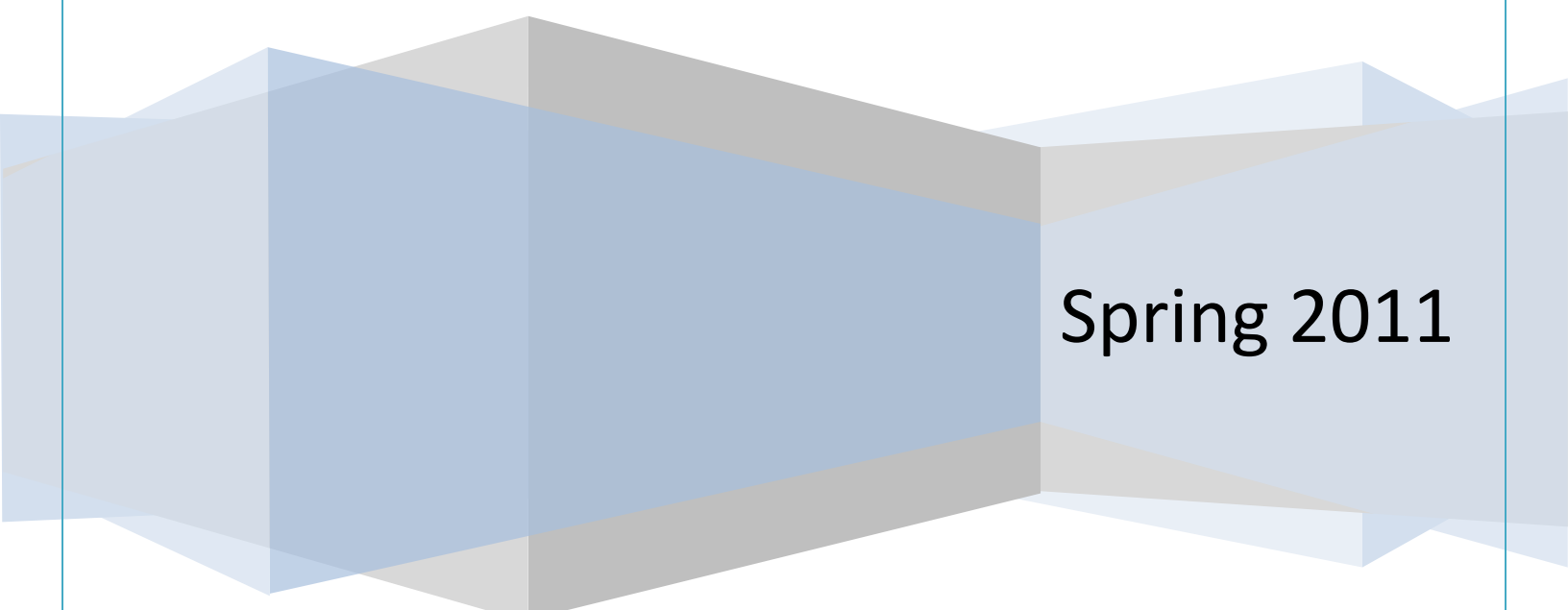


# ITEC 448

## Machine Tool Design

Hosein Atharifar, PhD, CMfgE



Spring 2011

## ITEC 448 - Machine Tool Design (Spring 2011)

Date	Day	Lecture	Subject		Class work	Home work	Reading assignments
Jan 18	Tu	1	- Purpose of tool design - Types and functions	<b>Foundation</b>	TBA	TBA	Ch 1, 2-TB1
Jan 20	Th	2	Supporting and locating princip.		TBA	TBA	3-TB1
Jan 25	Tu	3	Clamping and workholding prin.		TBA	TBA	4-TB1
Jan 27	Th	4	Basic construction principles		TBA	TBA	5-TB1
Feb. 1	Tu	5	Design economy		TBA	TBA	6-TB1
Feb. 3	Th	6	- Developing initial design - Tool material		TBA	TBA	7-TB1 21-TB1
Feb. 8	Tu	7	Tool drawings and GD&T		TBA	TBA	8-TB1
Feb. 10	Th	8	<b>Exam 1 – tool design foundation</b>				
Feb. 15	Tu	9	- Template jigs - Plate jigs	<b>OUC PROJECT 1</b>	TBA	TBA	9-TB1 11-TB1
Feb. 17	Th	10	CAD – class project		TBA	TBA	-
Feb. 22	Tu	11	CAD – class project		TBA	TBA	-
Feb. 24	Th	12	Vise-held and plate fixtures-CAD		TBA	TBA	10-TB1
March 1	Tu	13	Angle plate jigs and fixtures-CAD		TBA	TBA	12-TB1
March 3	Th	14	CAD – class project		TBA	TBA	-
March 8	Tu	<b>Spring Break</b>					
March 10	Th						
March 15	Tu	15	- Channel and box jigs - Vise-Jaw jigs and fixtures	<b>OUC PROJECT 2</b>	TBA	TBA	13-TB1 14-TB1
March 17	Th	16	CAD – class project		TBA	TBA	-
March 22	Tu	17	CAD – class project		TBA	TBA	-
March 24	Th	18	- Power workholding - Modular workholding		TBA	TBA	15-TB1 16-TB1
March 29	Tu	19	CAD – class project		TBA	TBA	-
March 31	Th	20	Low-cost jigs and fixtures		TBA	TBA	18-TB1
April 5	Tu	21	- Power Presses - Blanking operation	<b>OUC PROJECT 3</b>	TBA	TBA	7-TB2 8-TB2
April 7	Th	22	Forming and (deep) drawing		TBA	TBA	8-TB2
April 12	Tu	23	CAD – class project		TBA	TBA	-
April 14	Th	24	CAD – class project		TBA	TBA	-
April 19	Tu	25	CAD – class project		TBA	TBA	-
April 21	Th	26	CAD – class project		TBA	TBA	-
April 26	Tu	27	CAD – class project		TBA	TBA	-
April 28	Th	28	Welding and inspection tools, gauges		TBA	TBA	17-TB1
May 3	Tu	<b>Exam 2 (cumulative): Tuesday, May 3 (8-10 am)</b>					

Notes: 1. Class exercises and HW will be assigned in the class.  
2. Instructor preserves the right to change the course calendar.

- **Time:** Tuesday-Thursday 10 am-12:05 pm
- **Location:** Osburn Hall, rooms #300 and #301
- **Instructor:** Hosein Atharifar, office number 320 at Osburn hall
- **Office hours:** MW 10-11:30 (am) and TuTh 3:30-4:30 (pm)
- **Contact:** (717) 872-3328; [hatharifar@millersville.edu](mailto:hatharifar@millersville.edu); web site: <http://www.millersville.edu/~hatharifar/>

# Millersville University

## Department of Industry and Technology

### Machine Tool Design (ITEC 448), 3 credit hours

**PREREQUISITES:** ITEC 130 and ITEC 342

**INSTRUCTOR:** Hosein Atharifar

**CONTACT:** office #320 at Osburn hall; [hatharifar@millersville.edu](mailto:hatharifar@millersville.edu); (717) 872-3328

**Primary text:** Jig and Fixture Design, 5th ed. (by Edward G. Hoffman), ISBN-10: 1401811078, Publisher: Delmar Cengage Learning, Available at MU's bookstore located in Student Memorial Center

**Reference text:** Fundamentals of Tool Design, 5th ed. (by David Spitler and et al.), ISBN: 087263650X, Publisher: Society of Manufacturing Engineers (SME)

#### RECOMMENDED REFERENCES

- "Handbook of Jig and Fixture Design", 2<sup>nd</sup> Ed., by William E. Boyes, Publisher: Society of Manufacturing Engineers, ISBN-10: 0872633659.
- "Jig and Fixture Design Manual", by Erik Henriksen, Industrial Press, ISBN-10: 0831110988
- "Tool Design", by Cyril Donaldson and et al., 3<sup>rd</sup> Rev Ed., Publisher: McGraw-Hill Inc., ISBN-10: 0070175314.

#### CATALOG DESCRIPTION

This course emphasizes on the systematic study of jig and fixture design for conventional and CNC manufacturing processes utilizing the fundamentals workpiece control. Students will learn to design and draw tooling drawing on a CAD system. **Prerequisite:** ITEC 130 and ITEC 342 or permission of the instructor.

#### OBJECTIVES

As a result of this course student will:

1. Implement the tool design process when designing tooling for the manufacturing of a product.
2. Apply Geometric Tolerancing principles in the designs of tooling.
3. Evaluate and select appropriate materials and heat treatments for tooling applications.
4. Utilize the fundamentals of Workpiece Control as applied to tool design process.
5. Be able to function as individual tool designer.
6. Design, develop, and evaluate tooling for various joining processes.
7. Apply ANSI standards to tool design drawings and layouts.
8. Use CAD and conventional techniques in creating tooling designs and drawings.

#### GRADING POLICY

- Class attendance and participation (5%)
- Class exercises and projects (5 %)
- Homework (10%)
- Exam #1 (20%)
- Project #1 (10%)
- Project #2 (10%)
- Project #3 (10%)
- Exam #2 (30%)

## GRADING SCALE

<u>Grade</u>	<u>Percent</u>	<u>Grade</u>	<u>Percent</u>
A	≥ 94	C	73 – 76.9
A-	90 – 93.9	C-	70 – 72.9
B+	87 – 89.9	D+	67 – 69.9
B	83 – 86.9	D	63 – 66.9
B-	80 – 82.9	D-	60 – 62.9
C+	77 – 79.9	F	< 60

## CLASS ATTENDANCE POLICY

**Students are expected to attend all classes.** It is the student's responsibility to complete all course requirements even if a class is missed. If a student misses class for an officially excused reason, then he/she is entitled to make up the missed work but only at the convenience of the faculty member. Responsibility for materials presented in, assignments made for, and tests/quizzes given in regularly scheduled classes lies solely with the student. **Note: each absence beyond three sessions will reduce two points from your cumulative final grade.**

## ACADEMIC DISHONESTY

Academic dishonesty is not tolerated and may result in failure in the course. University's description of academic dishonesty is available at <http://www.millersville.edu/~govern/sect3/acaddis.html>.

## CLEAN-UP AND LABORATORY MAINTENANCE

All students are required to clean all areas in which they have worked at the end of the period—discard all scrap paper. It is each student's responsibility to participate in the general clean up and maintenance at the conclusion of the semester to restore the CAD labs and drafting facility.

## MISCELLANEOUS

- Students must check Desire2Learn (<https://millersville.desire2learn.com/>), their marauder e-mail, and <http://www.millersville.edu/~hatharifar/> for announcements, and other course material.
- Failure to take all tests and submit all assignments by the required deadlines invalidates this grading system.
- *There is one week allowance to return the **homework**.* Put your name, student number, and course section (e.g. ITEC 448.01). Submit your homework and project in the class. If there was an emergency, you can put your homework in my mail box.
- **Projects:** By deadline, submit an industrial type of report including conceptual design, working drawings encompasses detail drawings of parts and assembly, bill of materials (BOM), standard parts, manufacturing process, and calculations. A **template** might be provided for your project reports.
- There are no make-up exams. Exceptions may be made at my discretion for reasons of illness or university excused absences.
- Students with special needs should contact "Office of Learning Service" at (717) 872-3178, or <http://www.millersville.edu/~ols/reslib.php>.