

THREE RIVERS COMMUNITY COLLEGE  
COURSE OUTLINE

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Course Number/Title: MFG K214 Tool Design

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Lecture 1 hrs      Laboratory 0 hrs      Credit 1 hrs      Contact 1 hrs

Course Description: Theory in the design of metal cutting tools. The course is designed to give the students the basic knowledge of the principles, practices, tools, and commercial standards of single point cutting tool as well as jig, fixture, and die design.

Method: Fundamentals of Tool Design, SME, 4<sup>th</sup> Edition

Text: Tool design; Donaldson, Lecain, and Goold; McGraw-Hill; 3rd ed.

Prerequisites: CAD K106/107; MFG K102/103

Co-Requisites: MFG K215

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COURSE TOPICS/CONTENT

	HOURS
1. Principles of Metal Cutting	3
a) Machinability	
b) Feed and surface finish	
c) Speeds and tool life	
d) Chip types and chip breaks	
e) Tool geometry	
f) Tool forces and horsepower	
g) Carbide selection	
2. Jig and Fixture Design	3
a) Location of workpiece	
b) Clamping of workpiece	
c) Chip clearance and removal	
d) Standard items, bushings, feet, hinges, etc.	
3. Die Design	3
a) Presses and die sets	
b) Cutting theory for punches	
c) Punch and die clearances	
d) Punch types	
e) Die types	
f) Strippers	
g) Knockouts and shedders	
h) Die stops	
TOTAL HOURS	15

Date: February 13, 2008

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Program Coordinator: Robert Lantz

Department Chairperson: Tony Benoit

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Measurable Objectives

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1. The student will demonstrate the ability to use tables to select proper feed rates to achieve required turning surface finishes.
2. The student will be able to calculate tool life given appropriate material characteristics.
3. The student will be able to select tool geometries necessary to perform various machining functions.
4. The student will be able to calculate the required spindle horsepower for various cutting situations.
5. The student will demonstrate a comprehension of the concepts of location use with jigs and fixtures.
6. The student will identify various clamping methods employed with jigs and fixtures and when to use each.
7. The student will be able to select appropriate drill bushings for both drilling and reaming.
8. The student will show knowledge of progressive die fundamentals by laying out an appropriate scrap strip.
9. The student will be able to calculate punch and die clearances.