Module Code	MATH-428
Module Title	**Theory of Approximation and Splines - II**
Module Rating	3 Cr. Hours
Pre-requisites	Theory of Approximation and Splines - I

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

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