SRI VENKATESWARA UNIVERSITY - TIRUPATI

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

FIRST YEAR – II SEMESTER

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

(MAJOR)

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 anon-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. understandandapplytheappropriatemethodsforsolvinghigherorderdifferentialequations.

Course Content:-

Unit– 1 Differential Equations of first order and first degree Linear Differential Equations–Bernoulli'sEquations-ExactDifferentialEquations–Integratingfactors-Equations reducible to Exact Equations by Integrating Factors-

i)Inspection Method

ii) $Mx \square Ny$

iii) $\frac{1}{Mx \square Ny}$

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

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

(i) $Q(x) = e^{ax}$ (ii) $(x)=Sinax$(or)$Cosax$

Unit– 4 Higher order linear differential equations(continued.)

Solution to anon-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$V$isa function of$x$

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

Unit– 5 Higherorderlineardifferentialequationswithnon-constantcoefficients

LineardifferentialEquationswithnon-constantcoefficients;Cauchy-EulerEquation;LegendreEquation;Method of variation of parameters

Activities:-

Seminar/Quiz/Assignments/ApplicationsofDifferentialEquationstoReallifeProblem/ProblemSolvingSessions.

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.

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(MAJOR)

SEMESTER-II

COURSE4: ANALYTICAL SOLID GEOMETRY

Theory Credits:4 5 hrs/week

Course Outcomes

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

1. Understand planes and system of planes
2. know the detailed idea of lines
3. understand sphere sand their properties
4. know system of spheres and coaxial system of spheres
5. understand various types of cones

Course Content

Unit – 1 The Plane

Equation of plane in terms of its intercepts on the axis - Equations of the plane through the given points - Length of the perpendicular from a given point to a given plane- Bisectors of angles between two planes - Combined equation of two planes - Orthogonal projection on a plane.

Unit – 2 The Line

Equation of a line - Angle between a line and a plane - The condition that a given line may lie in a given plane - The condition that two given lines are coplanar - Number of arbitrary constants in the equations of straight line - Sets of conditions which determine a line - The shortest distance between two lines - Thelengthandequationsofthelineofshortestdistancebetweentwostraightlines - Length of the perpendicular from a given point to a given line.

Unit – 3 The Sphere

Definition and equation of the sphere - Equation of the sphere through four given points - Plane sections of a sphere- Intersection of two spheres -Equationofacircle-Spherethroughagivencircle-Intersectionofasphere and a line –Power of a point – Tangent plane-Plane of contact; Polar plane - Pole of a Plane-Conjugate points-Conjugate planes.

Unit – 4 Spheres(continued)

Angleofintersectionoftwospheres-Conditionsfortwospherestobeorthogonal-Radicalplane; Coaxial system of spheres - Simplified from of the equation of two spheres.

Unit–5 Cones

Definitions of a cone – vertex, guiding curve and generators -Equation of the cone with a given vertex and guiding curve - Equations of cones with vertex at origin are homogenous - Condition that the general equation of the second degree should represent a cone - Enveloping cone of a sphere - Right circular cone - Equation of the right circular cone with a given vertex, axis and semi vertical angle.

Activities

Seminar/Quiz/Assignments/ ThreedimensionalanalyticalSolidgeometryanditsapplications/ Problem Solving Sessions.

Text Book

AnalyticalSolidGeometrybyShantiNarayanandP.K.Mittal,publishedbyS. Chand& Company Ltd. 7th Edition.

Reference Books

1. AtextBookofAnalyticalGeometryofThreeDimensions,byP.K.JainandK haleelAhmed, published by Wiley Eastern Ltd., 1999.
2. CoordinateGeometryoftwoandthreedimensionsbyP.Balasubrahman yam,K.Y. Subrahmanyam, G.R. Venkataraman published by Tata McGraw -Hill Publishers.
3. Solid Geometry by B. Rama Bhupal Reddy, published by Spectrum University Press.

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SRI VENKATESWARA UNIVERSITY

B.Sc. DEGREE COURSE IN MATHEMATICS

II-SEMESTER - W.E.F. 2023-24

MODEL QUESTION PAPER

Time: 3 hours Marks: 75 marks

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer any five of the following questions in Part A.
Part B carries 50 marks. Answer any five of the following questions in Part B section.
Here Q. No. 9 & 10 from Unit – I,
Q. No. 11 & 12 from Unit – II,
Q. No. 13 & 14 from Unit – III,
Q. No. 15 & 16 from Unit – IV,
Q. No. 17 & 18 from Unit – V
Each question carries 10 Marks.

PART – A

Answer any *Five* of the following question. (5X5=25M)

1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

(P.T.O)

PART – B

Answer any FIVE from the questions. Each question carries 10 marks

(5X10= 50M)

9.	
10.	
11.	
12.	
13.	
14.	
15.	
16.	
17.	
18.