



ITCD 301- 001—Tool and Equipment Design
Department of Applied Engineering & Technology
College of Science and Technology
Morehead State University
ATME accredited program
Fall 2010 Syllabus



CLASS TIME: Room 104, Lloyd Cassity building
Lecture: Monday 3:10 – 5:10 PM
Lab: Monday 5:20 – 7:20 PM

INSTRUCTOR: Dr. Rajeev Madhavannair, Room: LC-301
Email: r.madhavann@moreheadstate.edu
Phone: (606) 783-2681
Fax: (606) 783-5030

OFFICE HOURS : Monday and Wednesday : 10.30 AM to 12.30 PM
or by appointment.

PREREQUISITES: ITCD 103, 203 and basic knowledge of design

COURSE DESCRIPTION: ITCD 301 – Tool and Equipment Design (2-2-3), The layout and design of tooling, jigs, fixtures, gages, and equipment through computer-aided design techniques.

COURSE GOALS: To prepare designer for manufacturing departments in metal industries

COURSE OBJECTIVES: At the end of this course you should be able to:

1. Discuss the tool design area of manufacturing
2. Discuss responsibilities of the tool designer
3. Design and draw jigs and fixture to hold parts during single and multi-machining operations
4. Discuss cutting tool design
5. Design and draw for modular tooling
6. Design and draw an automated fixture

TEXTBOOK: Fundamentals of Tool Design, 5th edition by, Society of Manufacturing Engineers, ISBN: 087263650-X

Recommended readings:

1. Carr-Lane Tooling Components catalog
2. Journal of Advanced Materials
3. Journal of Engineering Material & Technology
4. Machine Design

5. Metal Performance
6. Metal Finishing
7. Modern Drafting Practices & Standards Manual

COURSE OUTLINE:

1. Responsibilities of the tool designer
2. Problem solving process
3. Tooling materials and heat treating
4. Cutting tool design
5. Work holding principles
6. Jig and Fixture design
7. Die design
8. Design of inspection and gaging tooling
9. Tool design for joining processes
10. Modular tooling
11. Considerations for automated tools and automation in tool handling

Grading Assignments/Exams:

All assignments will be graded and returned to students with the detailed solutions and explanations within 3 days of the acceptance of all the submissions by students. The instructor will provide necessary and relevant comments to assist students in understanding. Once an item is returned, students are encouraged to ask for a review of any graded work; if it is felt the grade received was not appropriate or accurate. Within 2 days of receiving the graded assignment, the work in question must be returned by the student with a written or oral statement of explanation. This statement must be justified and supported by lecture notes, textbook, or other material from class. The final decision for the grade on all student assessment items is the responsibility of the class instructor.

Grading System:

Attendance & Class participation	08 %
Midterm Exam (objective 5, 6, 7, 8, 9)	20 %
Final Exam (objective 1, 2, 3, 4, 5, 6, 7, 8, 9)	20 %
Drawings (objective 1, 2, 3, 4, 5, 6, 7, 8, 9)	25 %
Homework's (objective 1, 2, 3, 4, 5, 6, 7, 8, 9)	10 %
Project (objective 3, 5, 6, 7, 8, 9)	15 %
Portfolio	02 %

GRADING SCALE:

90%-100%	A
80%-89.9%	B

70%-79.9%	C
60%-69.9%	D
<60%	E

Activity

Week

1. Orientation, course goals and objectives, introduction to the field of tool design, opportunities
2. Design process, drawing techniques for “tool drawings”, tool design and its relationship to production
3. Selection of tooling materials and heat treatment, metal cutting tools
4. Cutting tool design
5. Holding, locating, clamping
6. Jig design
7. Fixture design
8. Automated fixture
9. Gages and gage design, **Midterm Exam**
10. Blanking and piercing dies
11. Bending, forming, drawing dies and mold design
12. Joining processes
13. Machining centers, machining design
14. Modular tooling and automated tool handling
15. Equipment design
16. Project work
17. Finals week

The instructor reserves the right to alter this tentative schedule as circumstances may dictate. Changes will be announced in class. It is the student's responsibility to obtain information pertaining to changes in this schedule that are announced when he/she is absent from class

Attendance Policy

Cellular phone is not allowed to ring in the class during the class time. Please turn off your cellular phone before the class begins. If your cellular phone rings in class, you will be dismissed out of the class and it will be considered absence. Class meets 4 hours per week, 2 hours of lab and 2 hours of lecture. Students must attend all scheduled classes. Surprise quizzes will be given. Except in emergency situations or prior approval (with doctor's note), students will receive an unexcused absence for classes missed. Three unexcused absences will automatically cancel make up of all previous work. Excessive absences excused or otherwise, will result in an 'E' for the class. There are **no makeups for Quizzes**.

Homework Policies:

No late assignment will be accepted. It is impossible to fairly evaluate students when assignments are completed at various times, therefore **I can not accept assignments** even after one day late unless there are extenuating circumstances. You may also lose points if assignments are one day late even with those circumstances (10% per day including Saturday and Sunday).

Please type your name in the file name when you submit your assignment through blackboard. I will cut points if you do not write your name in the file name of the assignment. Hand written assignments are **NOT** accepted in any assignment (HW, exercise and project)

E-mailing Policy and Format

E-mail should be sent from your MSU e-mail account, any e-mail from personal account like yahoo, or, hotmail will be ignored because it goes directly to spam. In your e-mail the subject should be as following: **ITCD-301- (HW, Quiz, Exam, etc) - Your name.**

Policy for Accommodating Students with Disabilities:

In compliance with the Americans with Disabilities Act (ADA), all qualified students enrolled in this course are entitled to reasonable accommodations. It is the student's responsibility to inform the instructor of any special needs before the end of the second week of class.

Academic Honesty:

Cheating, fabrication, plagiarism or helping others to commit these acts will **not** be tolerated. Academic dishonesty will result in severe disciplinary action including, but not limited to, failure of the student assessment item or course, and/or dismissal from MSU. If you are not sure what constitutes academic dishonesty, read **The Eagle: Student Handbook** or ask your instructor. The policy is located online in the "Student Conduct Code" at: <http://www.moreheadstate.edu/units/studentlife/handbook/index.html>. **Note:** Copying information from the Internet is plagiarism if appropriate credit is not given.

Campus Safety Statement:

Emergency response information will be discussed in class. Students should familiarize themselves with the nearest exit routes in the event evacuation becomes necessary. You should notify your instructor at the beginning of the semester if you have special needs or will require assistance during an emergency evacuation. Students should familiarize themselves with emergency response protocols at www.moreheadstate.edu/emergency

Projects and Portfolio:

You will be expected to complete drawings including a final project, read blueprints, and turn in a professional portfolio that will contain all work. The portfolio will be clearly labeled on the front with your name, course, section etc, and include a table of contents as the first page. The portfolio is due two weeks before finals.

Exam Policies:

It will NOT be fair to reset the exam or quiz for some students. If it is an emergency I will allow, only one time during the semester, make up for exam or quiz at MUS under my supervision. To avoid any troubles during the exam or quiz please follow the instruction written at the beginning of each exam or quiz.

Assessment Techniques

(see objective and attached competencies for details)

Multiple assessment measures are used to determine student's competencies. **Written and performance test** are given to determine knowledge of terminology, identification of tools and materials, content and ability to think critically (objective 1 to 8). **Project and activity exercises** are given to ascertain whether students can perform design and drafting functions with manual and CAD techniques (Objectives 1 to 9). **Drawings and Final project** are performed to determine whether students learn the skills to perform requirements in later courses where sketches and drawings are required (objectives 2 to 9)

Course policy

Students are expected to act in a professional manner in dealing with all matter pertaining to the course. In particular, deceptive practices of any sort are unacceptable. Projects are to be your own work. This does not mean that you cannot discuss ideas and approaches with other students or faculty, but you should do the work yourselves. In particular, you should never be in possession of a copy (in any form) of all or part of another student's methodology. If you have any questions as to what type of cooperation are acceptable, please talk to me)

Announcements

You are responsible for the announcements made in the class. In addition, it is your responsibility to periodically check your blackboard, email account, and web pages for course details.

Revised ADA Statement:

Americans with Disabilities (ADA): In compliance with the ADA, all students with a documented disability are entitled to reasonable accommodations and services to support their academic success and safety. Though a request for services may be made at any time, services are best applied when they are requested at or before the start of the semester. To receive accommodations and services the student should immediately contact the Disability Services Coordinator in the office of Academic and Career Services, 233 Allie Young Hall, 606-783-5188

Revised ADA Statement:

Emergency response information will be discussed in class (if the class meets face to face). Students should familiarize themselves with the nearest exit routes in the event evacuation becomes necessary. You should notify your instructor at the beginning of the semester if you have special needs or will require assistance during an emergency evacuation. Students should familiarize themselves with emergency protocols at www.moreheadstate.edu/emergency