ST. JOSEPH’S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAM

II SEMESTER **MATHEMATICS**  TIME: 5HRS/WEEK

M 2302 (3) **THREE DIMENSIONAL ANALYTICAL SOLID GEOMETRY** MAX.MARKS:100

w.e.f 2020-2021(AH Batch) **SYLLABUS**

**COURSE OUTCOMES:** After successful completion of this course, the student will be able to:

* Get the knowledge of planes.
* Basic idea of lines, sphere, cone and cylinder.
* Understand the properties of planes, lines, spheres, cones and cylindres.
* Express the problems geometrically and then to get the solution.

**COURSE SYLLABUS:**

**UNIT – I**

**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 – II**

**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; The length and equations of the line of shortest distance between two straight lines; Length of the perpendicular from a given point to a given line.

**UNIT – III**

**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; Equation of a circle; Sphere through a given circle; Intersection of a sphere and a line; Power of a point; Tangent plane; Plane of contact; Polar plane; Pole of a Plane; Conjugate points; Conjugate planes.

**UNIT – IV**

**THE SPHERE AND THE CONE:**

**THE SPHERE:** Angle of intersection of two spheres; Conditions for two spheres to be orthogonal; Radical plane; Coaxial system of spheres; Simplified from of the equation of two spheres.

**THE CONE:** Definitions of a cone; vertex; guiding curve; 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.

**UNIT – V**

**THE CONE AND THE CYLINDER:**

Condition that a cone may have three mutually perpendicular generators; intersection of a line and a quadric cone; Tangent lines and tangent plane at a point; Condition that a plane may touch a cone; Reciprocal cones; Intersection of two cones with a common vertex.

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**THE CYLINDER:** Definition of a cylinder; Equation to the cylinder whose generators intersect a given conic and are parallel to a given line; Enveloping cylinder of a sphere; The right circular cylinder; Equation of the right circular cylinder with a given axis and radius. The general equation of the second degree and the various surfaces represented by it, shapes of some surfaces, Nature of Ellipsoid, Nature of Hyperboloid of one sheet.

**CO-CURRICULAR ACTIVITIES:**

Seminar/ Quiz/ Assignments/Three dimensional analytical Solid geometry and its applications/ Problem Solving.

**PRESCRIBED TEXT BOOK :** V Krishna Murthy & Others “A text book of Mathematics for BA/B.Sc Vol 1(Second Semester), Published by S. Chand & Company, New Delhi. (– 2016)

**REFERENCE BOOKS:**

1. Analytical Solid Geometry by Shanti Narayan and P.K. Mittal Published by S. Chand & Company Ltd. Seventeenth Edition.Sections :- 2.4, 2.7, 2.9, 3.1 to 3.8, 6.1 to 6.9, 7.1 to 7.8.- 2015

2. P.K. Jain and Khaleel Ahmed, “A text Book of Analytical Geometry of Three Dimensions”, Wiley Eastern Ltd., 1999.

3. Co-ordinate Geometry of two and three dimensions by P. Balasubrahmanyam, K.Y.

Subrahmanyam, G.R. Venkataraman published by Tata-MC Gran-Hill Publishers Company Ltd., New Delhi. (2000)

4. A text Book of Analytical Geometry of Three Dimensions, by P.K. Jain and Khaleel Ahmed, published by Wiley Eastern Ltd., 1999.

5. Co-ordinate Geometry of two and three dimensions by P. Balasubrahmanyam, K.Y.

Subrahmanyam, G.R. Venkataraman published by Tata-MC Gran-Hill Publishers Company Ltd., New Delhi.

6. Solid Geometry by B.RamaBhupal Reddy, published by Spectrum University Press.

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ST. JOSEPH’S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAM

II SEMESTER **MATHEMATICS**  TIME: 2 HRS./WEEK

M 2352 (2) **THREE DIMENSIONAL ANALYTICAL SOLID GEOMETRY** MAX.MARKS:50

w.e.f 2020-2021(AH Batch)  **PRACTICAL SYLLABUS**

**COURSE OUTCOMES:** After successful completion of this course, the student will be able to -

* Get the knowledge of planes.
* Basic idea of lines, sphere, cone and cylinder.
* Understand the properties of planes, lines, spheres, cones and cylinders.
* Express the problems geometrically and then to get the solution.

**COURSE SYLLABUS:**

**UNIT – I: 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; Problem solving method

**UNIT – II: 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; The shortest distance between two lines; The length and equations of the line of shortest distance between two straight lines; Length of the perpendicular from a given point to a given line; Problem solving method

**UNIT – III: 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; Equation of a circle; Sphere through a given circle; Intersection of a sphere and a line; Power of a point; Tangent plane; Plane of contact; Polar plane; Pole of a Plane; Conjugate points; Conjugate planes; Problem solving method

**UNIT – IV: The Sphere and the Cone:**

**The Sphere:** Angle of intersection of two spheres; Conditions for two spheres to be orthogonal; Radical plane; Coaxial system of spheres; Simplified from of the equation of two spheres; Problem solving method

**The Cone:** Definitions of a cone; vertex; guiding curve; 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; Problem solving method.

**UNIT – V**

**The Cone and the Cylinder:**

**The Cone(Continuation):**Condition that a cone may have three mutually perpendicular generators; intersection of a line and a quadric cone; Tangent lines and tangent plane at a point; Condition that a plane may touch a cone; Reciprocal cones; Intersection of two cones with a common vertex; Problem solving method

**The Cylinder:** Definition of a cylinder; Equation to the cylinder whose generators intersect a given conic and are parallel to a given line; Enveloping cylinder of a sphere; The right circular cylinder; Equation of the right circular cylinder with a given axis and radius. The general equation of the second degree and the various surfaces represented by it, shapes of some surfaces, Nature of Ellipsoid, Nature of Hyperboloid of one sheet; Problem solving method

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Company Ltd. Seventeenth Edition.Sections :- 2.4, 2.7, 2.9, 3.1 to 3.8, 6.1 to 6.9, 7.1 to 7.8.

- 2015

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Subrahmanyam, G.R. Venkataraman published by Tata-MC Gran-Hill Publishers Company Ltd.,New Delhi.

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