

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

COURSE: EN3112L Strength of Materials Lab
SEMESTER: Spring 2023
ROOM: Br108

INSTRUCTOR: LCDR G. M. Stephens, P. E.
213A Harrington
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(508) 830-5284

COURSE DELIVERY SPRING SEMESTER 2023: This course is intended to be delivered in-person. In the event that classes are moved off-campus, a synchronous style online learning format will be used to complete the course learning outcomes. Blackboard will be used for posting information (announcements, readings, lecture notes, assignments, videos, and raw (unweighted) grades from BB assignments).

STUDENT HOURS: Monday and Wednesday during 1st period, Tuesday 2nd period or by appointment. Office hours will be held in-person unless otherwise arranged.

COURSE DESCRIPTION: This laboratory reinforces the basic concepts of normal stress, shear stress, torsion, beam bending, beam deflection and deflection, and beam design as taught in the Strength of Materials course. Additional topics include: Izod and Charpy impact testing, compressive strength, and column buckling. Formal engineering reports are required with emphasis on writing and spreadsheet skills.

PREREQUISITE: Current enrollment in, or previous satisfactory 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.

TEXT: None

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

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

CLASS SCHEDULE: This course meets once a week for 2 hours in a laboratory setting

GRADING: Lab Assignments – 90%
Classroom Participation – 10%

NOTE(S) REGARDING SUBMISSIONS AND GRADING:

1. ALL written assignments are REQUIRED for successful completion of this class
2. All memoranda and excel files are graded on an INDIVIDUAL basis and must be ORIGINAL work unless otherwise noted on the assignment. If you are found to have used another student's

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work to complete your assignment, you are in violation of this requirement whether or not it amounts to an honor violation and are subject to removal from the course. **DO NOT COPY SOMEONE ELSE'S WORK IN WHOLE OR IN PART.**

3. All assignments must be uploaded to Blackboard as noted on the attached schedule.
4. Written assignments must be edited and reviewed prior to submission. All previous comments must be incorporated into future work. I may require you to use the Student Success Center (SSC) in the Information Commons prior to submission.
5. **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.**
6. Late homework will be assessed a 10% penalty for each day late. **Assignments 4 or more days late will be considered as a non-submission and will not be accepted.** No credit will be given for any assignment that is four or more days late. No credit will be given for any assignment submitted in conjunction with an unexcused absence.
7. If you fail to submit two assignments within the appropriate window, you will receive an F for the course and are no longer be eligible to remain in the lab.

ATTENDANCE: You are expected to be present for all labs in the proper uniform of the day. There will be **NO** makeup labs for unexcused absences.

CELL PHONES: Cell phones and other similar electronic devices are to be silenced and stored out of sight.
CALCULATORS ON CELL PHONES ARE NOT ALLOWED.

FOOD/BEVERAGES: No food or beverages will be allowed in the classroom with the exception of water

SAFETY POLICY: You will need eye protection for many experiments conducted in this lab. Any additional safety precautions will be outlined prior to conducting each individual lab.

CONTRIBUTION TO THE PROFESSIONAL COMPONENT: Strength of Materials Lab, a required course for Energy Systems Engineering, Facilities Engineering and Marine Engineering degrees, requires that students use the fundamental knowledge from other courses in the program, such as: mathematics, physics, and statics (mechanics). 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 Student Outcomes and all five of the Institutional Learning Objectives listed in MMA course catalog.

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ABET CRITERION 3 STUDENT OUTCOMES:

Outcome	
1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	NA
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	NA
3. an ability to communicate effectively with a range of audiences	NA
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	NA
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	NA
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	Y
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies	NA

Y Outcome achieved
NA – Outcome is not applicable

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 ADAcpliance@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 #	LAB SECTION	TUES LAB DATE	TOPIC	Assignment	DUE DATE
1 2 3 4 5 6 7 8 9 10 11 12	43	03/02/23	Lab Intro & Syllabus Review	Download Excel	3/2/2023
	43	03/09/23	Excel	Excel Graph/Table	3/10/23
	43	03/16/23	Double Shear Test	Excel Graph/Table	3/17/23
	43	03/23/23	Tensile Test	Excel Graph/Table	3/24/23
	43	03/30/23	Izod/Charpy Impact Test	Excel Graph/Table	3/31/23
	43	04/06/23	Poisson's Ratio	Memorandum	4/9/23
	43	04/13/23	Torsion Test	Excel Graph/Table	4/14/23
	43	04/20/23	Stress Concentration	Memorandum	4/23/23
	43	04/27/23	Principal Stresses	Excel Graph/Table	4/28/23
	43	05/04/23	Beam Deflection	Excel Graph/Table	5/5/23
	43	05/11/23	Elastic Curve	Memorandum	5/14/23
	43	05/18/23	Compressive Strength	Excel Graph/Table	5/19/23
43	05/25/23	Column Buckling	Excel Graph/Table	5/26/23	

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