

MASSACHUSETTS MARITIME ACADEMY
DEPARTMENT OF ENGINEERING
EN3112L – Strength of Materials Lab

COURSE: EN3112L- Strength of Materials Lab
SEMESTER: Fall 2022– Thursday, 0800-0950
ROOM: Bresnahan, ground floor, Materials Lab

INSTRUCTOR: Pete Carroll P.E.
210A Harrington
pcarroll@maritime.edu

OFFICE HOURS: 1000 – 1050 AM M, W, F.

COURSE DESCRIPTION: This laboratory reinforces the basic concepts of normal stress, shear stress, torsion, beam bending, beam deflection, and beam design as taught in the Strength of Materials course. Additional topics include: Izod and Charpy impact testing, compressive strength, material hardness, and buckling. Large emphasis will be placed on incremental growth in using EXCEL spreadsheets.

PREREQUISITE: Current enrollment in, or previous completion of, EN3112 Strength of Materials.

Note: if you withdraw from the Strength of Materials class, you must withdraw from the lab. You may withdraw from the lab without withdrawing from the class.

COURSE OBJECTIVES: At the completion of this course, the student should be able to:

- Conduct basic engineering experiments
- Apply strength of materials concepts to physical systems
- Analyze data and formulate engineering conclusions
- Write professional technical documents
- Organize and Display data in a logical and professional manner
- Recognize the differences between theoretical and actual engineering systems
- Work as a team to solve technical problems

CLASS SCHEDULE: This course meets once a week for 110 minutes in a laboratory setting.

GRADING:	Lab Assignments	85%
	Participation	15%

NOTES REGARDING GRADING: ALL lab assignments are REQUIRED to pass this class.

SUBMISSION AND ETHICS POLICY:

1. All lab assignments are graded on an INDIVIDUAL basis and must be ORIGINAL work. If you are found to have used another student's work to complete your assignment, you are in violation of this requirement and will fail the course. **DO NOT COPY SOMEONE ELSE'S WORK IN WHOLE OR IN PART.** If you have questions, or are confused, please seek my help. I will do everything I can to work you through your questions.
2. All lab assignments, memoranda and reports must be submitted to Blackboard, or as instructed, in accordance with the due dates noted on the attached assignment schedule before they are considered complete and ready for grading.
3. If your assignment is one day late, you will lose 10% on your grade. If your assignment is two days late, you will lose 30% on the grade. If your assignment is three days late, you will lose 60% on the grade. **Assignments 4 or more days late will be considered as a non-submission and will not be accepted.** **If you fail to submit two lab write-ups within the appropriate window, you will**

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receive an F for the course and are no longer be eligible to remain in the lab. *Remember, if you have not filed your electronic copy, your submission is INCOMPLETE.*

- 4. When spreadsheets are required for lab submissions, they shall be in Microsoft Excel format.** No other format is acceptable. You have access to FREE Excel. Submit an IT help ticket if you don't have access to Excel. We will use Excel for 90% of the class.
- It's highly encouraged to use the Writing Resource Center (WRC) in the Information Commons prior to submission.

ATTENDANCE: You are required to be in uniform of the day, **coveralls are NOT allowed.** There will be **NO** makeup labs for unexcused absences. If you have 2 unexcused absences, you will FAIL the course. In order to be excused from any lab, you must notify me well in **ADVANCE** (24 hours) of your class period, with an approved reason for your absence. You will not receive credit for the lab you miss unless you make prior arrangements with another instructor to attend an alternate lab session. Attending another instructor's lab session **MUST** be first approved by myself and the other instructor 24 hours before the lab.

SOFTWARE: Excel and Word format for your lab submissions only!

CONTRIBUTION TO THE PROFESSIONAL COMPONENT: Strength of Materials Lab, a required course for Marine Engineering, Facilities Engineering and Energy Systems Engineering, requires that students use the fundamental knowledge from other courses in the program, such as: mathematics, physics, and statics. This course contributes 1 semester hour to the engineering topic requirement.

RELATIONSHIP OF COURSE OBJECTIVES TO PROGRAM EDUCATIONAL OBJECTIVES:

Strength of Materials Lab supports the following Program Educational Objectives: all of the Intellectual Learning characteristics listed in MMA course catalog.

ABET CRITERION 3 OUTCOMES (2020-21):

Outcome	
1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	†
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	N
3. an ability to communicate effectively with a range of audiences	†
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	N
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	†
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	†
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies	†

† Outcome achieved

N – Outcome is not applicable

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STUDENT ACCOMMODATIONS: The Academy offers, upon request, accommodations to students with documented learning disabilities. The ADA Coordinator, Asst. Dean Elaine Craghead, evaluates the documentation provided, determines appropriate services, and is available to discuss accommodations with students. The Disability Resources office is located in the Academic Resource Center, ABSIC 320. Students can drop in during normal business hours, M-F 0800-1600, or call x5120, or email ADAcompliance@maritime.edu.

Letter Grade Cut-Offs:

$93 \leq X \leq 100$	A	$77 \leq X \leq 79$	C+
$90 \leq X \leq 92$	A-	$73 \leq X \leq 76$	C
$87 \leq X \leq 89$	B+	$70 \leq X \leq 72$	C-
$83 \leq X \leq 86$	B	$67 \leq X \leq 69$	D+
$80 \leq X \leq 82$	B-	$63 \leq X \leq 66$	D
		$X < 63$	F

There will be no D- grades given. You must have an average ≥ 63 in order to pass this class

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LAB SCHEDULE

LAB SECTION	TUES LAB DATE	TOPIC	Assignment	DUE DATE
41	09/08/22	Introduction/Excel	Excel Graph/Table	9/08/22
41	09/15/22	Double Shear Test	Excel Graph/Table	9/15/22
41	09/22/22	Impact Tests (Izod or Charpy)	Excel Graph/Table	9/22/22
41	09/29/22	Tensile Test	Excel Graph/Table	9/29/22
41	10/06/22	Poisson's Ratio	Memorandum	10/7/22
41	10/13/22	Torsion Test	Memorandum	10/14/22
41	10/20/22	Compression	Excel Graph/Table	10/20/22
41	10/27/22	Column Buckling	Excel Graph/Table	10/27/22
41	11/03/22	Bending Stress on a Prismatic Beam	Memorandum	11/04/22
41	11/10/22	Beam Deflection	Excel Graph/Table	11/10/22
41	11/17/22	Stress Concentration	Excel Graph/Table - team	in class
41	12/01/22	Elastic Curve	Memorandum - Team	12/02/22
41	12/08/22	Principal Stresses	Excel Graph/Table	12/8/22

Note: All submissions are per individual unless otherwise noted