North Central Michigan College
Master Course Syllabus

PART 1:

Course Name: Introduction to CAM Programming

Course Number: CAM 100

Credit Hrs. 1 Lecture Hrs. 1 Lab Hrs. 0 Clinical Hrs. 0 Variable Hrs. 0

Total Hours of Instruction: 1 Total Contact Hours: 17.6
(Total Contact hour's formula: (lecture hrs. + lab hrs. + clinical hrs) x 17.6)

Course Description:
Learn basic responsibilities of a CNC programmer for safety, personal accountability, communication, and process planning. Work with the CNC operator/instructor to understand challenges faced in manufacturing setup and operation. Develop a basic understanding of CAM software, G and M codes. Provide the opportunity for the student to review shop math related to programming CNC machines and creating a basic G-code program.

Prerequisite (s): ACT Math score of 17 or higher, or Compass Math score of 43 or higher or permission of instructor.
Co-requisite (s): None

Course Objectives:
Appropriate to first in sequence

- Analyze print for basic machining and part inspection.
- Comprehend process control and planning.
- Demonstrate process to create accurate geometry in the CAM software.
- Demonstrate CAM controls (assign tools and tool holders, select correct work offset, verify, edit program and power down equipment safely).
- Demonstrate applied shop math and prepare basic CNC mill G-code program. (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).

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, Room 533 SCRC.

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PART 2:

Lumina DQP outcomes and linked course objectives
(Please identify all Lumina DQP outcomes supported by this course, including the complete language of each outcome as shown on Part 3 of this syllabus. Under each Lumina DQP outcome, please list any course objectives that support the prior DQP outcome.)

Lumina DQP Outcome 2: Illustrates contemporary terminology used in the field.
- Comprehend process control and planning.

Lumina DQP Outcome 3: Generates substantially error-free products, reconstructions, data, juried exhibits or performances as appropriate to the field.
- Demonstrate process to create accurate geometry in the CAM software.
- Demonstrate CAM controls (assign tools and tool holders, select correct work offset, verify, edit program and power down equipment safely).

Lumina DQP Outcome 6: Illustrates core concepts of the field while executing analytical, practical or creative tasks.
- Analyze print for basic programming and part inspection.
- Comprehend process control and planning.

Lumina DQP Outcome 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.
- Demonstrate process to create accurate geometry in the CAM software.
- Demonstrate applied shop math and prepare basic CNC mill G-code program. (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).

Suggested Methods of Instruction:
Lecture, small-group discussion, PowerPoint presentations, video demonstrations, and hands-on lab sessions

Suggested Methods of Assessment and Evaluation:
Quizzes, exams, successful production of prototypes using CNC software.

Adopted Text at Time of Course Adoption/Revision:
Gizelback, Richard A. CNC Machining Fundamentals and Applications.

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Topics Covered During the Semester: NA

Sequence of topics and time allowance are at the discretion of the instructor

Week 1:	Introduction to CNC Programming Course Expectations
Week 2:	Safe Work Habit / Equipment Identification
Week 3:	Reading Prints / Measuring Equipment
Week 4:	Creating Geometry / Working with CAM Software
Week 5:	Review Shop Math applied to Basic G-Code Programming / Machining / Group Lab Stations with CAM software
Week 6:	Review Shop Math applied to Basic G-Code Programming / Machining / Group Lab Stations with CAM software
Week 7:	Review Shop Math applied to Basic G-Code Programming / Machining / Group Lab Stations with CAM software
Week 8:	Review Shop Math applied to Basic G-Code Programming / Machining / Group Lab Stations with CAM software
Week 9:	Review Shop Math applied to Basic G-Code Programming / Machining / Group Lab Stations with CAM software
Week 10:	Review Shop Math applied to Basic G-Code Programming / Machining / Group Lab Stations with CAM software
Week 11:	Review Shop Math applied to Basic G-Code Programming / Machining / Group Lab Stations with CAM software
Week 12:	Review Shop Math applied to Basic G-Code Programming / Machining / Group Lab Stations with CAM software
Week 13:	Review Shop Math applied to Basic G-Code Programming / Machining / Group Lab Stations with CAM software
Week 14:	Review Shop Math applied to Basic G-Code Programming / Machining / Group Lab Stations with CAM software
Week 15:	Review Shop Math applied to Basic G-Code Programming / Machining / Group Lab Stations with CAM software
Week 16:	Review and Final Exam

Section 1 & Section 2 approved by CRDAP on: 04 22 14	
Section 2 approved by AD:	Date:
Section 2 approved by CRDAP Chair:	Date:

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PART 3:

Use this reference sheet in Part 2 of Master Course Syllabus

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.

The Degree Qualifications Profile was adopted by CRDAP: April 11, 2012