SRI VENKATESWARA UNIVERSITY : TIRUPATI

B.A./B.Sc. MATHEMATICS

REVISED SYLLABUS FOR CORE COURSES

CBCS/ SEMESTER SYSTEM

(w.e.f. 2020-21 Admitted Batch)

CORE COURSES STRUCTURE

(Sem-I to Sem-IV)

Course	Subject	Hrs.	Credits	IA	ES	Total
Course -I	Differential Equations & Differential Equations Problem Solving Sessions	6	5	25	75	100
Course -II	Three dimensional analytical Solid geometry & Three dimensional analytical Solid Geometry Problem Solving Sessions	6	5	25	75	100
Course -III	Abstract Algebra & Abstract Algebra Problem Solving Sessions	6	5	25	75	100
Course -IV	Real Analysis & Real Analysis Problem Solving Sessions	6	5	25	75	100
Course -V	Linear Algebra & Linear Algebra Problem Solving Sessions	6	5	25	75	100

SRI VENKATESWARA UNIVERSITY : TIRUPATI

SEMESTER-I

CBCS/ SEMESTER SYSTEMB.A./B.Sc. MATHEMATICS (w.e.f. 2020-21 admitted Batch)
DIFFERENTIAL EQUATIONS
SYLLABUS (75 Hours)

Course Outcomes:

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

1. Solve linear differential equations
2. Convert non-exact homogeneous equations to exact differential equations by using integrating factors.
3. Know the methods of finding solutions of differential equations of the first order but not of the first degree.
4. Solve higher-order linear differential equations, both homogeneous and non homogeneous, with constant coefficients.
5. Understand the concept and apply appropriate methods for solving differential equations.

Course Syllabus:

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)

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 homogeneous in x and 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,

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

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

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, Legendre's linear equations.

Co-Curricular Activities(15 Hours)

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

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.A text book of Mathematics for B.A/B.Sc, Vol 1, by N. Krishna Murthy & others, published by S.Chand & Company, New Delhi.
2.Ordinary and Partial Differential Equations by Dr. M.D,Raisinghania, published by S. Chand & Company, New Delhi.
3.Differential Equations with applications and programs – S. Balachandra Rao & HR Anuradha-Universities Press.
4.Differential Equations -Srinivas Vangala & Madhu Rajesh, published by Spectrum University Press.

Dr.G.Sreenivasulu Reddy, BOS Chairman.

Mathematics, S.V.University, Tirupati

Recommended Question Paper Patterns and Models BLUE PRINT FOR

QUESTION PAPER PATTERN COURSE-I, DIFFERENTIAL EQUATIONS

Unit	**TOPIC**	**S.A.Q**(including choice)	**E.Q**(including choice)	**Total Marks**
I	Differential Equations of 1^{st} order and 1^{st} degree	2	2	30
II	Orthogonal Trajectories, Differential Equations of 1^{st} order but not of 1^{st} degree	2	2	30
III	Higher Order Linear Differential Equations (with constant coefficients) – I	1	2	25
IV	Higher Order Linear Differential Equations (with constant coefficients) – II	2	2	30
V	Higher Order Linear Differential Equations- III (with non constant coefficients)	1	2	25
TOTAL		8	10	140

S.A.Q. = Short answer questions (5 marks)

E.Q. = Essay questions (10 marks)

Short answer questions : 5 X 5 M = 25 M

Essay questions : 5 X 10 M = 50 M

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Total Marks = 75 M

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SRI VENKATESWARA UNIVERSITY : TIRUPATI

CBCS/ SEMESTER SYSTEM

I SEMESTER

(W.e.f 2020-21 Admitted Batch) B.A./B.Sc. MATHEMATICS

SE-I, DIFFERENTIAL EQUATIONS

MATHEMATICS MODEL PAPER

Time: 3Hrs **Max.Marks:75M**

SECTION - A

Answer any FIVE questions. Each question carries FIVE marks5 X 5 M=25 M

1. Solve $x\frac{dy}{dx}+2y-x^2\log x=0$
2. Solve $y + px = p^2x^4$.
3. Solve $(px - y)(py + x) = 2p$
4. Solve $(D^2 - 3D + 2) = \cosh x$
5. Solve $(D^2-3D+2)y=\sin e^{-x}$
6. Solve $(D^2-6D+13)y=8e^x\sin 2x$
7. Solve $(D^2 - 4D + 3)y = \sin 3x \cos 2x$.
8. Solve $x^2y'' - 2x(1 + x)y' + 2(1 + x)y = x^3$

SECTION - B

Answer ALL the questions. Each question carries TEN marks. 5 X 10 M = 50 M

9 a) Solve $(xy^3+y)dx+2(x^2y^2+x+y^4)dy=0$

(Or)

9b). Solve $\frac{dy}{dx}(x^2y^3+xy)=1$

10.a) Solve $p^2+2py\cot x=y^2$

(Or)

10 b) Find the orthogonal trajectories of the family of curves $x^{2/3}+y^{2/3}=a^{2/3}$ where 'a' is the parameter.

11a) Solve $(D^3+D^2-D-1)y=\cos 2x$

(Or)

11b) Solve $(D^2-4D+3)y=\sin 3x\ \cos 2x$

12 a) Solve $(D^2 - 2D + 4)y = 8(x^2 + e^{2x} + \sin 2x)$

(Or)

12b) Solve $(D^2 + 3D + 2)y = x e^x \sin x$

13a) Solve $(D^2 - 2D)y = e^x \sin x$ by the method of variation of parameters.

(Or)

13 b) Solve $3x^2 \frac{d^2y}{dx^2} + x\frac{dy}{dx} + y = x$

Dr.G.Sreenivasulu Reddy, BOS Chairman.

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