ME 560 - Kinematics
Fall Semester 1994

1993-95 Catalog Data:	ME 560 Kinematics. Sem. 1. Class 3, Credit 3 (el). Prerequisite: ME 352 or ME 360. Geometry of constrained plane motion with applications to linkage design. Type and number synthesis, size synthesis. Path curvature, inflection circle, cubic of stationary curvature. Finite displacements, three and four separated positions. Graphical, analytical, and computer techniques.
Textbook:	A. S. Hall, Jr., *Kinematics and Linkage Design*, Waveland Press, 1986.
References:	R. S. Hartenberg and J. Denavit, *Kinematic Synthesis of Linkages,* McGraw-Hill Co., 1964.
Coordinator:	G. R. Pennock, Associate Professor of M.E.
Goals:	This course provides students with a basic understanding of the kinematics of linkages and the design of planar mechanisms.

Prerequisites by Topic:

1. Displacement, Velocity, and Acceleration of planar mechanisms.
2. Instant Centers of Velocity.
3. Kinematics of a Point Path.
4. Three Position Synthesis.

Topics:

1. Introduction to Mechanisms. Analysis and Synthesis. (3 classes)
2. Vector Loops and Complex Number Methods. (3 classes)
3. Velocity and Acceleration Analysis. (3 classes)
4. Infinitisimal Displacements. Graphical Techniques. Path Curvature. (3 classes)
5. Inflection Circle. Cubic of Stationary Curavture. (6 classes)
6. Finite Displacements. Graphical and Analytical Methods. (3 classes)
7. Two, Three, and Four Separated Positions. (6 classes)
8. Analytical Linkage Design. Computer Techniques. (3 classes)
9. Tests (one midterm, one final).

Computer Usage:

Each student must write and run a computer program, in Fortran 77 or C, to solve one or two homework assignments.

Nature of Design Content:

The kinematic synthesis of planar mechanisms. The design of linkages based on the geometry of constrained rigid body motion. Design of Four-bar mechanisms for coordinated motion of the cranks. Numerous fields of engineering require automatic machinery as well as complicated instruments and other apparatus, the creation of which requires not only great ingenuity, but also a thorough knowledge of mechanical principles. In this respect, one of the foremost and fundamental branches of engineering science is the science of kinematics and mechanisms, without which the creation of such devices can hardly be attempted.

ABET category content as estimated by faculty member who prepared this course description:

Engineering Science: 2 credits or 66%
Engineering Design: 1 credits or 33%

Prepared by: ________________________________ Date: September 1994
G. R. Pennock