Course: Auxiliary Machinery 1: EN-1211-11 & EN-1211-12 **Spring 2025**

Class meets: Mon, Weds & Fri 08:00, class 11 and 09:00 class 12, Bresnahan Building, Room 201

Instructor: CAPT Jim Albani Office: Room 208A Harrington
E-Mail: jalbani@maritime.edu
Office Hours: M, W:10:00-10:50, T:12:00-13:00, or by appointment

Prerequisites:

Engineering Systems and Safety

Entrance Requirements

- Basic understanding of steam cycle.
- Understand basic engineering concepts
- Understand the operation and design of pressure and temperature regulating devices.

Text:

Required: Auxiliary Machinery, US DOE Fundamentals Handbook

Auxiliary Machinery 1 Study Guide

Introduction to Marine Engineering (online)

Course Description:

EN-1211 lays the foundation for future engineering courses. Students will learn the basic principles of construction, operation, maintenance and repair of piping systems and associated components. Topics include pipe and fittings, valves, pumps, heat exchangers, pressure, temperature, level and flow measurement, piping and instrumentation diagrams (P&ID), and blueprint reading

The laboratory portion consists of cutaway equipment, operational trainers, and simulators; and the use of actual power plant equipment to enhance the understanding of material presented in the course. The laboratory grade will be generated by the laboratory instructors and will consist of 10% of your final grade.

Student Notebook:

The course content will be delivered in a variety of formats including Blackboard presentations, Power Point presentations, handouts and reading assignments. Each student will be required to have a 3-ring binder notebook for the taking of notes and keeping of class handouts, etc. My expectation is that students maintain and add to their notebook throughout the semester. To encourage a well-kept notebook, I will occasionally allow the use of the student's notebook during quizzes.

Caution:

- Students are required to bring their notebook and writing utensils to class. See Student Notebook above
- No food or drink of any kind is allowed in the classroom.
- Leaving the class is to be discouraged. If you feel it's an emergency, you may raise your hand and ask for permission to leave. The Class is 50 minutes long. If I can be here, so can you.
- Smart phone or smart watch use of any kind is not permitted in class, and shall be silenced and stored out of sight before entering the class room, and remain so for the entire duration the class. There will be a one (1), point deduction from the final course average for each violation of this policy. I reserve the right to confiscate your phone during if it becomes an issue.
- Programmable calculators are not allowed during quizzes and exams
- Cell phones may not be used as a calculator
- No smart watches can be used in class, during quizzes or the final.

Black Board:

Material shared in class, such as handouts, static Power Point presentations, etc. will be posted on Blackboard. Make sure you can access Blackboard to download class materials, review PowerPoints in preparation for quizzes, etc. Class static Power Point presentations are typically posted within a few days following the class lecture.

Uniforms:

No boilers suits are allowed in the classroom, only the proper uniform of the day as announced by the Commandant of Cadets. If you come to my class in a boiler suit you will be told to leave and will not be allowed back into my class until you are in the proper uniform.

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 (1) point deducted from the Final Grade Point average for each occurrence.

Attendance and class participation:

- **Attendance is mandatory** along with **class participation** for all class lectures and lab instruction.
- This class is a required STCW course, students who miss four (4) or more classes will fail the course.
- For each unexcused class absence, the final grade will be reduced by 1 percent.
- Students with perfect attendance will have their lowest quiz grade dropped.
- Except for an excused absence, there will be **NO** make-up quizzes offered. Missing a quiz equals ZERO for that quiz.
- Lab classes are **Mandatory**. An "Incomplete" grade will be issued if all labs are not completed.

*** **Communication:** ***

- *A key to your success in my class is communication. If you are having trouble understanding the material, an upcoming scheduling conflict, concerns or other issues you need to address, reach out to me early in the process. Ideally via e-mail or an office visit.*
- *I have an open-door policy. I recommend you take advantage of it. The time to talk to me is before these conflicts become issues that will negatively affect your grade.*
- *Check your e-mail regularly, in the event I have to contact you or the class before a regularly scheduled lecture. E-mail is the best way to contact me outside of the classroom; jalbani@maritime.edu*

Academic Honesty:

Cheating will not be tolerated. If I have concerns of a violation of the honor code, I will pursue the violation with the Commandant of Cadets. In serious cases, violation of the honor code can result in dismissal from the Academy. As a minimum, a zero will be given to both the cheatee and the cheater involved in that quiz, assignment, etc.

Students with Disabilities:

Massachusetts Maritime Academy is committed to providing reasonable accommodations to students with documented disabilities. Students who believe they may need accommodations in this class should contact the ADA Coordinator: Dr. Elaine Craghead in ABS Information Commons Room 320, by phone at 508-830-5120 or email at ADAcompliance@maritime.edu to discuss specific needs.

Grading:

- Quizzes (Weekly on Friday) 65%
- Class Participation 5%
- Final Exam 20%
- Lab Grade 10%

Grading Scale

A: 95-100	B+: 87-89	B-: 80-83	C: 74-76	F: >70
A-: 90-94	B: 84-86	C+: 77-79	C-: 70-73	

Note:

This course is a STCW required course; the only grades earned in this class will be "A, B, C, or F." The lowest passing grade is a C-. If you have below a 70 (C-), you will fail the course and have to repeat the course again

Topics:

1. Steam Cycle Review
2. Fasteners and Hardware
3. Piping Identification
4. Pipe Connection Methods
5. Piping and Instrumentation Diagrams
6. Valve Functions and Basic Parts
7. Safety Valves and Relief Valves
8. Pneumatically Operated Valves
9. Packing and Gaskets
10. Steam Traps
11. Filters and Strainers
12. Temperature Measurements
13. Pressure Measurements
14. Level Measurements
15. Heat Exchangers
16. Non-Positive Displacement Pumps
17. Positive Displacement Pumps
18. Process Control

Learning Outcome:

Success in this course will be measured through examination and application of your understanding of the principles of construction, operation, maintenance, and repair of piping systems and their associated components.

Learning Objectives:

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

- Interpret machinery drawings and diagrams
- Interpret piping, hydraulic and pneumatic diagrams
- Safely operate pumps, valves, and pumping systems
- Conduct routine pumping operations
- Discuss the construction and operational principles of pumps, valves, and heat exchangers
- Discuss the methods and measurement of temperature, pressure, level, and flow
- Perform basic calculations and unit conversions involving system parameters
- Demonstrate basic mechanical knowledge and skill in a workshop environment

STCW Learning Objectives:

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-C1.7 Use of various types of sealants and packing
- 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

A word about in-person class:

My expectation is to complete this semester in-person in the classroom. However, in the event that the campus is closed due to an increase or outbreak in Covid cases and we are forced to transition to a remote format, Blackboard Learn is the platform I will be utilizing. The best thing we can do to prevent this is to follow all Covid protocols. Let's not let our guard down.

Reading Assignments:

Reading assignments are taken from the *DOE Fundamentals Handbook*, *Engineering Training Manual TS Kennedy* (Haynes), and handouts as required.

Reading assignments are mandatory. *The material in the reading assignments may be included on quizzes, even if it has not been reviewed in class*. Reading assignments may be amended as the course moves along.

- Steam Cycle – Chapter 1 Engine Training Manual
- Print Reading, Diagrams & Symbols_ DOE 121-176
- Fasteners, Hardware & Hand Tools – Handout (Blackboard)
- Piping Identification – Handout (Blackboard)
- Pipe Connection – Handout (Blackboard)
- Valve Functions – DOE 202-243
- Safety Valves – DOE 224-243
- Pneumatically Operated Valves – DOE 244-250
- Steam Traps – DOE 251-255
- Filters and Strainers – DOE 256-263
- Temperature Measurements – DOE 43-58
- Pressure Measurements – DOE 59-71
- Level Measurements – DOE 72-88

- Heat Exchangers – DOE 293-310
- Non-Positive Displacement Pump Overview – DOE 265-280
- Positive Displacement Pump Overview – DOE 282-292
- Process Control – DOE 346-400

Note: Reading assignments could change depending on pace of class.

Note: While every effort is made to adhere to the syllabus, instructor reserves the right to amend the course content as required.