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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|--------------------|
| Lecture Plan                                                                                                                                                                                                                                                                                                                    |                      |                    |
| Name of the College: Government College of Arts, Science and Commerce, Sanquelim-Goa                                                                                                                                                                                                                                            |                      |                    |
|                                                                                                                                                                                                                                                                                                                                 |                      |                    |
| Name of Faculty: Ms. Tabsum B                                                                                                                                                                                                                                                                                                   | Subject: Mathematics |                    |
|                                                                                                                                                                                                                                                                                                                                 |                      |                    |
| Paper code: MAT-308 -Analytical 3D Geometry                                                                                                                                                                                                                                                                                     | Program: B.Sc.       | Division: -        |
|                                                                                                                                                                                                                                                                                                                                 |                      |                    |
| Academic year: 2026-27                                                                                                                                                                                                                                                                                                          | Semester: V          | Total Lectures: 30 |
|                                                                                                                                                                                                                                                                                                                                 |                      |                    |
| Course Objectives:<br>To make students explore the principles of coordinate geometry, focusing on planes, lines, spheres, cones, cylinders and conicoids.                                                                                                                                                                       |                      |                    |
|                                                                                                                                                                                                                                                                                                                                 |                      |                    |
| Expected Course Outcome:<br>1) Define terms and explain concepts related to 3D Geometry<br>2) EUnderstand the properties of straight lines, spheres, cones and cylinders.<br>3) Establish various properties and results on conicoids.<br>4) Develop analytical skills in solving geometric problems.                           |                      |                    |
|                                                                                                                                                                                                                                                                                                                                 |                      |                    |
| Student Learning Outcome: Student will be able to<br>1) Define and explain fundamental concepts of 3D Geometry and understand the properties of straight lines, spheres, cones, and cylinders.<br>2) Establish various properties and results on conicoids and develop analytical skills in solving complex geometric problems. |                      |                    |
|                                                                                                                                                                                                                                                                                                                                 |                      |                    |

| Month    | Lecture From | Lecture To | No. of lectures allotted | Topic, Subtopic to be covered                                                                                                                                                               | Exercise/ Assignment | ICT Tools       | Reference books                                                                                      |
|----------|--------------|------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------|------------------------------------------------------------------------------------------------------|
|          |              |            |                          |                                                                                                                                                                                             |                      |                 |                                                                                                      |
| July/Aug | 28/07/2026   | 31/07/2026 | 2                        | The Plane Section 2.1<br><br>Section 2.2, General equation of first degree, Normal form and transformation of general equation to normal form, Direction cosines of the normal to the plane |                      | Chalk and Board | Shanti Narayan, Dr. P.K. Mittal, Analytical Solid Geometry S. Chand Publications (Sixteenth Edition) |
|          |              |            |                          |                                                                                                                                                                                             |                      | Chalk and Board | Shanti Narayan, Dr. P.K. Mittal, Analytical Solid Geometry S. Chand Publications (Sixteenth Edition) |
| August   | 03/08/2026   | 08/08/2026 | 2                        | Angle between the planes, Determination of the planes under given conditions, Length of the perpendicular from a point to a plane.                                                          |                      | Chalk and Board | Shanti Narayan, Dr. P.K. Mittal, Analytical Solid Geometry S. Chand Publications (Sixteenth Edition) |
| August   | 10/08/2026   | 15/08/2026 | 2                        | Representation of line, Equation of line through a given point in given direction, Equation of line through two points,                                                                     |                      | Chalk and Board | Shanti Narayan, Dr. P.K. Mittal, Analytical Solid Geometry S. Chand Publications (Sixteenth Edition) |

|           |            |            |   |                                                                                                                                        |  |                 |                                                                                                      |
|-----------|------------|------------|---|----------------------------------------------------------------------------------------------------------------------------------------|--|-----------------|------------------------------------------------------------------------------------------------------|
| August    | 17/08/2026 | 22/08/2026 | 2 | Transformation from the unsymmetrical to the symmetrical form, Angle between line and a plane, Conditions for a line to lie in a plane |  | Chalk and Board | Shanti Narayan, Dr. P.K. Mittal, Analytical Solid Geometry S. Chand Publications (Sixteenth Edition) |
| August    | 24/08/2026 | 29/08/2026 | 2 | Shortest distance between two lines. Length of the perpendicular from a point to a line                                                |  | Chalk and Board | Shanti Narayan, Dr. P.K. Mittal, Analytical Solid Geometry S. Chand Publications (Sixteenth Edition) |
|           | 31/08/2026 | 05/09/2026 | 2 | Equation of a Sphere, General equation of a Sphere                                                                                     |  | Chalk and Board | Shanti Narayan, Dr. P.K. Mittal, Analytical Solid Geometry S. Chand Publications (Sixteenth Edition) |
| September | 07/09/2026 | 12/09/2026 | 2 | Sphere through four given points, Plane section of a Sphere                                                                            |  | Chalk and Board | Shanti Narayan, Dr. P.K. Mittal, Analytical Solid Geometry S. Chand Publications (Sixteenth Edition) |
| September | 14/09/2026 | 19/09/2026 | 2 | Ganesh Chaturthi Break (14–19 Sep)                                                                                                     |  |                 |                                                                                                      |
| September | 21/09/2026 | 26/09/2026 | 2 | Definition, Equation of a Cone with conics as guiding curve, The Right Circular Cone                                                   |  | Chalk and Board | Shanti Narayan, Dr. P.K. Mittal, Analytical Solid Geometry S. Chand Publications (Sixteenth Edition) |
| Sept/Oct  | 28/09/2026 | 03/10/2026 | 2 | Definition, equation of a right circular cone, The Cylinder: Definition, Equation of a Cylinder                                        |  | Chalk and Board | Shanti Narayan, Dr. P.K. Mittal, Analytical Solid Geometry S.                                        |

|         |            |            |   |                                                                                                                                                             |  |                       |                                                                                                                      |
|---------|------------|------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------|----------------------------------------------------------------------------------------------------------------------|
|         |            |            |   |                                                                                                                                                             |  |                       | Chand Publications<br>(Sixteenth Edition)                                                                            |
| October | 05/10/2026 | 10/10/2026 | 2 | Definition, Equation of a Right<br>Circular Cylinder.                                                                                                       |  | Chalk<br>and<br>Board | Shanti Narayan, Dr.<br>P.K. Mittal, Analytical<br>Solid Geometry S.<br>Chand Publications<br>(Sixteenth Edition)     |
| October | 12/10/2026 | 14/10/2026 | 2 | The general equation of the second<br>degree, Shapes of some surfaces:<br>The Ellipsoid, The Hyperboloid of<br>one sheet, The Hyperboloid of two<br>sheets. |  | Chalk<br>and<br>Board | Shanti Narayan, Dr.<br>P.K. Mittal,<br>Analytical Solid<br>Geometry S. Chand<br>Publications<br>(Sixteenth Edition). |

**\* Assessment Rubrics**

| Component            | Max Marks |
|----------------------|-----------|
| ISA 1                | 5         |
| ISA 2                | 5         |
| Practical            | Nil       |
| Project              | Nil       |
| Semester End<br>Exam | 40        |