EICC COURSE DEVELOPMENT MODEL (CDM)

CATALOG COURSE NUMBER: MFG-116
COURSE TITLE: Carbide Tooling
Originating College: ☐CCC ☐MCC ☑SCC Effective Term/Year: Fall 2014
Initiating Faculty Member: Kenneth Darmody Initiating Department Coordinator: Ben Kettering

Reason for submission: Check all that apply
☐New Course If yes, type of course:
☐**A&S**
To be considered for General Education? ☐ Yes ☐ No Category:
To be part of an A & S Concentration? ☐ Yes ☐ No Concentration:
☐**CTE** Program Title: ☐Required ☑Elective
☑General Education or Program Review ☐Reactivation of an inactive course ☐Making course inactive
☐Changing course; please explain:
☐Other; please explain:

Contact Hours/Distribution of Contact Hours

Lecture Hours		Lab Hours		Clinical Hours		Coop Hours	
Hours per Week:	1.00	Hours per Week:	0	Hours per Week:	0	Hours per Week:	0
Number of Weeks:	16.50	Number of Weeks:	16.50	Number of Weeks:	16.50	Number of Weeks:	16.50
***Note: If offering a course for the full fall or spring semester, the number of weeks is 16.5*							
Total Lecture Hrs:	19.80	Total Lab Hrs:	0	Total Clinical Hrs:	0	Total Coop Hrs:	0

Semester Hours Credit: 1.00 if variable credit, give range:
Allow repeat* for credit: ☐Yes ☑No
If yes, total course repeats allowed: If yes, total credits:
*Note that repeat for credit means a student can pass the course and then repeat it for additional credit. An internship course is an example of a course that could be set up as repeatable for additional credit

Course or courses this CDM replaces, if any:

CATALOG COURSE DESCRIPTION: This course will introduce the student to the history and advances of carbide tooling. Indexable inserts; drilling, milling, and turning with carbide tools; basic tooling applications of carbides and coated carbide tools are also covered. Students will develop the necessary knowledge to understand and effectively utilize different types of machine tooling.

RECOMMENDED ENTRY LEVEL SKILLS/KNOWLEDGE:

PRE-REQUISITE COURSES

CCN#	COURSE TITLE

CO-REQUISITE COURSES

CCN#	COURSE TITLE

PUBLISHED MATERIAL(S) USED FOR CDM DEVELOPMENT: Kibbe, Richard, John Neely, Warren White, and Roland Meyer. Machine Tool Practices. Upper Saddle River: Prentice Hall, 2010. Print.

In general it is expected that source material will be dated within 5 years of this CDM date. If all materials/ textbooks cited above are older than this, please explain:

GENERAL COURSE GOALS

Upon successful completion of this course the student should be able to:

Understand how carbide works.
Interpret carbide reference manuals to determine the best tool to select for the material they will be working on.

TOPICAL OUTLINE

1. Basics of Carbide Metallurgy
2. Principles of Drilling
3. Principles of Milling
4. Threading
5. Workpiece Material Groups
6. Selecting Single-Point Tooling
7. Analyzing Tool Life and Insert Failure
8. Productivity Calculator

COURSE OBJECTIVES

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

1. Basics of Carbide Metallurgy
   a. Explain how cutting tool performance has improved in the last century and a half as new materials and coatings were developed.
   b. Explain why inserts fail.
   c. Explain how the workpiece material and machine operating conditions influence the selection of the optimum grade of carbide.
2. Principles of Drilling
   a. Describe common drilling operations.
   b. Describe three types of drills and their relative advantages and disadvantages.
   c. Describe how to select carbide drills.
   d. Determine optimum operating conditions for carbide drills.
3. Principles of Milling
   a. Determine what edge conditions, rake angle, and cutter geometry exist.
   b. Determine which milling grade of insert should be used.
   c. Determine how to remove vibration, if it exists.
   d. Determine how to achieve proper surface finish and chip thickness for the best productivity.
   e. Determine metal removal rate.
4. Threading
   a. Identify common thread forms.
   b. Achieve a basic understanding of threading fundamentals, terms and definitions.
   c. Determine the best insert, toolholder and anvil for the application.
   d. Determine when thread milling should be used.
5. Workpiece Material Groups
   a. Explain machinablility ratings and describe how machining characteristics are affected by workpiece material properties.
   b. Identify workpiece material and determine which workpiece group it belongs to.
   c. Once material group has been identified, use catalogs to determine insert grade and what cutting speed should be used.
6. Selecting Single-Point Tooling
   a. Describe how workpiece configuration influences toolholder and insert selection.
   b. Identify eight basic insert shapes and their relative strengths.
7. Analyzing Tool Life and Insert Failure
   a. Describe the way inserts should fail to optimize tool life.
   b. Describe the eight common insert failure mechanisms.
   c. Describe corrective actions for each of the failure mechanisms.
8. Productivity Calculator
   a. Using the productivity calculator, determine feeds and speeds for various materials and processes.

RECOMMENDED METHODS OF INSTRUCTION: *Check all appropriate methods of instruction to facilitate student learning of course objectives.*

❑Case Studies | ❑Class Discussions

- ☐ Computer lab work
- ☐ Computer-assisted writing
- ☑ Demonstration or modeling
- ☐ Field observation
- ☐ Guest speaker
- ☐ In-class writing or editing workshops
- ☑ Lecture
- ☐ Model building
- ☐ Readings
- ☐ Service learning
- ☑ Student and instructor conferences
- ☐ Student presentation
- ☐ Tests or quizzes
- ☐ Writing assignments/exercises (graded or not)
- ☑ Other (please list specifics): Videotapes
- ☑ Computer-assisted tools
- ☐ Conducting experiments
- ☐ Electronic interaction
- ☐ Field trips
- ☑ Guided practice
- ☐ Journals
- ☐ Library instruction and resources
- ☐ Peer review
- ☐ Role play
- ☐ Simulation
- ☐ Student collaborative learning
- ☑ Student projects
- ☐ Worksheets/surveys

RECOMMENDED EVALUATION METHODS: *Check all appropriate methods of evaluation to assess student achievement of course objectives.*

- ☐ Class workshops
- ☐ Collaborative work
- ☑ Individual conferences
- ☐ Laboratory reports
- ☐ Portfolios
- ☑ Quizzes
- ☐ Student presentations
- ☑ Tests
- ☐ Other (please list specifics):
- ☐ Classroom discussions/participation
- ☑ Demonstration of skill(s)
- ☐ Journals
- ☐ Oral presentations
- ☐ Pretest/Posttest
- ☐ Reading responses
- ☑ Student projects
- ☐ Writing Assignments

ATTENDANCE: Policies on attendance will be formulated by the instructor and communicated to the students on the course syllabus.

ACADEMIC DISHONESTY: Policies on academic dishonesty can be found in the EICC student code of conduct published in the student handbook.

CDM CREATION/REVIEW/REVISION INFORMATION	
Originally Written by:	Date:
Department Chair, Comments, & Date:	
Does similar curriculum exist at other EICC Colleges? ☐CCC ☐MCC ☐SCC ☐No	
If yes, Counterparts Consulted, College, Comments & Date:	
CDM Review or Revision Date:	
Faculty member(s) & College:	
Does similar curriculum exist at other EICC Colleges? ☐CCC ☐MCC ☐SCC ☐No	
Changes made to course which will require further review steps:	

❑ Making course inactive ❑ Credit hours ❑ Contact hours ❑ Course Description
❑ 25% or more of course objectives ❑ Other minor revisions or no revisions
Dean Review, Comments & Date:
If changes made require further review and approval:
College Curriculum Committee Sign-off & Date:
IC Review Subcommittee Sign-off & Date:
Instructional Council Approval: