

Part I



North Central
MICHIGAN COLLEGE
Your growth. Our mission.

Master Course *Syllabus*

Course Name: Introduction to CNC (Computer-Numerically Controlled) Milling Operations

Course Number: CNC 100

Credit Hrs. 2 Lecture Hrs. 1 Lab Hrs. 2 Clinical Hrs. Variable Hrs.

Total Hours of Instruction: 48 Total Contact Hours: 52.8
(Total Contact Hours Formula: (lecture hrs. + lab hrs. + clinical hrs.) x 17.6)

Course Description:

Provides the opportunity for the student to develop the knowledge, skills process and understanding of safety when working with CNC (Computer-Numerically Controlled) milling machines, including basic power-up, machine controls, part set-up, tool set-up, program activation and proofing for CNC milling machines.

Course Objectives and Outcomes:

- Practice safe work habits;
- Prepare basic CNC milling machine G-code programs (follow programming protocol for specific machines, establish origin in work offset page, input tool length values, use block numbers, preparatory and miscellaneous codes, coordinate words and canned cycles);
- Explore CNC milling machine controls (load tools and tool holders, select correct work offset, select, activate, proof, and delete programs, power down equipment safely).

Satisfies Lumina Degree Qualification Profile #'s (DQP) (as approved on 04/11/12): 1,2,4,6,7,10,13,15

Reasonable accommodations can be provided for students with documented disabilities. Please contact Learning Support Services to arrange for these — (231) 348-6687 or (231) 348-6817, kflewelling@ncmich.edu, Room 533 SCRC.



Suggested Methods of Instruction: lecture, small-group discussion, powerpoint presentations, video demonstrations, hands-on lab sessions.

Suggested Methods of Evaluation: quizzes, exams, successful production of prototypes using CNC software.

Adopted Text at Time of Course Adoption/Revision: Smid, Peter. CNC Programming Handbook, 3rd ed.

Topics Covered During the Semester:

| | | | |
|--------|--|---------|------------------------------|
| Week 1 | Introduction to CNC Milling Operations | Week 9 | Basic G Code Programs |
| Week 2 | Safe Work Habits | Week 10 | CNC Milling Machine Controls |
| Week 3 | Safe Work Habits | Week 11 | CNC Milling Machine Controls |
| Week 4 | Basic G Code Programs | Week 12 | CNC Milling Machine Controls |
| Week 5 | Basic G Code Programs | Week 13 | CNC Milling Machine Controls |
| Week 6 | Basic G Code Programs | Week 14 | CNC Milling Machine Controls |
| Week 7 | Basic G Code Programs | Week 15 | CNC Milling Machine Controls |
| Week 8 | Basic G Code Programs | Week 16 | Review and Final Exam |

The Degree Qualifications Profile

Lumina Foundation, 2011

Specialized Knowledge

1. Describes the scope and principal features of the field of study, citing at least some of its core theories and practices, and offers a similar explication of at least one related field.
2. Illustrates contemporary terminology used in the field.
3. Generates substantially error-free products, reconstructions, data, juried exhibits or performances as appropriate to the field.

Broad Integrative Knowledge

4. Describes how existing knowledge or practice is advanced, tested and revised
5. Describes and examines a range of perspectives on key debates and their significance both within the field and in society.
6. Illustrates core concepts of the field while executing analytical, practical or creative tasks.
7. Selects and applies recognized methods of the field in interpreting characteristic discipline-based problems.
8. Assembles evidence relevant to characteristic problems in the field, describes the significance of the evidence, and uses the evidence in analysis of these problems.
9. Describes the ways in which at least two disciplines define, address and interpret the importance of a contemporary challenge or problem in science, the arts, society, human services, economic life or technology.

Intellectual Skills – Analytic Inquiry

10. Identifies, categorizes and distinguishes among elements of ideas, concepts, theories and/or practical approaches to standard problems.

Intellectual Skills – Use of Information Resources

11. Identifies, categorizes, evaluates and cites multiple information resources necessary to engage in projects, papers or performance in his or her program.

Intellectual Skills – Engaging Diverse Perspectives

12. Describes how knowledge from different cultural perspectives would affect his or her interpretations of prominent problems in politics, society, the arts and/or global relations.

Intellectual Skills – Communication Fluency

13. Presents accurate calculations and symbolic operations, and explains how such calculations and operations are used in either his or her specific field of study or in interpreting social and economic trends.
14. Presents substantially error-free prose in both argumentative and narrative forms to general and specialized audiences.

Applied Learning

15. Describes in writing at least one substantial case in which knowledge and skills acquired in academic settings are applied to a challenge in a non-academic setting; applies that learning to the question; and analyzes at least one significant concept or method related to his or her course of study in light of learning outside the classroom.
16. Locates, gathers and organizes evidence on an assigned research topic addressing a course-related question or a question of practice in a work or community setting; offers and examines competing hypotheses in answering the question.

Civic Learning

17. Describes his or her own civic and cultural background, including its origins and development, assumptions, and predispositions.
18. Describes diverse positions, historical and contemporary, on selected democratic values or practices, and presents his or her own position on a specific problem where one or more of these values or practices are involved.
19. Takes an active role in a community context (work, service, co-curricular activities, etc.), and examines the civic issues encountered and the insights gained from the community experience.

Adopted by CRDAP: April 11, 2012