

Massachusetts Maritime Academy  
Auxiliary Machinery One (EN-1211)  
Spring 2022 (3.5 Credits)

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Office Hours: Mon., Weds, Fri. 7<sup>th</sup> Period (14:00-14:50)

COVID-19: It is expected that all MMA cadets/students comply with MMA Policies and Protocols

Cell Phones MUST be turned off and NO TEXTING during class! Your Cell Phone must be off and in your pocket. YOU CANNOT USE YOUR CELL PHONE AS A CALCULATOR!

Laptops: Used only with my permission and students must sit in front of class so I can view laptop screen, which is ONLY to be used for class. Any issues regarding this, I will deny Laptop use in my class. Also, NO RECORDING of MY CLASS, AUDIO or VISUAL, without my permission

Class Conduct: Any student who distracts my class; whether verbal, written, electronic or what I Judge pertinent in my class, including Inappropriately wearing the UNIFORM of the DAY will be dismissed from my class with (3) points deducted from their FINAL COURSE grade. You will be reported to COMCAD.

Textbooks:

Introductory to Steam Engineering: EN-1111 Notes  
Auxiliary Machinery, U.S. Department of Energy EN-1211  
Auxiliary Machinery I Study Guide  
Engineering Training Manual (TS Kennedy)

Website: [web.maritime.edu](http://web.maritime.edu) Go to USCG License Exam Preparation, then MEWB Test Generator (7<sup>th</sup> Edition). Also, go to STCW Training Videos

Uniform and Dress Code: Cadets are expected to be in the proper uniform of the day as announced by the Commandant of Cadets Department. NO BOILER SUITS!

NO FOOD or DRINKS in CLASS.... EXCEPTION.... You may drink water from your container or bottled water in my class. YOU ARE RESPONSIBLE TO REMOVE YOUR BOTTLE OR CONTAINER FROM CLASS AND TO CLEAN-UP ANY ACCIDENTAL SPILLS!!!!

Please use HEAD PRIOR to class! If it is an EMERGENCY and you must go, you must first ask permission!

NO electronic devices may be used in during exams EXCEPT a non-data-transmitting calculator. Calculators MAY NOT be shared during an exam. Any infringement from this policy will constitute cheating and will be treated as such in accordance with regimental manual/academic policies. YOU CANNOT USE YOUR CELL PHONE AS A CALCULATOR!

Course Description: Auxiliary Machinery I am a (3.5) credit course that lays the foundation for future engineering courses. Students will learn the basic principles of construction, operation, maintenance and repair of auxiliary machinery systems. Topics include pipe and fittings: valves, pumps and heat exchangers; pressure, temperature, level and flow measurement; piping and instrument diagrams (P & ID) and blueprint reading. Both shore-side and marine applications are discussed. This is a required course for all engineering students and contains STCW knowledge and practical elements. A grade of C- or better is required to pass.

Standard in Training, Certification, and Watchkeeping (STCW) Auxiliary Machinery I am an STCW Course. STCW policy requires a passing grade of 70 or higher for any STCW course. The STCW course grading will be A, B, C, C- or F. No "D" grading policy. You will Pass or Fail. Failing will require Auxiliary Machinery I again.

Prerequisites: Engineering Systems and Safety (EN-1112); Intermediate Algebra (SM-0112)

Course Objective: Auxiliary Machinery I prepare the student in the fundamentals of operation, maintenance and repair of auxiliary machinery systems. Knowledge of the construction and purpose of system components is paramount. Emphasis is placed on safety and the specific engineering topics and systems discussed.

Learning Objectives: At the completion of the course, the student should be able to:

- Demonstrate knowledge and understanding of the following STCW elements:
- [AB-E-A5.1](#) Basic knowledge of the function of auxiliary machinery
- [AB-E-A5.1](#) Basic knowledge of the operation of auxiliary machinery
- [AB-E-A6.1](#) Knowledge of oil transfer operations
- [AB-E-A6.1](#) Preparations for fueling and transfer operations
- [AB-E-A6.1](#) Procedures for connecting and disconnecting fueling and transfer hoses
- [AB-E-A6.1](#) Procedures relating to incidents that may arise during fueling or transferring operation
- [AB-E-A6.1](#) Procedures for securing from fueling and transfer operations
- [AB-E-A8.1](#) Safe operation of valves and pumps
- [AB-E-B1.1](#) Ability to use lubrication materials and equipment
- [OICEW-A4.1](#) Basic construction and operation principles of pumps
- [OICEW-A4.1](#) Basic construction and operation principles of heat exchanges
- [OICEW-A5.2](#) Operation of pumping systems
- [OICEW-A5.2](#) Routine pumping operations
- OICEW-C1.4 Methods for carrying out safe emergency/temporary repair
- [OICEW-C1.7](#) Use of various types of sealants and packings
- [OICEW-C2.2](#) Appropriate basic mechanical knowledge and skills
- [OICEW-C2.5](#) Design characteristics and selection of materials in construction of equipment
- [OICEW-C2.6](#) Interpretation of machinery drawings and handbooks

Demonstrate proficiency in the following skills:

[ABE-1-6A](#) Assist with fuel oil transfer

OICEW-8E2A Make emergency repairs

RFPEW-1H2C Shift and clean a basket-type duplex strainer

The Course supports the achievement of the following ABET objectives:

An ability to apply knowledge of mathematics, science and engineering

An ability to identify, formulate and solve engineering problems

An ability to communicate effectively

ATTENDANCE: Attendance is mandatory for class lectures and lab instruction. Daily Attendance will be taken. TWO (2) Points will be deducted from your Final grade for each class missed. Missing (4) classes results in a FAILURE for this course. If you miss a class, for any reason, you are responsible for all lessons and assignments. All medical/Illness absences must be accompanied by a signed medical document upon return to class. You must attend your assigned class, no “switching” to an earlier class. You must take exams on scheduled dates, confirmed by me. If, due to an MMA sporting event/activity, in which the Dean acknowledges your absence, you must immediately schedule with me the appropriate time to make-up this exam/Quiz, after which taken, the class exams will be returned.

Sleeping in class: Any student sleeping during any part of my class will be dismissed from class. This will be considered an absence from class with (2) points deducted from the Final Grade Point average.

Special Liberty Policy: Please do not ask the Instructor to sign a special liberty request. The only special liberties recognized by the engineering department are those of an emergency nature which are granted directly by the Commandant of Cadets office.

Notebooks: Students are expected to maintain a NEAT three-ring notebook for the course materials.

Grading Policy:

Quizzes.....40%  
Mid-Term.....15%  
Final Exam.....15%  
Homework.....20%  
Labs..... 10%

Grading Scale:

A, 95-100	B+, 87-89	B-, 80-82	C, 73-76	F > 70
A-, 90-94	B, 83-86	C+, 77-79	C-, 70-72	

Homework:

- Homework assignments will be given during class.
- Homework must be submitted in pdf format emailed to me before the beginning of class, the date it is due.
- LATE HOMEWORK NOT ACCEPTED!
- Homework must be neat and well-written/typed or NO Credit will be given.
- There must be a "Title" page.

Examination Material:

- There will be weekly quizzes, a Mid-term exam and a Final Exam.
- Exams will be a mix of multiple-choice and written questions. Illegible written answers will receive ZERO Credit!
- If a quiz needs to be rescheduled, the new quiz date and subject material will be announced in class.
- Material for exams/quizzes will come from subject matter covered in Class, the TS Kennedy, required reading assignments, handouts, homework, labs, safety and USCG questions from the web. maritime website and Blackboard.
- All written and drawn test answers must be neat or no credit will be given. If topic/subject materials are to be changed, for any quiz/exam, I will announce the changes to the class. Quizzes/Midterm will be returned after all students take the exam.

Quiz/ Midterm Make-up: If you miss a quiz or the Midterm exam, due to a MEDICAL or Major Family Issue, you must take quiz/ Midterm at a mutually convenient time immediately upon returning to class.

TOPICS

- Steam Cycle Review
- Fasteners and Hardware
- Piping Identification
- Pipe connection Methods
- Piping and Instrumentation Diagrams
- Valve Functions and Basic Parts
- Safety Valves and Relief Valves
- Pneumatically Operated Valves
- Steam Traps
- Filters and Strainers
- Temperature Measurements
- Pressure Measurements
- Level Measurements
- Heat Exchangers
- Non-Positive Displacement Pumps
- Positive Displacement Pumps
- Process Control

OTHER OBJECTIVES

- Calculate the dimensions of a section of pipe or tubing
- Explain the construction techniques and materials used in a section of pipe or tube
- Identify all pipe fittings used in a fluid piping system
- Describe the types and purpose of various flange connections used in a high-pressure fluid piping system
- Identify the various types of expansion joints used in a fluid piping system
- Discuss the various operational problems associated with fluid piping systems
- Identify the various materials used in packing and gasket sealing systems
- Calculate the size of moving shaft packing sizes
- Discuss the importance of the "Lock out-Tag out" safety procedure
- Explain the various methods of renewing fixed gasket joints and the safety concerns involved
- Calculate pressure readings in both the gage and absolute scales
- Calculate pressure readings based on the height of various liquids
- Identify the various pressure measuring devices
- Calculate temperature readings in both Fahrenheit and Celsius scales
- Discuss the difference between thermometers and pyrometers
- Describe the methods of liquid level measurements. Deep or Ullage soundings
- Identify the various types of valves used in a fluid piping system. Demonstrate use of piping symbols on system drawings to identify these valves
- Discuss the construction differences in valves used in low- and high-pressure piping systems
- Discuss the troubleshooting of problems associated with valves
- Describe the operation of a spring-loaded pressure regulating valve
- Demonstrate knowledge of the purpose of the basic parts of a spring-loaded pressure reducing valve
- Discuss operational problems associated with the failure of various parts of a spring-loaded pressure reducing valve
- Describe the use of diaphragm control valves in a pneumatic piping system
- Describe the operation of a pneumatically operated pressure regulating valve
- Discuss the features of a diaphragm control valve in regards to whether it "Fails-Open or Fails Closed."

Topics and Dates:

SAFETY Topic material will come from class, lab, Introduction to Steam Engineering Ch. 9, TS Kennedy, OSHA, and will be discussed in various classes.

NOTE: THERE IS OVERLAP IN TOPIC MATTER. THIS ALLOWS US TO ADVANCE TO THE NEXT TOPIC OR REVIEW. THE PAGES ARE REDUNDANTLY WRITTEN FOR CLASS CONVENIENCE.

Topics and Dates.....REQUIRED READING .....BLACKBOARD COURSE CONTENT

Content is Posted as per class and subject material before each exam. This material is updated continually and it is YOUR responsibility to study this material.

Class One: Weds. 3/2/22

- Safety.....Review.....Posted as per CLASS
- Fatigue.....Review
- Loto .....Review
- Engineering Terms.....Review
- Steam Cycle.....Intro. to Steam Engineering  
Ch. 1 and 2
- Piping and Instrumentation Diagrams (P&ID) .....DOE Handbook pp. 121-176

Class Two: FRI. 3/4/22 (QUIZ 1)

- Review
- Steam Cycle.....Intro. to Steam Engineering  
Ch. 1 and 2
- Thermodynamic principles.....DOE Handbook pp. 9-30
- Steam Tables.....Intro. to Steam Engineering pp 157-160

Topics and Dates.....REQUIRED READING .....Required viewing of Blackboard Course Content

Class Three: MON. 3/7/22

Review  
Steam Cycle .....Introduction to Steam Engineering  
Ch. 1 and 2  
Thermodynamic principles.....DOE Handbook pp. 9-30  
Steam Tables.....Intro Steam Engineering pp 157-160  
Piping and Instrumentation Diagrams (P&ID) .....DOE Handbook pp. 121-176

Posted as per CLASS

Class Four: WEDS. 3/9/22

Review  
ISOMETRIC DRAWING in class Today or next class  
Piping and Instrumentation Diagrams (P&ID) .....DOE Handbook pp. 121-176  
Measuring Tools.....Aux. Mach. I Study Guide pp 19-30  
Fasteners and Hardware.....Aux. Mach. I Study Guide pp. 9-18

Class FIVE: FRI. 3/11/22 (QUIZ 2)

ISOMETRIC DRAWING in class Today or next class  
Review  
Piping and Instrumentation Diagrams (P&ID) .....DOE Handbook pp. 121-176  
Measuring Tools.....Aux. Mach. I Study Guide pp 19-30  
Fasteners and Hardware.....Aux. Mach. I Study Guide pp. 9-18

Class SIX: MON. 3/14/22

Review  
Measuring Tools.....Aux. Mach. I Study Guide pp 19-30  
Fasteners and Hardware.....Aux. Mach. I Study Guide pp. 9-18  
Torque Wrenches.....Aux. Mach. I Study Guide pg. 37  
Basic Pressure measuring instruments .....DOE Handbook pp 59- 71  
Pressure scales, conversion factors.....Aux. Mach. I Study Guide pp 73-95.  
(Gages ,Pressure Instruments, manometers, Transducers)

Class SEVEN: WEDS. 3/16/22

Review  
Measuring Tools.....Aux.Mach.I Study Guide pp 19-30  
Fasteners and Hardware.....Aux. Mach. I Study Guide pp. 9-18  
Pressure scales, conversion factors.....Aux. Mach. I Study Guide pp 73-95.  
Basic measuring instruments .....DOE Handbook pp 59- 71  
(Gages, Pressure Detectors, manometers, Transducers)

Class EIGHT: FRI. 3/18/22 (QUIZ 3).....HOMEWORK #1 is DUE

Review  
Fasteners and Hardware.....Aux.Mach, I Study Guide pp. 9-18  
Level Measurements .....DOE Handbook pp 72-88  
Pressure scales, conversion factors.....Aux. Mach. I Study Guide pp 73-95.  
(Gages ,Pressure Detectors, manometers, Transducers)

Class NINE: Mon. 3/21/22

Review

Level Measurements .....DOE Handbook pp 72-88

Temperature Scales, conversion factors..... DOE Handbook pp 43-58

Basic Temperature measuring instruments .....Aux. Mach. I Study Guide pp 63-71

Thermocouples/RTD's.....continued next page.

Topics and Dates.....REQUIRED READING .....Required viewing of Blackboard Course Content

Pressure scales, conversion factors.....Aux. Mach. I Study Guide pp 73-95.  
(Gages ,Pressure Detectors, manometers, Transducers)

Posted as per CLASS

Class TEN: WEDS. 3/23/22

Review

Level Measurements .....DOE Handbook pp 72-88

Temperature Scales, conversion factors.....DOE Handbook pp 43-71

Basic Temp.measuring instruments.....Aux. Mach. I Study Guide pp 63-71

Thermocouples/RTD's

Class ELEVEN: FRI. 3/25/22 (QUIZ 4)

Review

Temperature Scales, conversion factors.....DOE Handbook pp 43-71

Basic measuring instruments.....Aux. Mach. I Study Guide pp 63-71

Thermocouples/RTD's

Class TWELVE: MON. 3/28/22

Review

Pipe/Tubing..... Aux. Mach. I Study Guide pp. 105-116

Pipe/Tubing Identification and Materials.....Aux. Mach. I Study Guide pp. 117-120

Pipe/Tubing Pipe Fittings and Joints.....Aux. Mach. I Study Guide121-137

Piping Problems.....Aux. Mach. I Study Guide 138-145

Basic measuring instruments..... .Aux. Mach. I Study Guide pp 63-71

Thermocouples/RTD's

Class THIRTEEN: WEDS. 3/30/22

Review

Pipe/Tubing Identification and Materials..... Aux Mach I Study Guide pp. 117-120

Pipe/Tubing Pipe Fittings and Joints .....Aux Mach I Study Guide121-137

Pipefitting/Tubing Tools .....Aux Mach I Study Guide pp. 44-60

Piping Problems..... Aux Mach I Study Guide 138-145

Class FOURTEEN: FRI. 4/1/22 (QUIZ 5)

Review

Pipe/Tubing Identification and Materials.....Aux Mach I Study Guide pp. 117-120

Pipe/Tubing Pipe Fittings and Joints .....Aux Mach I Study Guide 121-137

Pipefitting/Tubing Tools .....Aux Mach I Study Guide pp. 44-60

Piping Problems.....Aux I Study Guide 138-145

Class FIFTEEN: MON. 4/4/22....

Review

Pipefitting/Tubing Tools .....Aux Mach I Study Guide pp. 44-60

Pipe/Tubing Identification and Materials..... Aux I Study Guide pp. 117-120

Pipe/Tubing Pipe Fittings and Joints .....Aux Mach I Study Guide121-137

Piping Problems.....Aux Mach I Study Guide 138-145

Steam traps.....DOE Handbook pp 251-255.

Class SIXTEEN: WEDS. 4/6/22 .....

Review

Pipefitting/Tubing Tools ..... Aux Mach I Study Guide pp. 44-60

Pipe/Tubing Pipe Fittings and Joints .....Aux Mach I Study Guide121-137

Piping Problems.....Aux Mach I Study Guide 138-145

Continued next page.

Topics and Dates.....REQUIRED READING .....Required viewing of Blackboard Course Content

Steam traps.....DOE Handbook pp 251-255.  
Aux Mach I Study Guide pp 159-172

Posted as per CLASS

Class SEVENTEEN: FRI. 4/8/22...(Quiz 6) HOMEWORK #2 DUE

Review

Steam traps.....DOE Handbook pp 251-255.  
Aux Mach I Study Guide pp 159-172

Review

Pipe/Tubing.....Aux Mach I Study Guide pp. 105-116

Pipe/Tubing Identification and Materials.....Aux Mach I Study Guide pp. 117-120

Pipe/Tubing Pipe Fittings and Joints.....Aux Mach I Study Guide121-137

Piping Problems.....Aux Mach I Study Guide 138-145

Class EIGHTEEN: MON. 4/11/22

Review

Steam traps.....DOE Handbook pp 251-255.  
Aux Mach I Study Guide pp 159-172

Review

Pipe/Tubing.....Aux Mach I Study Guide pp. 105-116

Pipe/Tubing Identification and Materials.....Aux Mach I Study Guide pp. 117-120

Pipe/Tubing Pipe Fittings and Joints.....Aux Mach I Study Guide121-137

Piping Problems.....Aux Mach I Study Guide 138-145

Class NINETEEN: Weds., 4/13/22

MID-TERM EXAM

EXAM INCLUDES ALL MATERIAL UP TO THIS POINT; Class Work, Homework, Safety, Reading Assignments

Class Twenty: WEDS. 4/20/22.

Review

Valves Types, Parts and Functions.....DOE Handbook pp. 201-250, 394-400  
Aux Mach I Study Guide pp 187-243

Packing and Gaskets .....Aux Mach I Study Guide pp 173-185

Regulating Valves-Spring Loaded.....Aux Mach I Study Guide pp 219-231  
(Including Reducing Valves)

Regulating Valves-Air Operated.....Aux Mach I Study Guide pp. 233-243

Valve Actuators.....DOE pp. 244-250

Class Twenty-one: FRI. 4/22/22 (Quiz 7)

Review

Valves Types, Parts and Functions.....DOE Handbook pp. 201-250, 394-400  
.Aux Mach I Study Guide pp 187-243

Packing and Gaskets .....Aux Mach I Study Guide pp 173-185

Regulating Valves-Spring Loaded.....Aux Mach I Study Guide pp 219-231

(Including Reducing Valves)  
Regulating Valves-Air Operated.....Aux Mach I Study Guide pp. 233-243  
Valve Actuators.....DOE pp. 244-250

Class Twenty-two: MON. 4/25/22

Review  
Valves Types, Parts and Functions.....DOE Handbook pp. 201-250, 394-400  
Aux Mach I Study Guide pp 187-243  
Packing and Gaskets .....Aux Mach I Study Guide pp 173-185  
Regulating Valves-Spring Loaded.....Aux Mach I Study Guide pp 219-231

Continued net page.

Topics and Dates.....REQUIRED READING .....Required viewing of Blackboard Course Content

(Including Reducing Valves)

Posted as per CLASS

Regulating Valves-Air Operated.....Aux Mach I Study Guide pp. 233-243  
Valve Actuators.....DOE pp. 244-250  
Relief and Safety Valves.....DOE pp. 240-242  
Aux Mach I Study Guide pp. 200-202

Class Twenty-three: WEDS... 4/27/22 .....

Review  
Valves Types, Parts and Functions..... DOE Handbook pp. 201-250, 394-400  
Aux Mach I Study Guide pp 187-243  
Packing and Gaskets .....Aux Mach I Study Guide pp 173-185  
Regulating Valves-Spring Loaded.....Aux Mach I Study Guide pp 219-231

(Including Reducing Valves)  
Regulating Valves-Air Operated.....Aux Mach I Study Guide pp. 233-243  
Valve Actuators.....DOE pp. 244-250

Relief and Safety Valves.....DOE pp. 240-242  
Aux Mach I Study Guide pp. 200-202

Class Twenty-Four: FRI. 4/29/22(Quiz 8) Homework #3 DUE

Review

Valves

Heat Exchangers.....DOE Handbook pp 293-310  
Strainers.....DOE Handbook pp. 256-264  
Aux Mach I Study Guide pp. 147-157

Class Twenty-Five: MON. 5/2/22 Review

Heat Exchangers.....DOE Handbook pp 293-310  
Strainers.....DOE Handbook pp. 256-264

Class Twenty-six: WEDS. 5/4/22

Review

Heat Exchangers.....DOE Handbook pp 293-310  
Strainers.....DOE Handbook pp. 256-264  
Aux Mach I Study Guide pp. 147-157

Class Twenty-seven: FRI. 5/6/22 (Quiz 9)

Review

Heat Exchangers.....DOE Handbook pp 293-310  
Strainers.....DOE Handbook pp. 256-264  
Aux. Mach. I Study Guide pp. 147-157



Positive Displacement Pumps.....DOE Handbook pp. 282-292  
Non-Positive Displacement Pumps.....DOE Handbook pp 265-281  
Aux. Mach.I Study Guide pp 249-275

Class Twenty-eight: MON. 5/9/22

Positive Displacement Pumps.....DOE Handbook pp. 282-292  
Non-Positive Displacement Pumps.....DOE Handbook pp 265-281  
Aux. Mach. I Study Guide pp 249-275

Class Twenty-nine: WEDS. 5/11/22

Review

Positive Displacement Pumps.....DOE Handbook pp. 282-292  
Non-Positive Displacement Pumps.....DOE Handbook pp 265-281  
Aux. Mach. I Study Guide pp 249-275

Topics and Dates.....REQUIRED READING ..... Required viewing of Blackboard Course Content

Class Thirty: FRI. 5/13/22 (QUIZ 10)

Review

Positive Displacement Pumps.....DOE Handbook pp. 282-292  
Non-Positive Displacement Pumps.....DOE Handbook pp 265-281  
Aux. Mach. I Study Guide pp 249-275

Posted as per CLASS

Class Thirty-one: MON. 5/16/22

Review

Positive Displacement Pumps.....DOE Handbook pp. 282-292  
Non-Positive Displacement Pumps.....DOE Handbook pp 265-281  
Aux. Mach. I Study Guide pp 249-275

Class Thirty-two: WEDS. 5/18/22

Review

Positive Displacement Pumps.....DOE Handbook pp. 282-292  
Non-Positive Displacement Pumps.....DOE Handbook pp 265-281  
Aux. Mach. I Study Guide pp 249-275

Class Thirty-three: FRI. 5/20/22 (QUIZ 11)

Review

Positive Displacement Pumps.....DOE Handbook pp. 282-292  
Non-Positive Displacement Pumps.....DOE Handbook pp 265-281  
Aux. Mach. I Study Guide pp 249-275

Fuel Oil Transfer

Class Thirty-four: MON. 5/23/22

Review

Bunkering and Bunkering Safety ..... Class Discussion  
Fuel Oil Transfer  
Safety

Class Thirty-five: WEDS. 5/25/22

Homework #4 DUE

Review

Bunkering and Bunkering Safety .....Class Discussion  
Fuel Oil Transfer  
Safety

Class Thirty-Six: FRI. 5/27/22 (Quiz 12) HOMEWORK #4 is DUE

Review

Process Control.....DOE Handbook pp 341-393

Power Plant Operation/Class  
Safety

Class Thirty-seven: TUES, 5/31/22: Review

Review  
Process Control.....DOE Handbook pp 341-393  
Power Plant Operation/Class  
Safety

Class Thirty-eight: WEDS. 6/1/22...

Review  
Process Control.....DOE Handbook pp 341-393  
Power Plant Operation/Class  
Safety

Topics and Dates.....REQUIRED READING .....Required viewing of Blackboard Course Content

Class Thirty-nine: FRI. 6/3/22 (Quiz 13)

Review  
Process Control.....DOE Handbook pp 341-393  
Power Plant Operation/Class  
Safety

Posted as per CLASS

Class Forty: MON. 6/6/22

LAST CLASS: REVIEW

- Textbook pages may vary with recent editions.
- LABS:
- Labs will meet in Bresnahan Rm 126 or where the Lab Instructor designates. Bring lab handouts, given in class, with you. All labs must be completed to the satisfaction of the lab instructor. Any lab missed will cause the final grade to be issued as an “INCOMPLETE.” There are no make-up labs at the end of the semester. If you miss a lab, YOU are responsible to make it up
- Lab Attire: Wear PPE; Long-sleeve Boiler Suit, Hard Hat, Steel-Toed Boots, Hearing Protection, Flashlight, gloves.
- Bring (3) Ring Binder and Pen/Pencil and calculator.
- Learning Disabilities: MMA is committed to providing reasonable accommodations to students with documented disabilities. Students who believe they need accommodations in this class are required to contact Mr. Fran Zitcovich, Acting director of Disability Compliance, the first day of class at ext. 2208 or by e-mail at [ftishkevich@maritime.edu](mailto:ftishkevich@maritime.edu)
- \*MMA Health Services realizes that students may encounter situations which could impede their academic, personal and social development and success. Counseling services are designed to help students address these concerns, increase their self-awareness and empower them to manage challenging areas in their lives. To schedule a confidential appointment please email [Jlevesque@maritime.edu](mailto:Jlevesque@maritime.edu) or call ext. 1480.

Academic Accessibility Services: MMA is committed to providing reasonable accommodations to students with documented disabilities. Students who believe they need accommodations in this class are required to contact ADA Coordinator: Dr. Elaine Craghead, Asst. Dean, ABSIC 320, phone x5120, email:[ADAAcompliance@maritime.edu](mailto:ADAAcompliance@maritime.edu), Hrs.: Monday -Friday,8-4.

(We're here 8-4, Monday-Friday)

