North Central Michigan College
Master Course Syllabus

PART 1:

Course Name: CAM Creating 3D Geometry and Assigning Tool Paths

Course Number: CAM 140

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:
Develop 2d and 3d geometry with CAM software to accurately machine the part print within tolerance. Successfully import and export geometry using the CAM software. Assign tools to 3d surfaces to accurately and efficiently manufacture part to print specifications. Determine the length of tool and all necessary factors involved to complete the part successfully. Communicate to the operator/instructor the intended process, tools used, and machine setup to manufacture the part.

Prerequisite (s): CAM 130
Co-requisite (s):

Course Objectives:
Appropriate to fifth in sequence.

- Analyze print for programming and part inspection.
- Create accurate 2d and 3d geometry in the CAM software to match print specifications.
- Demonstrate CAM controls (assign tools and tool holders, select correct work offset, verify, edit program and power down equipment safely).
- Demonstrate process control and planning.
- Create a G-code program that would successfully machine HRS parts to print specifications.
- Successfully communicate proper manufacturing setup process, tool list, and datum point to operator/instructor.
- Complete quality control, inspection reports, segregate good parts from bad parts, and tag parts for traceability.

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 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.

- Demonstrate process control and planning.

Lumina DQP Outcome 2: Illustrates contemporary terminology used in the field.

- Successfully communicate proper manufacturing setup process, tool list, and datum point to operator/instructor.

Lumina DQP Outcome 3: Generates substantially error-free products, reconstructions, data, juried exhibits or performances as appropriate to the field.

- Create accurate 2d and 3d geometry in the CAM software to match print specifications.
- Demonstrate CAM controls (assign tools and tool holders, select correct work offset, verify, edit program and power down equipment safely).
- Create a G-code program that would successfully machine HRS parts to print specifications.

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

- Analyze print for programming and part inspection.

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.

- Complete quality control, inspection reports, segregate good parts from bad parts, and tag parts for traceability.

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Suggested Methods of Instruction:
Lecture, small-group discussion, PowerPoint presentations, video demonstrations, and hands-on lab sessions, using laptop computers and CAM software.

Suggested Methods of Assessment and Evaluation:
Quizzes, exams, successful production of basic part using CAM software.

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

Topics Covered During the Semester:
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 Habits
	Equipment Identification
Week 3	Reading Prints/Measuring Equipment
Week 4	Creating Geometry
	Working with CAM software
Week 5	Review Shop Math applied to
	Start part project 1
	Group Lab Stations with CAM software
Week 6	Review Shop Math applied to
	Continue and finish part project 1
	Group Lab Stations with CAM software
Week 7	Review Shop Math applied to
	Start part project 2
	Group Lab Stations with CAM software
Week 8	Review Shop Math applied to
	Continue and finish part project 2
	Group Lab Stations with CAM software
Week 9	Review Shop Math applied to
	Start part project 3
	Group Lab Stations with CAM software
Week 10	Review Shop Math applied to
	Continue and finish part project 3
	Group Lab Stations with CAM software
Week 11	Review Shop Math applied to
	Start part project 4
	Group Lab Stations with CAM software

Week 12	Review Shop Math applied to Continue and finish part project 4 Group Lab Stations with CAM software
Week 13	Review Shop Math applied to Start part project final Group Lab Stations with CAM software
Week 14	Review Shop Math applied to Continue part project final Group Lab Stations with CAM software
Week 15	Review Shop Math applied to Continue part project final Group Lab Stations with CAM software
Week 16	Review and inspect final part project 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