Subject: CAD (3161903) **Sem.: 6th Sem.** **Year: 2023-24**

Assignment 2 Curves and Surfaces_CO2

1. Develop the parametric equations for i) line ii) Circle iii) Ellipse.
2. Parametric generation of circle, ellipse, parabola and hyper bola.

   Take,

   a = 2 to 5, b = 1 to 7,

   Xmax = 2 to 10 units,

   Ymin = 1 to 6 units.
3. Derive from fundamentals the parametric equation for the Hermite Cubic spline. Represent the equation in matrix form.
4. Briefly discuss about B-spline curve and Bezier curve.
5. A Bezier curve is to be constructed using control points P_0 (35, 30), P_1 (25, 0), P_2 (15, 25) and P_3 (5, 10). The Bezier curve is anchored at P_0 and P_3. Find the equation of the Bezier curve and plot the curve for u= 0, 0.2, 0.4, 0.6, 0.8 and 1.
6. Generate a Bezier curve using the following control points:

   (2, 0), (4, 3), (5, 2), (4, -2), (5, -3) and (6, -2)
7. Explain the following surfaces**,**

   i) Patch ii) Ruled iii) Coons iv) Bezier surface v) B-spline surfaces vi) Surface of revolution vii) Tabulated surface

8*. Solve any one curve out of analytical or synthetic curve using MS Excel.

* Challenge question (It is not compulsory for all)

Learning Questions (No need to write):

8. List the advantages and limitations of surface modeling.
9. Explain analytic curves and synthetic curves with example.
10. Write a note on Explicit non-parametric representation.
11. Explain Bezier curve along with its properties.

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12. The end points for line L_1 are P_1 (5, 7, 9) and P_2 (6, 8, 2). Determine (a) the parametric equation of the line (b) tangent vector of the line (c) Length of the line.
13. Compare explicit and implicit non parametric representation of curve. Explain the parametric representation of a curve and its advantages over nonparametric representations with suitable example.
14. The vertices of a Bezier polygon are: (2, 2), (3, 4), (4, 4) and (5, 4) respectively. Determine four points on Bezier Curve.

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