

## BS (4 Years) for Affiliated Colleges



Code	Subject Title	Cr. Hrs	Semester
<b>MATH-429</b>	<b>Theory of Approximation and Splines - II</b>	<b>3</b>	<b>VIII</b>
Year	Discipline		
<b>4</b>	<b>Mathematics</b>		

### Objectives:

#### Parametric Curves (Scalar and Vector Case)

- Cubic algebraic form
- Cubic Hermite form
- Cubic control point form
- Bernstein Bezier cubic form
- Bernstein Bezier general form
- B-Spline cubic form
- Matrix forms of parametric curves
- Rational quadratic form
- Rational cubic form
- Tensor product surface, Bernstein Bezier cubic patch, quadratic by cubic Bernstein Bezier patch, Bernstein Bezier quartic patch
- Convex hull property
- Affine invariance property
- Variation diminishing property
- Algorithms to compute Bernstein Bezier form

#### Spline Functions

- Introduction to splines
- Cubic Hermite splines
- End conditions of cubic splines: clamped conditions, natural conditions, 2nd Derivative conditions, periodic conditions, not a knot conditions
- General Splines: natural splines, periodic splines
- Truncated power function, representation of spline in terms of truncated power functions, examples

### Recommended Books:

- Gerald Farin, Curves and Surfaces for Computer Aided Geometric Design: A Practical Guide, 5th edition (Academic Press. Inc., 2002).
- I. D. Faux, Computational Geometry for Design and Manufacture, (Ellis Horwood, 1979).
- Richard H. Bartels, John C. Beatty, and John C. Beatty, An Introduction to Spline for use in Computer Graphics and Geometric Modeling, (Morgan Kaufmann Publisher, 2006).
- Carl de Boor, A Practical Guide to Splines, (Springer Verlag, 2001).
- Larry L. Schumaker, Spline Functions: Basic Theory, (John Wiley and Sons, 1993).