ME 661 Computer Aided Engineering Design (3-0-0-6)

Computer graphics fundamentals: Transformations, projections; Parametric curves: Differential geometry of curves, Hermite (PC), Bezier and B-Spline curves; Parametric surfaces: Differential geometry of surfaces, differential geometry of ruled and developable surfaces, Ferguson, Coon's, Bezier and B-Spline surface patches, sweep and cylindrical surfaces, composite surface; Representation of solids: Cellular decomposition models, *b*-rep and CSG models, parametric instancing and sweep; CG, mass & geometrical properties; Data transfer; CAD for FEA, design optimization and CAM; Recent trends: Reverse engineering and rapid manufacturing.

References:

[1] D. F. Rogers and J. A. Adams, *Mathematical Elements of Computer Graphics*, 2nd ed., Mc Graw Hill, 1990.

[2] M. E. Mortenson, *Geometric Modeling*, John Wiley & Sons, 1985.

[3] M. E. Mortenson, *Mathematics for Computer Graphics Applications*, 2nd ed., Industrial Press, 1999.

[4] D. L. Ryan, *Computer-Aided Graphics and Design*, Marcel Dekker Inc, 1994.

[5] K. Lee, *Principles of CAD/CAM/CAE systems*, Addison Wesley, 1999.

[6] I. Zied, *CAD/CAM Theory and Practice*, Tata McGraw Hill, 2000.