North Central State College

MASTER SYLLABUS	2025-2026

A. Academic Division: Engineering Technology, Business & Criminal Justice Division

B. Discipline: Manufacturing

C. Course Number and Title: MFGT2010 Jig and Fixture Design

D. Assistant Dean: Brooke Miller, M.B.A.

E. Credit Hours: 3
Lecture: 2 hours
Laboratory: 2 hours

F. Prerequisites: MFGT1110 and either MECT1150 or ENRD2260

G. Last Course/Curriculum Revision Date: Fall 2025 Origin date: 07/28/23

H. Textbook(s) Title:

Jig and Fixture Design
- Author(s): Edward G Hoffman
- Copyright year: 2003
- Edition: 5th
- ISBN #: 9781401811075

I. Workbook(s) and/or Lab Manual: *E-Book* provided by Instructor: Compilation of Tool Design Instructions and Projects

J. Course Description: Tool design is the process of designing and developing the tools, methods, and techniques necessary to improve manufacturing efficiency and productivity. Students use Solid Modeling software to design tools used in fabricating, welding, and inspection applications. Tool design is an ever-changing, growing process of creative problem solving which addresses quality and economy to produce a competitive product to solve manufacturing situations.

K. College-Wide Learning Outcomes:

College-Wide Learning Outcome	Assessments - - How it is met & When it is met
Communication – Written	
Communication – Speech	
Intercultural Knowledge and Competence	
Critical Thinking	
Information Literacy	
Quantitative Literacy	

L. Course Outcomes and Assessment Methods:

Upon successful completion of this course, the student shall:

Outcomes	Assessments – How it is met & When it is met
1. Identify job skills needed to become a Tool Designer.	Week one Written assignments and exam
2. Identify basic types and functions of jigs and fixtures.	Starting week two Worksheets, case studies design projects
3. Identify considerations of design economics and apply to final exam project.	Fourth week to end of semester Worksheets, case studies design projects Industry standard financial application
4. Design basic jigs and fixtures, applying proper principles of safety, practicality and sound construction.	Fifth week to end of semester Worksheets, case studies design projects Final project/exam
5. Identify and describe specialized work holding devices and their benefits and applications.	Week two to end of semester Worksheets, case studies design projects Final project/exam
6. Identify and specify acceptable tool materials, application and components in design projects.	Week four through end of semester Worksheets, case studies design projects Final project/exam
7. Use solid modeling software such as AutoDesk Inventor as a tool to design and troubleshoot special tooling used in manufacturing situations.	Week four through end of semester Worksheets, case studies design projects Final project/exam
8. Use CAD and solid modeling software to create technical drawings of special tooling in compliance with ANSI standards.	Week four through end of semester Design projects Final project/exam
9. Use Plotter to produce prints to ANSI standards.	Week four through end of semester Design projects Final project/exam
10. Participate in CONCURRENT ENGINEERING activities.	Week four through end of semester Technical communications, guided case studies, design projects Final project/exam
11. Evaluate proposed solutions to manufacturing problems by completing peer evaluations of technical drawings.	Week nine to end of semester Peer evaluations
12. Create tooling to provide a solution to an automated manufacturing case such as CNC machining centers, inspection, or assembly scenarios.	Week four through end of semester Design projects, concurrent engineering activities, Final project/exam

M. Recommended Grading Scale:

NUMERIC	GRADE	POINTS	DEFINITION
93–100	A	4.00	Superior
90–92	A-	3.67	Superior
87–89	B+	3.33	Above Average
83–86	B	3.00	Above Average
80–82	B-	2.67	Above Average
77–79	C+	2.33	Average
73–76	C	2.00	Average
70-72	C-	1.67	Below Average
67–69	D+	1.33	Below Average
63-66	D	1.00	Below Average
60-62	D-	0.67	Poor
00-59	F	0.00	Failure

N. College Procedures/Policies:

North Central State College believes that every student is a valued and equal member of the community.* Every student brings different experiences to the College, and all are important in enriching academic life and developing greater understanding and appreciation of one another. Therefore, NC State College creates an inclusive culture in which students feel comfortable sharing their experiences. Discrimination and prejudice have no place on the campus, and the College takes any complaint in this regard seriously. Students encountering aspects of the instruction that result in barriers to their sense of being included and respected should contact the instructor, assistant dean, or dean without fear of reprisal.

* *Inclusive of race, color, religion, gender, gender identity or expression, national origin (ancestry), military status (past, present or future), disability, age (40 years or older), status as a parent during pregnancy and immediately after the birth of a child, status as a parent of a young child, status as a foster parent, genetic information, or sexual orientation*

Important information regarding College Procedures and Policies can be found on the syllabus supplement located at https://ncstatecollege.edu/documents/President/PoliciesProcedures/PolicyManual/Final%20PDFs/14-081b.pdf

North Central State College

SYLLABUS ADDENDUM

Academic Division:	Engineering Technology, Business & Criminal Justice	**Discipline:**	Manufacturing
Course Coordinator:	Brooke Miller		
Course Number:	MFGT2010	**Course Title:**	Jig and Fixture Design
Semester / Session:	SP 2026 / Session ___	**Start / End Date:**	01/12/2026 thru 05/08/2026

Instructor Information

Name:	Chris Harriman	**Credentials:**	State Cert and 30+ years in the field
Phone Number:	419-560-8931	**E-Mail Address:**	charriman@ncstatecollege.edu
Office Location:	023	**Office Hours:**	Varies

I. Topical Timeline / Course Calendar (Subject to Change):

Weeks	Topics	Assignment	Due Date
	PREREQUISITES: CAD(Inventor)and Print Reading		
1	***CHAPTER 1*** Intro to Die Designs	Homework on CANVAS	
2	***CHAPTER 2*** Classification and Types of Dies	Homework on CANVAS	
3	***CHAPTER 3*** The Material Strip	Homework on CANVAS	
4	***CHAPTER 4*** The Blank	Homework on CANVAS	
5	***CHAPTER 5*** Fourteen Steps to Design a Die	Homework on CANVAS	
6	***CHAPTER 6*** How to Layout a Scrap Strip	Homework on CANVAS	
7	***CHAPTER 7*** How to Design Die Blocks	Homework on CANVAS	
8	***MIDTERM***	Midterm on CANVAS	
9	***CHAPTER 8*** How to Design Blanking Punches	Homework on CANVAS	
10	***CHAPTER 9*** How to Design Piercing Punches	Homework on CANVAS	
11	***CHAPTER 10*** How to Design Punch Plates	Homework on CANVAS	
12	***CHAPTER 11*** How to Design Pilots	Homework on CANVAS	
13	***CHAPTER 12*** How to Design Gauges	Homework on CANVAS	
14	***CHAPTER 13*** How to Design Finger Stops	Homework on CANVAS	
15	***CHAPTER 14*** How to Design Strippers	Machining Technologies Lab	
16	***Final Exam***	FINAL EXAM on CANVAS	

Course Number: _____ **Course Title:** _____
Semester / Session: _____ **Start / End Date:** _____

II. Grading and Testing Guidelines:

Final Grade Calculation

Activity	Qty	Points	Percentage
Homework			50
Midterm			25
Final Exam			25

1. **Topic description #1**
   The application and design of Jigs and Fixtures

III. Examination Policy:

1. The reasons for which a student will be excused from taking an examination _____
   a. Hospitalization (with documented verification)
   b. Death in the immediate family (with documented verification)
   c. Personal illness or illness in immediate family - (doctor's excuse required).
2. A student who misses an examination for any reason is responsible for _____
   a. Making up their work within 2 weeks of returning to class

IV. Class Attendance and Homework Make-Up Policy:

1. Class attendance is necessary to acquire the knowledge required to _____
2. Students are responsible for SAFETY.

V. Classroom Expectations:

1. **Good attention, attitude and work ethic in class.**
2. **Good working knowledge of Inventor 2024 as a prerequisite.**