3	3
			Differential Equations & Problem Solving Sessions	2	1

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(MINOR)
SEMESTER-II

COURSE 1: DIFFERENTIAL EQUATIONS

Theory _____ Credits:4 _____ 5 hrs/week

Course Outcomes

After successful completion of this course, the student will be able to

1. Solve first order first degree linear differential equations.
2. Convert an non-exact homogeneous equation to exact differential equation by using an integrating factor.
3. Know the methods of finding solution of a differential equation of first order but not of first degree.
4. solve higher-order linear differential equations for both homogeneous and non-homogeneous, with constant coefficients.
5. understand and apply the appropriate methods for solving higher order differential equations.

Course Content

Unit- 1 Differential Equations of first order and first degree Linear Differential Equations–Bernoulli’s Equations-Exact Differential Equations–Integrating factors- Equations reducible to Exact Equations by Integrating Factors-

i) Inspection Method _____

ii) $Mx + Ny = 1$

iii) $Mx + Ny = e^{ax}$ _____

Unit- 2

Differential Equations of first order but not of first degree

Equations solvable for p , Equations solvable for y , Equations solvable for x – Clairaut’s equation –Orthogonal Trajectories: Cartesian and Polar forms.

Unit- 3

Higher order linear differential equations

Solutions of homogeneous linear differential equations of order n with constant coefficients- Solutions of non-homogeneous linear differential equations with constant coefficients by means of polynomial operators

(i) $Q(x) e^{ax}$ (ii) $(x) = \sin ax$ (or) $\cos ax$
) = $\frac{1}{ax}$

Unit- 4

Higher order linear differential equations(continued.)

Solution to a non-homogeneous linear differential equation
with constant coefficients

P.I. of $(D)y=Q$ when $Q=bx^k$

P.I. of $(D)y=Q$ when $Q=e^{ax}V$, where V is a function of x

P.I. of $(D)y=Q$ when $Q=xV$, where V is a function of x

Unit- 5

Higher order linear differential equations with non-constant coefficients

Linear differential Equations with non-constant coefficients; Cauchy-
Euler Equation; Legendre Equation; Method of variation of parameters

Activities

Seminar/Quiz/Assignments/
Applications of Differential Equations to Real life Problem/
Problem Solving Sessions.

Text Book

Differential Equations and Their Applications by Zafar Ahsan,
published by Prentice-Hall of India Pvt. Ltd, New Delhi-Second
edition.

Reference Books

1. Ordinary and Partial Differential Equations by Dr.M.D. Raisinghania, published by S. Chand & Company, New Delhi.
2. Differential Equations with applications and programs – S. Balachandra Rao & HR Anuradha-Universities Press.
3. Differential Equations-Srinivas Vangala & Madhu Rajesh, published by Spectrum University Press.
