

## FLORIDA STATE COLLEGE AT JACKSONVILLE

## COLLEGE CREDIT COURSE OUTLINE

COURSE NUMBER: PMT 2262

COURSE TITLE: CAD /CAM II

PREREQUISITE(S): PMT 2261

COREQUISITE(S): None

CREDIT HOURS: 3

CONTACT HOURS/WEEK: 4

CONTACT HOUR BREAKDOWN:

    Lecture/Discussion: 1

    Laboratory: 3

    Other \_\_\_\_\_:

FACULTY WORKLOAD POINTS: 3.01

STANDARDIZED CLASS SIZE  
ALLOCATION: 24

CATALOG COURSE DESCRIPTION:

This course covers the development of 3-D shapes and the codes necessary to produce parts. Students are required to design a new product or modify an existing design which includes creating surface curves. This course will focus on creating tool paths for complex 3-D surfaces.

SUGGESTED TEXT(S): Machine Tool Practices, ISBN: 0-13-033447-2 by Kibbe and Neely

IMPLEMENTATION DATE: Fall Term, 2009 (20101)

REVIEW OR MODIFICATION DATE:

COURSE TOPICS	<u>CONTACT HOURS PER TOPIC</u>
I. Creation of 2D & 3D wire frame drawings using EMCO software.	5
II. Creation of 2D tool path for turning/boring operations.	5
III. Edit existing drawings for CAM processing	5
IV. Set-up and operate CNC Turning Center	10
V. Develop Machining Strategy for Turning operations	10
VI. Upload and download part programs to network	5
VII. Understand tooling setups and offsets	10
VIII. Apply Cartesian Coordinate system to turning operations	10

PROGRAM TITLE: Engineering Technology

COURSE TITLE: CAD /CAM II

CIP NUMBER: 1615.061300 AS

LIST PERFORMANCE STANDARD ADDRESSED:

NUMBER(S): TITLES(S):

12.0 DEMONSTRATE PROFICIENCY IN THE PRINCIPLES, CONCEPTS AND APPLICATIONS IN METAL FABRICATION METHODS - The student will be able to:

12.01 Understand professionalism in the manufacturing environment.

12.02 Understand, use and work with precision numbers.

12.03 Interpret mechanical drawings.

12.04 Demonstrate the use of geometric dimensioning and tolerancing.

12.05 Understand materials, and machining processes.

12.06 Demonstrate safe use of hand and power tools.

12.07 Identify the use and process in part layout.

12.08 Demonstrate a working knowledge of metal forming equipment.

12.09 Demonstrate the use of precision steel rulers.

12.10 Demonstrate the use of oxy - fuel cutting.

12.11 Demonstrate acceptable methods in tungsten inert gas welding.

12.12 Demonstrate acceptable methods in gas metal arc welding.

12.17 Demonstrate acceptable methods to use a dial indicator.

12.18 Explain the use of a height gauge to measure stock.

12.19 Identify aircraft sheet metal tools.

12.20 Demonstrate acceptable methods hand cutting and forming sheet metal.

12.21 Demonstrate the use of layout sheet metal tools.

12.22 Demonstrate acceptable methods using micro-counter sinks.

12.23 Demonstrate acceptable methods of Riveting solid rivets.

12.24 Identify and demonstrate operation of the pneumatic rivet gun.

12.25 Demonstrate the use of a rivet gauge set.

12.26 Demonstrate acceptable methods using a back rivet set.

12.27 Demonstrate acceptable methods using bucking bars.

12.28 Demonstrate the use of rivet squeezers and dimpling.

12.29 Demonstrate acceptable methods in using a blind riveting.

## LIST PERFORMANCE STANDARD ADDRESSED: (Continued)

NUMBER(S):            TITLES(S):

- 12.30 Identify the axes on a CNC mill.
- 12.31 Demonstrate hand jog features on a CNC mill & CNC lathe.
- 12.32 Demonstrate acceptable methods to use an ironworker.
- 12.33 Demonstrate acceptable methods using a break & shear.
- 12.34 Demonstrate the use of dial calipers.

14.0 DEMONSTRATE PROFICIENCY IN THE SET-UP AND OPERATION OF MANUAL AND CNC MACHINING CENTERS - The student will be able to:

- 14.01 Set up and maintain a manual lathe and mill.
- 14.02 Demonstrate acceptable processes using a manual lathe and mill.
- 14.03 Demonstrate acceptable control of machining processes.
- 14.04 Identify and define the physics of machine cutting metals.
- 14.05 Demonstrate the characteristics of machining cutting tools.
- 14.06 Define and identify parameters of cutting tool life.
- 14.07 Demonstrate efficient parameters in production processes.
- 14.08 Demonstrate the process to drill and layout holes to a specific size.
- 14.09 Identify baseline machining layout.
- 14.10 Identify manual machining procedures used in CNC programming.
- 14.11 Identify grinding machining practices and processes.
- 14.12 Identify thread types and tooling used in machining.
- 14.13 Identify metal alloys and their properties in machining.
- 14.14 Demonstrate job planning procedures in machining.
- 14.15 Demonstrate procedures to calculate cutting tool speeds and feeds.
- 14.16 Demonstrate methods for accessing machine RPM.
- 14.17 Identify coordinate and primary machining axes.
- 14.18 Define and describe Absolute and incremental coordinates.
- 14.19 Identify the five CNC drive components.
- 14.20 Demonstrate rapid travel and interpolation.
- 14.21 Identify coordinate and primary machining axes.
- 14.22 Identify and define industrial machining and turning centers.
- 14.23 Identify processes for program creation and data management.
- 14.24 Demonstrate acceptable procedures in starting CNC machines.
- 14.25 Demonstrate the CNC machine controls for set up and operation.
- 14.26 Demonstrate acceptable procedures to set up a CNC Machining center.

## LIST PERFORMANCE STANDARD ADDRESSED: (Continued)

NUMBER(S):            TITLES(S):

- 14.27 Demonstrate acceptable procedures to run programs using a CNC machining center.
- 14.28 Demonstrate acceptable procedures to generate a CNC program.
- 14.29 Demonstrate acceptable procedures in CNC job planning.
- 14.30 Identify cutting tools collets and holding fixtures.
- 14.31 Identify CNC tooling and applications.
- 14.32 Define CNC programming code words and conventions.
- 14.33 Define and demonstrate CNC program fixed cycles.

15.0 DEMONSTRATE PROFICIENCY IN COMPUTER-AIDED DRAFTING/COMPUTER-AIDED MANUFACTURING (CAD/CAM) SOFTWARE - The student will be able to:

- 15.03 Demonstrate contouring using CAM tool path commands.
- 15.04 Apply pocketing using CAM tool path commands.
- 15.05 Demonstrate drill cycles using CAM tool path commands.
- 15.06 Demonstrate thread cycles using CAM tool path commands.
- 15.01 Create CAD/CAM geometry for tool path processing.
- 15.02 Demonstrate procedures to import/export CAD/CAM files.
- 15.07 Demonstrate engraving using CAM tool path commands.
- 15.08 Construct lettering using CAM tool path commands.
- 15.09 Demonstrate nesting using CAM tool path commands.
- 15.10 Describe procedures for CAM post-processing.
- 15.11 Apply tool path verification for a CAM program.
- 15.12 Apply job set-up procedures for a CAM program.
- 15.13 Demonstrate ability to save, copy, delete, and rename computer files with Windows-based programs.
- 15.14 Create a CNC machining working portfolio.
- 15.15 Demonstrate the use of back plotting in a cam program.
- 15.16 Demonstrate how to modify an existing tool path.

16.0 DEMONSTRATE A PROFICIENCY IN 3-D SOLID MODELING DESIGN & PROGRAMMING

- The student will be able to:

- 16.01 Identify wire frame geometry for surface modeling.
- 16.02 Demonstrate tool path verification and post processing.

LIST PERFORMANCE STANDARD ADDRESSED: (Continued)

NUMBER(S):            TITLES(S):

- 16.03 Create a 3D wire frame in different construction planes.
- 16.04 Demonstrate Geometry editing commands.
- 16.05 Create a solid body applying extruding commands.
- 16.06 Demonstrate the programming parameters using high speed machining tooling.
- 16.07 Demonstrate CNC tooling selection and applications.
- 16.09 Demonstrate the chamfer command on a solid body.
- 16.10 Apply the revolve command by editing a solid body.
- 16.11 Demonstrate the fillet command on a solid body.
- 16.12 Create a wire frame model for a ruled surface.
- 16.13 Construct a sphere using primitive commands.
- 16.14 Apply primitive commands to construct a cylinder.
- 16.15 Edit solid geometry using loft commands.
- 16.16 Demonstrate the use of default short-cut key assignments.
- 16.17 Construct coons wire frame geometry.
- 16.18 Create sweep surfaces and flow line tool path.
- 16.19 Demonstrate raised letters on a surface.
- 16.20 Demonstrate stock set-up for tool path creation.



*NOTE: Use either the Tab key or mouse click to move from field to field. The box will expand to accommodate your entry.*

<b>Section 1</b>	
<b>COURSE PREFIX AND NUMBER:</b> PMT 2262	<b>SEMESTER CREDIT HOURS:</b> <u>3</u>
<b>COURSE TITLE:</b> <u>CAD /CAM II</u>	

**Section 2**  
**TYPE OF COURSE: (Click on the box to check all that apply)**

<input type="checkbox"/> AA Elective	<input type="checkbox"/> AS Required Professional Course	<input type="checkbox"/> College Prep
<input type="checkbox"/> AS Professional Elective	<input checked="" type="checkbox"/> AAS Required Professional Course	<input type="checkbox"/> Technical Certificate
<input type="checkbox"/> Other _____		
<input type="checkbox"/> General Education: (For General Education courses, you must also complete Section 3 and Section 7)		

**Section 3 (If applicable)**  
**INDICATE BELOW THE DISCIPLINE AREA FOR GENERAL EDUCATION COURSES:**

<input type="checkbox"/> Communications	<input type="checkbox"/> Social & Behavioral Sciences	<input type="checkbox"/> Mathematics
<input type="checkbox"/> Natural Sciences	<input type="checkbox"/> Humanities	

**Section 4**  
**INTELLECTUAL COMPETENCIES:**

<input checked="" type="checkbox"/> Reading	<input checked="" type="checkbox"/> Speaking	<input checked="" type="checkbox"/> Critical Analysis	<input checked="" type="checkbox"/> Quantitative Skills	<input type="checkbox"/> Scientific Method of Inquiry
<input checked="" type="checkbox"/> Writing	<input checked="" type="checkbox"/> Listening	<input type="checkbox"/> Information Literacy	<input checked="" type="checkbox"/> Ethical Judgment	<input checked="" type="checkbox"/> Working Collaboratively

	Section 5 LEARNING OUTCOMES	METHOD OF ASSESSMENT
1	Creation of 2D & 3D wire frame drawings using EMCO software.	Hands-on test, quizzes, or written test
2	Creation of 2D tool path for turning/boring operations.	Hands-on test, quizzes, or written test
3	Edit existing drawings for CAM processing	Hands-on test, quizzes, or written test
4	Set-up and operate CNC Turning Center	Hands-on test, quizzes, or written test
5	Develop Machining Strategy for Turning operations	Hands-on test, quizzes, or written test
6	Upload and download part programs to network	Hands-on test, quizzes, or written test
7	Understand tooling setups and offsets	Hands-on test, quizzes, or written test
8	Apply Cartesian Coordinate system to turning operations	Hands-on test, quizzes, or written test

**Section 6** Name of Person Completing This Form: Darrell J. High      Date: 05/07/07