Course Description:

The objective of this course is to provide educational experience in the study of Computer Aided manufacturing (CAM), which includes 2D and 3D geometry construction, integration of CAD and CAM, 2D and 3D tool path, CNC code generation and role of CAM in the production of the materials. The overall objective of this course is to give students a solid grounding in the basics of computer-aided manufacturing, and application of Mastercam software.

Course objectives:

1. Develop a basic understanding of an integrated manufacturing system in order to optimize the overall effectiveness of the production.
2. Solve problems associated with the operation and set-up of CNC mill and lathe machines.
3. Identify terms and definitions related to computer-aided manufacturing.
4. Display a satisfactory level of competence in generating 2D and 3D construction and toolpath.
5. Be familiar with the process and operation of Mastercam software.

Expected Learner Outcomes:

1. Demonstrate safe and correct operation of CNC machine when creating a G-code program using CAD/CAM software.
2. Ability to solve problems related to creating geometry, toolpath and G-code program.
3. Demonstrate understanding of solid modeling and surface toolpath.

Student Assignment and Late Work:

Each student is expected to maintain a class/lab notebook, which will include notes assignments and handouts. The notebook will be an integral part of the course and will
contain information necessary for the satisfactory completion of the course. In the event of absences or tardies the student will be expected to contact a class member for the assignment. IT WILL BE YOUR RESPONSIBILITY TO MAKE UP AND TURN IN ALL COURSE ASSIGNMENTS. Course assignments will become due on the date specified. Late assignment will receive a late grade.

Counseling and Special Assistance:

Instructor will be available prior to and after each class session as time permits and during the posted office hours. Every effort will be made to assist students in the successful completion of the course. However, the responsibility for completion rests with the student. Time organization and study habits should be developed and maintained throughout the course.

Class Attendance:

The course grade will be affected by the student's full time attendance. Tardies are annoying and disruptive and will be kept to a minimum. Each class meeting will begin promptly and each student is expected to exercise courtesy and discretion in the event of unavoidable tardies and absence. The course grade will be affected after two unexcused absents. Three tardies will equal to an unexcused absent. Maximum grade reduction due to tardies and absence would not exceed a letter grade.

Grading Procedure and Examinations:

Presentations and papers will be graded using the following reference criteria: content organization, accuracy and neatness. Exams and projects will be graded on a percentage basis as follows: 90-100% = A 80-89% = B 70-79% = C 60-69% = D and 59% or below = F. The semester grade will include a composite of papers, presentations, projects, class participation and attendance.

Safety Training:

Course 1: Orientation to laboratory safety: EOS-OLS is a mandatory requirement to be taken online using Blackboard. The module should be completed by the 20th class day. If the requirement is not completed you will not be able to participate in lab-base activities in this course.

Text:

Course Outline:

1/25  Introduction.

2/1   G-code programming, Mastercam environment.

2/8   Introduction to Mastercam, 2D Geometry commands.

2/15  Introduction to 2D geometry, 2D geometry construction.

2/22  Modify existing geometry, 2D toolpath generation.

3/1   Contour toolpath, Pocket and drill toolpath.

3/8   Test, Engraving and letters.

3/15  Project, Introduction to 3D wire frame.

3/22  Spring Break.

3/29  Constructing 3D wire frame, Introduction to surface modeling.

4/5   Surface modeling construction, 3D toolpath using surface.

4/12  Solid modeling construction, Rough surface toolpath.

4/19  Finish surface toolpath, Creating part geometry for lathe.

4/26  Lathe geometry project, Lathe Job setup and tool definition.

5/3   Review test.

5/10  Review for the final.