



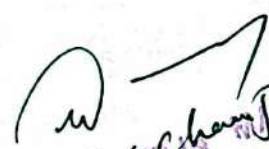
SRI VENKATESWARA UNIVERSITY - TIRUPATI
Syllabus for 4-Year UG Honors in B.Sc. (Mathematics) as Major
in consonance with Curriculum framework
w. e. f. AY 2025-26

COURSE STRUCTURE (for Semester I to VI)

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
I	I	1 ✓	Differential Equations	5	4
		2 ✓	Solid Geometry	5	4
	II	3 ✓	Group Theory	5	4
		4 ✓	Elementary Real Analysis	5	4
II	III	5	Ring Theory	5	4
		6	Advanced Real Analysis	5	4
		7	Theory of Matrices	5	4
	IV	8	Linear algebra	5	4
		9 ✓	Vector Calculus	5	4
		10	Linear Programming Problems	5	4
III	V	11 ✓	Special Functions	5	4
		12 A ✓	Laplace Transforms	5	4
		OR			
		12 B ✓	Foundations of Automata Theory	5	4
		13 A ✓	Numerical Methods	5	4
		OR			
		13 B ✓	Mathematical Methods using MATLAB	5	4

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
	VI	14 A ✓	Integral Transforms	5	4
		OR			
		14 B ✓	Statistical Analysis using R	5	4
		15 A	Advanced Numerical Methods	5	4
		OR			
		15 B	Mathematical Computations using Python	5	4

Note: In the III Year (during the V and VI Semesters), students are required to select a pair of electives from one of the **Two** specified domains. **For example: if set 'A' is chosen, courses 12 to 15 to be chosen as 12 A, 13 A, 14 A and 15 A.** To ensure in-depth understanding and skill development in the chosen domain, students must continue with the same domain electives in both the V and VI Semesters.


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SRI VENKATESWARA UNIVERSITY - TIRUPATHI
UG Honors in B.Sc. (Mathematics)

SEMESTER-I

Course 1: Differential Equations

Credits: 4.

5hrs/week

Unit – 1

Exact Differential Equations – Integrating factors – Equations reducible to Exact Equations by Integrating Factors:

(i) $1 / (Mx + Ny)$

(ii) $1 / (Mx - Ny)$

Linear Differential Equations – Bernoulli's Equations

Unit – 2

Equations solvable for p, Equations solvable for y, Equations solvable for x – Clairaut's equation

Unit – 3

Solutions of homogeneous linear differential equations of second and higher order with constant coefficients $f(D)y = 0$. Solutions of non-homogeneous linear differential equations $f(D)y = Q(x)$ of second order with constant coefficients by means of polynomial operators:

(i) $Q(x) = b e^{ax}$, where b is a real constant

(ii) $Q(x) = \sin(ax)$ or $\cos(ax)$, where a is a real constant

Unit – 4

Solution to non-homogeneous linear differential equations of second order with constant coefficients by means of polynomial operators:

$Q(x) = b x^k$, $Q(x) = e^{ax} V$, where V is a function of x.

Unit – 5

Solution of non-homogeneous linear differential equations of second order with constant coefficients by means of polynomial operators:

$Q(x) = xV$, where V is a function of x.

Problems on Method of Variation of Parameters to find solutions of linear differential equations with variable coefficients.

Activities

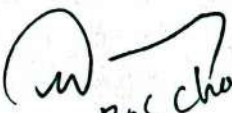
The activities planned throughout the Differential Equations course include a variety of interactive and evaluative methods such as quizzes, assignments, seminars, and student presentations. Students will also engage in a mini project, prepare concept flowcharts, and participate in operator method chart activities. Peer teaching sessions, LMS-based online quizzes, and board work challenges will foster collaborative and digital learning. Additionally, poster presentations on applications and visual aids like chalk talks will be incorporated to support diverse learning styles and deepen conceptual clarity.

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 by S. Balachandra Rao & HR Anuradha – Universities Press.
3. Differential Equations by Srinivas Vangala & Madhu Rajesh, published by Spectrum University.


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SRI VENKATESHWARA UNIVERSITY-TIRUPATI

B.Sc(Honors)-Mathematics(Major)

I Semester

Course 1:DIFFERENTIAL EQUATIONS

Time: 3 Hours

Max. Marks: 75

SECTION – A

(Answer any FIVE questions)

Each question carries 3 Marks

(5 × 3 = 15 Marks)

1. Define an exact differential equation and give an example.
2. Solve $(2xy + y^2)dx + (x^2 + 2xy)dy = 0$.
3. Solve for p: $x^2 + y^2 = 2px$.
4. Find the general solution of Clairaut's equation $y = px + f(p)$.
5. Solve the homogeneous linear differential equation $(D^2 - 3D + 2)y = 0$.
6. Find the particular integral of $(D^2 + 9)y = \sin 3x$.
7. Find the particular integral of $(D^2 - 2D + 1)y = e^x$.
8. Solve $(D^2 + 4)y = 5x^2$.
9. Find the particular integral of $(D^2 + 1)y = x \sin x$.
10. Use the method of variation of parameters to solve $y'' + y = \sec x$.

SECTION – B

Answer ALL the questions.

Each question carries 12 Marks

(5 × 12 = 60 Marks)

11. (a) Solve the differential equation $(y^2 + xy)dx + x^2dy = 0$.
(OR)
(b) Solve the linear differential equation $(x + y)dx + (y - x)dy = 0$.
12. (a) Solve the equation solvable for y: $x^2 + y^2 + 2px = 0$.
(OR)
(b) Solve Clairaut's equation $y = px + 1/p$.

13. (a) Solve $(D^2 - 4D + 4)y = e^{2x}$.

(OR)

(b) Find the complete solution of $(D^2 + 1)y = \sin x + \cos x$.

14. (a) Solve $(D^2 + 2D + 1)y = e^{2x}$.

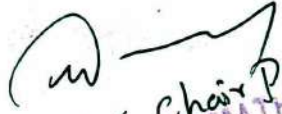
(OR)

(b) Find the particular integral of $(D^2 + 9)y = 3x e^{3x}$.

15. (a) Using the method of variation of parameters, solve $y'' + y = \tan x$.

(OR)

(b) Solve $(D^2 + 4)y = x \sin 2x$ by polynomial operator method.


Bos Chair Person
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