

Course Syllabus – MFG202

07/19/21

Course Identification -

Course Number - MFG 202 Course Title – Advanced CNC Credit Hours - 6.0
Meeting Times - 1:00P - 2:15 lecture, Lab 2:30 – 5:40
Meeting Days – Lecture 3981 & Lab 3985 Tuesday & Thursday
Location – CTR211 (Labs BTC 105)

Instructor Information -

Instructor's Name – Robert Tosch
Office Location - Rm. 103D BTC
Office Hours - 8:00A – 12:00 Monday
Phone Number - (989) 358-7421 Email: Toschr@alpenacc.edu

Course Materials -

Complete EDM handbook: Carl Sommer, Steve Sommer
Second Edition, Technical Advance Publishing Company 2005

Course Description and Prerequisites -

Course Description – This is a follow-up course for MFG 201 Introduction to CNC and MFG 204 Computer Aided Manufacturing courses. Students will learn how to set up and run various types of computer numerical control machines and associated tooling, as well as CMM inspection of the finished parts. The student will also use machine conversational controls and CAD/CAM to create CNC programs, master records and inspection sheets
Prerequisites – MTH 110 & MFG 201 or permission of instructor.

Cell Phone rules

Cell phones are to be turned off or to silent mode during class.
Texting during class is strictly forbidden. This includes the lab portion of class.

Course Instructional Objectives/Core Competencies -

Objectives - Instructional objectives define the scope of the knowledge, attitude and skills which students are expected to acquire for successful completion of the course.

- SAFELY run various CNC machines
- PLAN AN EMERGENCY CRASH PROCEDURE
- TEST (DRY RUN) THE PROGRAM
- TEST THE SET-UP.
- STAY ALERT AND MONITOR THE SET-UP AND RUN.
- Set proper tooling offset for different types of machines
- Understand the steps necessary to setup & run CNC mills, lathes & Wire EDM machines.
- Develop a CNC job package to produce a part.
- Transfer code from the DNC system to a CNC machine control.
- Produce a part using a complete CAM program on a CNC mill, lathe & wire EDM to design tolerances.
- Explain and document setup procedures for CNC lathes, wire EDM and mills.
- Perform set-up procedures on CNC machines.
- Explain and demonstrate height compensation, cutter compensation, and tooling offset.
- Explain and document setup procedures for CNC lathes, wire EDM and mills.

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Core Competencies - This course contributes to the development of the following core competencies basic to all associate degree students:

II How to solve problems: Students will be able to identify a problem, to collect & analyze information, develop & apply machining strategies, & evaluate outcomes. The student will given a part print to collect & analyze to proper machine procedures to set up & run a CNC programs.

III. How to use mathematical concepts: Students can understand & use concepts of mathematics appropriate to their chosen program of study.

IV. How to communicate effectively: Students will read blueprints & interpret information to set up & run a CNC program, produce a CNC program & package.

Activity/Reading Schedule – Lectures

Introduction-12 – 14 Jan.

DNC operations

Predator operations

Fanuc WEDM

WEDM Setup & operation

WEDM Machine controls

Wire alignment

- 1) HAAS Turning center 19 – 21 Jan.
 - A. Machine controls
 - B. Tooling set up
 - C. Tool offsets
- 2) Fadal VMC-26 – 28 Jan
 - A. Machine controls
 - B. Tooling set up
 - C. Tool offsets
- 3) **Chapter 2** Fundamentals of wire EDM 2 Feb
 - A. Step by step EDM process
 - B. Three type of WEDM
 - C. Complete cycle
 - D. Thread Mill
- 4) **Chapter 3** Profiting with Wire EDM 4 Feb.
 - A. Advantages of Wire EDM
 - B. Haas Quick Code
 - C. **Home Work CH 2: 1-4, 8, 12-17, 21, 23**
 - D. **Home Work CH 3: 2, 6, 8-9, 11-12**
- 5) **Chapter 4** Proper procedures 9 Feb.
 - A. Edge preparation
 - B. Starter holes
 - C. Layout
 - D. G84.1 rigid Tapping
 - E. **Home Work CH 4: 2, 5-8**
- 6) **Chapter 5** Understanding the WEDM process 11 Feb.
 - A. Wire path
 - B. Skim cutting
 - C. **Chapter 6** reducing costs
 - D. **Home Work CH 5: 1, 6-7, 14, 20-22**
 - E. **Home Work CH 6: 1-7**

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- 7) **Chapter 7** Advantages of using Wire EDM for die making 16 Feb
 - A. WEDM fixtures & tooling
 - B. **Chapter 7** Wire EDMing punch & die sections
 - C. **Chapter 8** One piece Stamping dies
 - D. **Home Work CH 7: 8, 9, 11**
 - E. **Home Work CH 8: 2, 3, 5**
- 8) **TEST #1 WEDM Operations** 18 Feb.
- 9) **No Class Spring Break** 22 Feb – 26 Feb
- 10) CMM programming-1 - 3 March
 - A. Alignment Features
 - B. Geometric Elements
 - C. Measuring Features
 - D. Planning a Part Program
- 11) Design Economics-8 Mar
 - A. Design Economy
 - B. Comparative Analysis
- 12) Background of ISO 9000 Mar. 10 – 15 Mar.
 - A. Objective of ISO 9000
 - B. Requirements of ISO 9000
- 13) Center line shift in fixture design 17 Mar.
- 14) Clamping forces-22 Mar.
- 15) **TEST #2 Machine operation & Quality Control** 24 Mar.
- 16) **EASTER BREAK-NO CLASS** 29 Mar.
- 17) **Part 6** Production systems 31 Mar, 5 & 7 April.
 - A. Lean production
 - B. **Part 8** Quality
 - C. **Part 9** Manufacturing management
- 18) Set-up reduction-12 – 14 April
- 19) Preventive Maintenance 19 – 21 April
 - A. Wire EDM
 - B. Haas Lathe
 - C. Fadal VMC-
 - D. Anilam
- 20) Tour & Lab Cleanup day 26-28 April
- 21) **Final Exam** Machine Maintenance & Quality Systems 3 May

Make-up and Late Paper Work Procedures -

Assignments have a due date & are due at the end of class on the due date. .

Late Assignments – For each class day after the due date, the grade will be reduced by 20%. The assignment will not be accepted after the assignments have been returned to the class.

Grading Procedure -

Several quizzes and exams will be given for 30% of the grade. Homework will equal 20% of the grade & Lab assignments will equal 50% of the grade.

Scores on exams, quizzes, lab assignments and homework will be use to compute the final course grade.

A = 100 - 95%

A- = 94 - 90%

B+ = 89 - 87%

B = 86 - 84%

B- = 83 - 80%

C+ = 79 - 77%

C = 76 - 74%

C- = 73 - 70%Note: grades below this level may result in loss of financial aid or academic

probation

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D+	= 69 - 67%
D	= 66 - 64%
D-	= 63 - 60%
E	= BELOW 59

Ethics Policy -

Disruptive Conduct - Student behavior that is detrimental to an environment conducive to learning or to the maintenance of a reasonable level of order on the campus or in the classroom shall be considered disruptive conduct. Students involved in disruptive conduct will be subject to disciplinary action as outlined in the handbook and which includes suspension or dismissal.

Dishonest Scholarly Practices - Dishonest scholarly practices include, but are not necessarily limited to taking, using, or copying another's work and submitting it as one's own, intentionally falsifying information or taking another's ideas with the intention of passing ideas in class as one's own.

Consequences for proven cases of dishonest scholarly practices: The course instructor will determine the appropriate penalty for proven cases of dishonest scholarly practice in their classes.

Minimum penalties will be:

The first offense may result in an equivalent grade of "E" being given for the particular test, project, paper, course, etc. on which the cheating has occurred. The instructor may require the student to demonstrate mastery of the objectives for the particular test, project, paper, course, etc.; the grade will remain as "E."

The second offense (two total offenses, not necessarily in one course) will result in the student being assigned a failing grade for the course in which the second offense occurred.

Any student involved in three total offenses (not necessarily in one course) will be immediately dismissed from the college for one full academic semester.

Additional Resource Materials -

Smid, Peter. *CNC Programming Handbook (CNC)*, Third Edition, Industrial Press, Inc., 2007.

Student Work -

Student work such as quizzes and assignments will be returned to the student as soon as possible. Tests will be reviewed in class, but will not be returned.

Non-Scheduled Laboratory Work -

Non-scheduled lab work must be coordinated with the instructor. All lab assignments must be accomplished in the ACC Machine Shop.

Withdrawal -

A course may be dropped any time through the **10th week** of the semester. (Oct 30)

GENERAL COLLEGE INFORMATION

Available Assistance: Should a student encounter difficulty with any of the concepts covered in this course or otherwise require outside resources and/or expertise, assistance is available from the following: Student Services Center, Van Lare Hall 101: Contact Yvonne White at 989.358.7270.

Free tutoring is available to all students in the areas of basic composition, reading, numerical, and study skills. The Student Services Center also offers students access to computers, printers, and various resources.

Workshops are put on throughout the semester to support students with topics such as: Effective Study Habits, Conducting Research, APA & MLA formatting, Understanding your Degree Requirements, Applying for Scholarships, etc.'

Testing Center, Van Lare Hall 122: Contact Kim Montague at 989.358.7209.

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Students may be asked to take make-up tests in the ACC Testing Center. ALL students must provide Testing Center Staff with a photo ID prior to testing. Please anticipate your testing needs and allow enough time for testing. Making an appointment will ensure you have a spot reserved to take your test.

Class Cancellations: If the College alters its normal operating schedule, a message is sent to the local news media and is recorded on the ACC phone system (1-888-468-6222). When possible the message is included on the college's homepage (www.alpenacc.edu).

SchoolMessenger Alpena Community College has signed on with *SchoolMessenger*, a service that provides alert notifications of emergency broadcasts, weather delays and cancellations, and course instructor cancellations, to subscribers via SMS text messaging and/or email. Students can opt-in anytime by texting **OPTIN** to the number 68453; students who successfully enrolled in the service will receive the following message: “You are registered to receive approx 3 msg/mo. Text STOP to quit, HELP for help.” **myacc.alpenacc.edu** E-mail accounts are provided to every student. **Official correspondence from the College will be sent to this account. Students are responsible for the information received and will need to monitor their account on a regular basis.** If you need help or have questions regarding your account, please contact the ACC help desk at 989.358.7374 or helpdesk@alpenacc.edu. You will no longer be able to change your email address in Web Advisor.

Office 365 is free for all ACC students. Learn more on the College’s website at www.alpenacc.edu.

Americans with Disabilities Act: It is the policy of Alpena Community College (ACC) to comply with Section 504 of the Rehabilitation Act of 1973, as amended, and with the Americans with Disabilities Act of 1990 (ADA). These acts provide for equal opportunity for students with disabilities in educational activities, programs, and facilities. ACC is committed to affording equal opportunity to persons with disabilities by providing access to its programs, activities, and services. *It is the responsibility of the student to make known, in a timely manner, the need for any accommodation or auxiliary aids. Please contact the Dean of Students, VLH 109.* http://discover.alpenacc.edu/americans_with_disabilities_act.php

Campus Safety Policies and Procedures: Alpena Community College is committed to enhancing the safety and security of our campus communities. To this end, the College has adopted a series of Board of Trustees policies, designated as Series 7000

(http://discover.alpenacc.edu/safety/policies_and_procedures.php) designed to specifically address issues of safety and security and to comply with federal and state laws, including the following:

The Jeanne Clery Disclosures of Campus Security Policy and Campus Crime Statistics Act (The Clery Act)
The Violence Against Women Reauthorization Act of 2013, also known as Campus SAVE Act (Sexual Violence Elimination Act)

Alpena Community College is firmly committed to maintaining a campus environment free from sexual harassment and sexual violence, including domestic violence, dating violence, sexual assault, stalking, and sexual exploitation, which are collectively referred to as ‘Sexual Misconduct.’ All students should refer to the College’s Sexual Misconduct Policy – 7009 for complete definitions, policy provisions, and procedures. Policy 7009 and other important resources can be found on the College website at http://discover.alpenacc.edu/safety/sexual_misconduct.php.

Students who experience or have information regarding Sexual Misconduct are encouraged, but not required, to report it to Carolyn Daoust, Title IX Coordinator, or Nancy Seguin, Dean of Students.

The Drug-Free Schools and Campus Regulations of U.S. Department of Education More information about these laws are available at www.alpenacc.edu under the Safety Resources & Links tab. ACC has a Safety Policies and Procedures Compliance Committee, appointed by the College President. The Committee meets regularly to review policies, recommend updates and amendments, and to develop procedures and programming in support of implementation of the policies. For questions, or information, contact any committee member.

TOBACCO FREE CAMPUS: Alpena Community College has adopted a tobacco free environment on the main campus and at the Huron Shores campus. Effective August 24, 2009, all tobacco use is prohibited on any Alpena Community College properties.

Syllabus Revision/Instructor Prerogative -

- **Instructor reserves the right to add to or delete from contents as presented in course syllabus.**

ALPENA **COMMUNITY COLLEGE**

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ACC is sponsored by a \$2.5 million grant from the U.S. Department of Labor, Employment & Training Administration TAACCCT Grant #TC-26458-14-60-A-26. It is the policy of Alpena Community College (ACC) to comply with Section 504 of the Rehabilitation Act of 1973, as amended, and with the Americans with Disabilities Act of 1990 (ADA). These acts provide for equal opportunity for students with disabilities in educational activities, programs, and facilities. ACC is committed to affording equal opportunity to persons with disabilities by providing access to its programs, activities, and services.

This workforce product was funded by a grant awarded by the U.S. Department of Labor’s Employment and Training Administration. The product was created by the grantee and does not necessarily reflect the official position of the U.S. Department of Labor. The U.S. Department of Labor makes no guarantees, warranties, or assurances of any kind, express or implied, with respect to such information, including any information on linked sites and including but not limited to, accuracy of the information or its completeness, timeliness, usefulness, adequacy, continued availability, or ownership.