

# ADIKAVI NANNAYA UNIVERSITY

## RAJAMAHENDRAVARAM

### CBCS / Semester System

(W.e.f. 2016-17 Admitted Batch)

#### I Semester Syllabus

#### B.A./B.Sc. MATHEMATICS

#### PAPER – 1 DIFFERENTIAL EQUATIONS

60 Hrs

##### **UNIT – I (12 Hours), Differential Equations of first order and first degree :**

Linear Differential Equations; Differential Equations Reducible to Linear Form; Exact Differential Equations; Integrating Factors; Change of Variables.

##### **UNIT – II (12 Hours), Orthogonal Trajectories.**

##### **Differential Equations of first order but not of the first degree :**

Equations solvable for  $p$ ; Equations solvable for  $y$ ; Equations solvable for  $x$ ; Equations that do not contain  $x$  (or  $y$ ); Equations of the first degree in  $x$  and  $y$  – Clairaut's Equation.

##### **UNIT – III (12 Hours), Higher order linear differential equations-I :**

Solution of homogeneous linear differential equations of order  $n$  with constant coefficients; Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators.

General Solution of  $f(D)y=0$

General Solution of  $f(D)y=Q$  when  $Q$  is a function of  $x$ .

$\frac{1}{f(D)}$  is Expressed as partial fractions.

P.I. of  $f(D)y = Q$  when  $Q = be^{ax}$

P.I. of  $f(D)y = Q$  when  $Q$  is  $b \sin ax$  or  $b \cos ax$ .

##### **UNIT – IV (12 Hours), Higher order linear differential equations-II :**

Solution of the non-homogeneous linear differential equations with constant coefficients.

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

P.I. of  $f(D)y = Q$  when  $Q = e^{ax}V$

P.I. of  $f(D)y = Q$  when  $Q = xV$

P.I. of  $f(D)y = Q$  when  $Q = x^mV$

##### **UNIT – V (12 Hours), Higher order linear differential equations-III :**

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

##### **Reference Books :**

1. Differential Equations and Their Applications by Zafar Ahsan, published by Prentice-Hall of India Learning Pvt. Ltd. New Delhi-Second edition.
2. A text book of mathematics for BA/BSc Vol 1 by N. Krishna Murthy & others, published by S. Chand & Company, New Delhi.

3. Ordinary and Partial Differential Equations Raisinghania, published by S. Chand & Company, New Delhi.
4. Differential Equations with applications and programs – S. Balachandra Rao & HR Anuradha-universities press.

**Suggested Activities:**

Seminar/ Quiz/ Assignments/ Project on Application of Differential Equations in Real life