

Massachusetts Maritime Academy  
Machine Tool Technology, EN-2112  
SYLLABUS AND COURSE POLICY

**Instructor:** Lt. Mahoney  
Licensed USCG Chief Engineer, Steam.  
3<sup>rd</sup> Asst. Engineer, Motor

**Office Hours:** 11:00-12:00, Monday  
11:00-12:00, Tuesday  
12:00-13:00, Wednesday

**Texts:**

*Machine Tool Practices (MTP)*. Authors: Kibbe, Neely, Meyer, White. Publisher, Prentice Hall; (10 TH EDITION)

*How To Run A Lathe (HTRAL)*. Publisher, South Bend Lathe

*Welding Technology Fundamentals (WTF)* Publisher, Goodheart-Willcox Inc.

Handouts

**Course Composition:**

Course consists of a 1 hour lecture and a 3 hour lab weekly. Labs alternate weekly between Machine Shop and Welding Lab. Course credit is 2

**Learning Objectives:**

- Set-up and dress the wheels on the bench grinder.
- Off-hand grind a 60 degree thread form tool and radius form tool on a high speed steel tool blank.
- Set-up and operate the lathe and tooling for facing, centerdrilling, turning and threading a test coupon to blueprint specifications.
- Correctly align tool and test coupon and chase an existing thread.
- Operate the band saws, drill press, hydraulic press and hand tools.
- Use precision measuring instruments
- Set up and use an oxy- fuel cutting torch
- Set-up and adjust SMAW equipment and weld a lap joint in the flat position
- Set-up and adjust SMAW equipment and weld a lap joint in the vertical position
- Be able to identify welding defects using dye penetrant testing.
- Demonstrate proficiency in the following STCW elements.
  - OICEW-1-1A Cut a circular hole using oxyacetylene process
  - OICEW-1-1B Form two steel plates using brazing process
  - OICEW-1-1C Form two steel plates using electric arc welding process
  - OICEW-1-1F Visual test of welded joint
  - OICEW-1-1G Dye-penetrant test of welded joint
  - OICEW-8-1A Lathe project.

**Course Policy:**

Attendance is **mandatory**. The students must come prepared with appropriate safety equipment, books and materials. **Students will not be admitted to class or labs after the start of the period.** Each missed class will result in a reduction of the final grade by **4** points. Weekly quizzes will be given; quiz material will be from lectures, labs and reading assignments. **Reading assignments must be read before the due date listed on the syllabus.** All missed quizzes must be rescheduled within **24** hours. No cell phone use is allowed in class. No programmable calculators are allowed in class.

**Labs:**

**Students must sign the muster sheet for each lab.** The student must attend on their scheduled day and session. Labs run in 2 week cycles. Students must make arrangements with the instructor to make up a missed lab within **24** hours of the missed lab. The lab needs to be made up during the two week cycle, **while that lab is still being conducted.** Failure to do so will result in an **incomplete**. Lab grades are determined by participation, work habits, conduct, instructor assessment, pop quiz grades, and the

successful completion of projects. Each student must complete the lab projects successfully. All students will come prepared for the lab with a 3 ring binder containing the semester labs handouts and PPE.

**Grading:**

There will be weekly quizzes. The questions will be drawn from lectures, lab sessions, and the Marine Engineering Workbook and texts.

The final grade will be determined as follows:

Machine Shop Lab	x .20
Weekly Quizzes	x .60
Final Exam	x .20

Welding lab is pass or fail

A minimum grade of C- is required to pass this course.

Massachusetts Maritime Academy is committed to providing reasonable accommodations for students with documented disabilities. The Director of Disability Compliance works in collaboration with faculty and other campus departments to provide support for students with disabilities. This coordination of efforts complies with the mandates of Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990.

Week	Book & Topic <u>VER 10</u>	PAGES	Due Date Month/Day
2.	Safety (lathe)	Safety (Lab 1 handout)	
	Safety (welding)	(MTP) Hazards in lathe operations (WTF) Weld safety, checklist	375-377 13-19
	Tooling	(MTP) Toolholders, cutting tools	386-400
	OFW & Gas Cutting	(WTF) Equipment & Supplies	Chap 20
3.	Lathe Basics	(MTP) Engine lathe	379-385
	Spindle	(MTP) Spindle tooling	401-406
	Operating Controls	(MTP) Controls	407-411
	Facing, Ctr. Drilling	(MTP) Facing, ctr. drilling	413-421
	OFW & Gas Cutting	(WTF) Equipment assy. and adj	Chap 21
4.	Turning between Centers	(MTP) Work between centers	422-434
	Alignment of Centers	(MTP) Alignment of centers	435-437
	Oxyfuel Gas Cutting	(WTF) Gas cutting	Chap 22
5.	Other Lathe Operations	(MTP) Drilling, boring etc.	438-451
	Brazing and Braze Welding	(WTF) Brazing and Braze Welding	Chap 25
6.	60 deg. Thread	(MTP) Calculations	452-455
	Cutting Ext Thrd.	(MTP) Cutting ext. UNC thrd.	457-467
	Physics Of Welding	(WTF) The physics of welding	Chap 3
	Weld Joints	(WTF) Weld joints and positions	Chap 4
7.	Hand Tools	(MTP) Hacksaws	55-57
		(MTP) Files	58-63
		(MTP) Hand reamers	64-67
		(MTP) Taps	68-78
		(MTP) Dies	79-82
	SMAW	(WTF) Equipment & Supplies	Chap 5
	SMAW	(WTF) Equipment Assy & Adj.	Chap 6
8.	Measurement	(MTP) Steel rules (inch)	105-111
	Direct Measurement	(MTP) Vernier caliper (inch)	114-117
		(MTP) Dial caliper (inch)	120-121
	Micrometer Inst.	(MTP) Types, readings	123-138
	Vernier Mics.	(MTP) Reading vernier mics.	141-143
	Comparison Instruments	(MTP) Comparison Instruments	144-155
	SMAW	(WTF) Electrodes	Chap 7
		(WTF) Flat welding position	Chap 8
9.	Lathe Tapers	(MTP) Cutting tapers	472-482
	SMAW	(WTF) Horizontal, vert. & OH positions	Chap 9
10.	Steady & Follower Rests	(MTP) Using rests	483-488
	SMAW	(WTF) Surfacing	Chap 10
11.	Sawing Machines	(MTP) Sawing machines	293-301
		(MTP) Using recip & horz machines	302-311
		(MTP) Abrasive & Cold saws	312-314
	Vertical Band Machine	(MTP) Prep & usage	315-323
	Welding Symbols	(WTF) Welding symbols	Chap 33
12.	Drilling Machines	(MTP) Types	331-334
		(MTP) The drill press	335-337
	Drilling tools	(MTP) Drilling tools	338-346
		(MTP) Hand grinding	347-350
	Drilling operations	(MTP) Operating drilling machines	351-362
	Countersinking & boring	(MTP) Countersinking	363-365
13.	Inspection & Testing Welds	(WTF) Inspection and testing welds	Chap 34
			12/9

Week	Book & Topic <u>VER 9</u>	PAGES	Due Date Month/Day
2.	Safety (lathe)	Safety (Lab 1 handout)	
	Safety (welding)	(MTP) Hazards in lathe operations (WTF) Weld safety, checklist	387-390 13-19
	Tooling	(MTP) Toolholders, cutting tools	399-412 9/9
	OFW & Gas Cutting	(WTF) Equipment & Supplies	Chap 20
3.	Lathe Basics	(MTP) Engine lathe	391-398 9/16
	Spindle	(MTP) Spindle tooling	413-419
	Operating Controls	(MTP) Controls	420-424
	Facing, Ctr. Drilling	(MTP) Facing, ctr. drilling	425-434
	OFW & Gas Cutting	(WTF) Equipment assy. and adj	Chap 21
4.	Turning between Centers	(MTP) Work between centers	435-447 9/23
	Alignment of Centers	(MTP) Alignment of centers	448-450
	Oxyfuel Gas Cutting	(WTF) Gas cutting	Chap 22
5.	Other Lathe Operations	(MTP) Drilling, boring etc.	451-464 9/30
	Brazing and Braze Welding	(WTF) Brazing and Braze Welding	Chap 25
6.	60 deg. Thread	(MTP) Calculations	465-469 10/7
	Cutting Ext Thrd.	(MTP) Cutting ext. UNC thrd.	470-480
	Physics Of Welding	(WTF) The physics of welding	Chap 3
	Weld Joints	(WTF) Weld joints and positions	Chap 4
7.	Hand Tools	(MTP) Hacksaws	54-56 10/14
		(MTP) Files	57-62
		(MTP) Hand reamers	63-66
		(MTP) Taps	67-76
		(MTP) Dies	77-80
	SMAW	(WTF) Equipment & Supplies	Chap 5
	SMAW	(WTF) Equipment Assy & Adj.	Chap 6
8.	Measurement	(MTP) Steel rules (inch)	107-113 10/21
	Direct Measurement	(MTP) Vernier caliper (inch)	116-119
		(MTP) Dial caliper (inch)	122-123
	Micrometer Inst.	(MTP) Types, readings	125-139
	Vernier Mics.	(MTP) Reading vernier mics.	143-145
	Comparison Instruments	(MTP) Comparison Instruments	146-157
	SMAW	(WTF) Electrodes	Chap 7
		(WTF) Flat welding position	Chap 8
9.	Lathe Tapers	(MTP) Cutting tapers	485-495 10/28
	SMAW	(WTF) Horizontal, vert. & OH positions	Chap 9
10.	Steady & Follower Rests	(MTP) Using rests	496-501 11/4
	SMAW	(WTF) Surfacing	Chap 10
11.	Sawing Machines	(MTP) Sawing machines	302-312 11/18
		(MTP) Using recip & horz machines	313-322
		(MTP) Abrasive & Cold saws	323-325
	Vertical Band Machine	(MTP) Prep & usage	326-340
	Welding Symbols	(WTF) Welding symbols	Chap 33
12.	Drilling Machines	(MTP) Drill machine types	341-345
		(MTP) The drill press	346-348 12/2
	Drilling tools	(MTP) Drilling tools	349-357
		(MTP) hand grinding drills	358-361
	Drilling operations	(MTP) Operating drilling machines	362-373
	Countersinking & boring	(MTP) Countersinking	374-375
13.	Inspection & Testing Welds	(WTF) Inspection and testing welds	Chap 34 12/9

	Monday	Tuesday	Wednesday	Thursday	Friday
		1 Orientation	2 LAB 1	3 LAB 1	4
	7 HOLIDAY	8 ADD LAB 1	9 CLASS 1 LAB 2A	10 LAB 2A	11
SEPT	14 LAB 1	15 LAB 2A	16 CLASS 2 LAB 2B	17 LAB 2B	18
	21 LAB 2A	22 DROP LAB 2B	23 CLASS 3 LAB 3A	24 LAB 3A	25
	28 LAB 2B	29 LAB 3A	30 CLASS 4 LAB 3B		
				1 LAB 3B	2
	5 LAB 3A	6 LAB 3B	7 CLASS 5 LAB 4A	8 LAB 4A	9
OCT	12 HOLIDAY	13 MONDAY SCH LAB 3B	14 15 CLASS 6 LAB 4B	15 LAB 4B	16
	19 LAB 4A	20 LAB 4A DEFICIENCIES	21 CLASS 7 LAB 5A	22 LAB 5A	23
	26 LAB 4B	27 LAB 4B	28 CLASS 8 LAB 5B	29 LAB 5B	30
	2 LAB 5A	3 LAB 5A	4 CLASS 9 LAB 6A	5 LAB 6A	6
	9 LAB 5B	10 LAB 5B WITHDRAW	11 HOLIDAY	12 LAB 6B	13
NOV	16 LAB 6A	17 CLASS 9 LAB 6A	18 CLASS 10 LAB 6B	19 LAB 7A	20
	23 LAB 6B	24 LAB 6B	25 HOLIDAY	26 HOLIDAY	27 HOLIDAY
	30 LAB 7A				
		1 LAB 7A	2 CLASS 11 LAB 7A	3 LAB 7B	4
DEC	7 LAB 7B	8 LAB 7B	9 CLASS 12 LAB 7B	10	11 End Classes
	14 Finals	15 Finals	16 Finals	17 Finals	18 Finals

