

UNIVERSITY OF MADRAS
B.Sc. DEGREE COURSE IN MATHEMATICS
SYLLABUS WITH EFFECT FROM 2020-2021

BMA-CSC06

CORE-VI: DIFFERENTIAL EQUATIONS
(Common to B.Sc. Maths with Computer Applications)

Inst.Hrs : 4

Credits : 4

YEAR: II

SEMESTER: III

Learning outcomes:

Students will acquire knowledge

- About the methods of solving Ordinary and Partial Differential Equations.
- To introduce Differential Equation as a powerful tool in solving problems in Science.

UNIT I

Ordinary Differential Equations: Variable separable-Homogeneous Equation-Non-Homogeneous Equations of first degree in x and y-Linear Equation-Bernoulli's Equation-Exact differential equations.

Chapter 2: Section 1 to 6.

UNIT II

Equation of first order but not of higher degree: Equation solvable for dy/dx - Equation solvable for y- Equation solvable for x- Clairauts form-Linear Equations with constant coefficients- Particular integrals e^{ax} , $\sin ax$, $\cos ax$, x^m , Ve^{ax} where V is $\sin ax$ or $\cos ax$ or x^m .

Chapter 4: Section 1, 2.1, 2.2, 3.1.

Chapter 5: Section 4.

UNIT III

Simultaneous linear differential equations- Linear Equations of the Second Order -Complete solution in terms of a known integrals- Reduction to the Normal form- Change of the Independent Variable - Method of Variation of Parameters.

Chapter 6: Section- 6

Chapter 8:Section- 1,2,3,4.

UNIT IV

Partial differential equation: Formation of PDE by Eliminating arbitrary constants and arbitrary functions-complete integral-singular integral-General integral- Lagrange's Linear Equations $Pp+Qq=R$.

Chapter 12: Section- 1, 2, 3.1, 3.2, 4.

UNIT V

Special methods - Standard forms - Charpit's Methods - Related problems

Chapter 12: Section-5.1, 5.2, 5.3, 5.4, 6.

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Contents and treatment as in

“Differential Equations and its applications”, by S.Narayanan, T.K.Manikavachagam Pillay — S.Viswanathan (Printers and Publishers) Pvt. Ltd(2006).

Reference:

- 1.Mathematics for B.Sc-Branch-I Volume –III by P.Kandasamy ,K.Thilagavathy
S.Chand Publications.
- 2.Differential equations with applications and historical notes by George F.Simmons,
2ndEd,TataMcgraw Hill Publications .
3. Differential Equations by ShepleyL.Ross, 3 rdEd ,JohnWiely and sons 1984.
- 4 .Differential Equations by N.P.Bali,Laxmi Publications Ltd,New Delhi-2004.
5. Ordinary and Partial differential Equation by Dr.M.D.Raisinghaniania ,S.Chand.

e-Resources:

- 1.<http://mathworld.wolfram.com>
2. http://www.analyzemath.com/calculus/Differential_Equations/applications.html