NURBS: Non-Uniform Rational B-splines – CSE579

Text: **NURB curves and surfaces**, by G. Farin, AK Peters, Boston, 1999.

Coordinator: Gerald Farin, professor

Prerequisite by Topic: Basic computer graphics skills, linear algebra and calculus skills, familiarity with fundamental concepts of Curve and Surface Modeling.

Goals: This course presents the theory of NURBS. These are a recent way of describing curves and surfaces in a CAD/CAM environment and are rapidly gaining importance in that community. After completion of the course, students will have a thorough understanding of the principles underlying geometric modeling using rational curves and surfaces. Because of the NURBS impact on the CAD/CAM industry, knowledge gained in this course should be beneficial in the job market.

Prerequisites: CSE477, CSE470

Topics:

- The Projective Plane (3)
- Projective Maps (2)
- Conics (5)
- Conic Splines (3)
- Rational Bézier Curves (5)
- Rational Cubics (3)
- Projective Splines (3)
- Rational B-splines (4)
- Rectangular Patches (5)
- Rational Bźier Triangles (4)
- Quadrics (3)

- Gregory Patches (2)
- Examples and Standards (3)

Assignments: There will be four programming projects and four homework projects, each counting equally towards your grade.