



United International University
School of Science and Engineering

Assignment- 01 Trimester: Summer 2024

Course Title: Coordinate Geometry and Vector Analysis

Course Code: Math 2201

1. $\mathbf{v} = (2, 7)$, $\mathbf{e}_1 = (\frac{1}{2}, \frac{\sqrt{3}}{4})$ and $\mathbf{e}_2 = (\frac{2}{3}, \frac{\sqrt{5}}{3})$. Find the scalar components of \mathbf{v} along \mathbf{e}_1 and \mathbf{e}_2 and the vector components of \mathbf{v} along \mathbf{e}_1 and \mathbf{e}_2 .
2. Determine whether the vectors $\mathbf{u} = \hat{i} - 5\hat{j} + 2\hat{k}$, $\mathbf{v} = \hat{i} + 3\hat{j} - \hat{k}$ and $\mathbf{w} = 4\hat{i} - 3\hat{j} + 2\hat{k}$ lie in the same plane.
3. Let L_1 and L_2 be the lines.
$$L_1: x = 1 + 2t, y = 3 + t, z = 1 + t$$
$$L_2: x - 2 = 8t, y - 2 = 5t, z - 4 = 2t$$
 - a. Are the lines parallel?
 - b. Do the lines intersect?
 - c. Find the distance between the lines if possible.
4. Determine the line $x = 2 - t, y = 3 + t, z = t$ is parallel to the plane $2x + y + z = 1$.
5. Find the acute angle between two planes
$$3x - 2y + z = 5,$$
$$x + 6y - 2z - 4 = 0$$
6. Find the parametric equations of line passing through the point [2]
P (-1, 4, 8) and Q (2, 7, 0).
7. Find the projection of \mathbf{v} on \mathbf{b} and the vector component of \mathbf{v} orthogonal to \mathbf{b} where $\mathbf{v} = -3\hat{i} - 2\hat{j}$, $\mathbf{b} = 2\hat{i} + \hat{j}$.