Department:

Engineering Graphics and Technologies

Course Description:

This course instructs the concepts and capabilities of Computer Numeric Control machine tools. Topics to include Computer Aided Drafting and Computer Aided Machining (CAD/CAM) integration, tooling processes, machine setup, machine controller operation, and the basic applications. Upon completion students should be able to integrate Computer Aided Drafting to Computer Aided Machining in both 2D and 3D milling and lathe, generate geometry and setup Computer Numeric Control processes using Mastercam software, apply tooling setup and operation, understand the Post Processor, and operate a Computer Numeric Control machine.

Course Competencies:

Upon completion of the course, the student should be able to:

1. Appreciate and apply all personal and work place safety procedures.
2. Perform machine tool related mathematical calculations.
3. Demonstrate an understanding of different types of machine control and processes.
4. Demonstrate skill in job process planning.
5. Apply Computer Aided Drafting data, profiles, 2D vector paths, and 3D contours.
6. Identify and understand a basic programming code, tool path modifications, and verification.
7. Identify and understand Post Processors and the operation.
8. Demonstrate machine operation.

Course Content:

A. Mastercam Interface
B. Coordinate System
C. Computer Aided Drafting and Computer Aided Machining Math
D. Creating Geometry, Lines, Arcs, Circles
E. Modifying Geometry, Trim, Extend, Xform
F. Stock Setup, Tooling, Tooling Metrology, and Tool Tables
G. Backplot and Verify
H. Multi Passes and Depth of Cuts
I. Work Coordinate Systems
J. Post Processor, Mach 3
K. Machine Setup, Maintenance, Safety
L. Material Fixtures and Hold Downs
M. Machine Operation

Learning Assessments:

Competencies will be assessed by chapter tests, problems and assignments, class participation, quizzes, and a comprehensive final exam.

Instructional Materials:

Textbooks: Gizelbach, R. A. (2009). *CNC Machining Fundamentals and Applications*. Tinley Park, IL: Goodheart-Willcox. ISBN-13: 978-1590707906

Manton, M. & Weidinger, D. (2011). *Mastercam X6 Training Guide: Mill 2D & 3D*. Caminstructor Inc. ISBN-13: 978-1927359020

Manton, M. & Weidinger, D. (2011). *Mastercam X6 Training Guide: Lathe*. Caminstructor Inc. ISBN-13: 978-1927359037

Guidelines for Requesting Accommodations Based on Documented Disability or Medical Condition

It is the intention of Highland Community College to work toward full compliance with the Americans with Disabilities Act, to make instructional programs accessible to all people, and to provide reasonable accommodations according to the law.

Students should understand that it is their responsibility to self-identify their need(s) for accommodation and that they must provide current, comprehensive diagnosis of a specific disability or medical condition from a qualified professional in order to receive services. Documentation must include specific recommendations for accommodation(s). Documentation should be provided in a timely manner prior to or early in the semester so that the requested accommodation can be considered and, if warranted, arranged.

In order to begin the process all students **must** complete the "Disabilities Self-Identification Form" on our Disability Services website.

This form can also be accessed at the Highland Community College homepage under Students Services/Student Resources/Disability Service or by contacting the Disabilities Coordinator.

A Note on Harassment, Discrimination and Sexual Misconduct

Highland Community College seeks to assure all community members learn and work in a welcoming and inclusive environment. Title VII, Title IX, and College policy prohibit harassment, discrimination and sexual misconduct. Highland Community College encourages anyone experiencing harassment, discrimination or sexual misconduct to talk to report to the Vice President for Student Services, the Human Resources Director or complete an online report about what happened so that they can get the support they need and Highland Community College can respond appropriately.

There are both confidential and non-confidential resources and reporting options available to you. Highland Community College is legally obligated to respond to reports of sexual misconduct, and therefore we cannot guarantee the confidentiality of a report, unless made to a confidential resource. Responses may vary from support services to formal investigations. As a faculty member, I am required to report incidents of sexual misconduct and thus cannot guarantee confidentiality. I must provide our Title IX coordinator with relevant details such as the names of those involved in the incident. For more information about policies and resources or reporting options, please review our Equity Grievance Policy.