

**Course:** Auxiliary Machinery II (ME) EN-2111 Fall 2015

**Instructor:** Lt. Olivia Humphrey, Assistant Professor  
**Office:** Harrington Building, Room 212A  
**Phone/Email:** Ext. 2076 [ohumphrey@maritime.edu](mailto:ohumphrey@maritime.edu)  
**Office Hours:** Mon, Tues, and Fri; 5th period 1200-1300

**Text:**  
**Excerpts from Department of Energy (DOE) Fundamentals Handbook**  
**Marine Engineering Workbook and Illustrations**  
**Engineering Training Manual (ETM), TS Kennedy**

**Prerequisite:** Auxiliaries 1 (En-1222)

**Course Description:**

A continuation of EN-1211 and covers the construction, operation, maintenance, and repair of basic power plant systems, steam traps, strainers, pumps, heat exchangers, condensers, air ejectors, deaerators, hydraulic systems and components, and air compressors and systems. The laboratory consists of CAD use to draw specific training ship systems; the use of cutaway equipment, operational trainers, and simulators; and the use of actual ship's equipment to enhance the understanding of material presented in the course. [Lab time required]

**Entrance Requirements**

- Demonstrate a basic understanding of piping systems
- Understand the construction and function of valves
- Understand the operation and design of pressure and temperature regulating devices
- Understand the construction, operation, and function of pressures and temperature measuring devices

**Homework:**

Homework will be assigned and will be subject material for exams. All homework assignments must be passed in on due dates with no exceptions. Late or illegible homework will not be accepted, and graded as a zero. For medical exemptions, homework must be passed in on an agreed upon date with me.

**Quizzes:**

Quizzes will be given throughout the semester and will be announced in advance. Material for the quizzes will come from subject matter covered in class, labs, reading assignments, handouts, [web.maritime.edu](http://web.maritime.edu) website, course textbooks and homework. There will be no make-up quizzes given.

**Attendance:**

Students with two (2) or less unexcused absences will have the lowest **QUIZ** grade dropped. There will be **NO** quiz make-ups. For each *unexcused* absence over two (2) there will be a 1-point deduction from the final course average. Labs are mandatory. Each missed Lab will cause the final course average to be reduced by 3.33%.

**Grading:**

Quizzes (50%), Final (30%), Homework (10%) and Labs (10%)

**Grading Scale:**

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

**Standard in Training, Certification, and Watch keeping (STCW):**

Auxiliary Machinery II is 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 make up the course.

**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.

**Uniform and Dress Code:**

Cadets are expected to be in proper uniform of the day as announced by the Commandant of Cadets.

**CELL PHONES RINGERS MUST BE OFF!!!!****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 Fran Tishkevich, 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)

**Student Learning Outcomes:**

The main objective of the course is to give the student a basic understanding of the Installation, Operation and Maintenance of Auxiliary Systems and Equipment that relate to the Marine Industry.

## Learning Objectives:

### Demonstrate knowledge and understanding of the following STCW elements:

- OICEW-A1.2 Change-over of remote/automatic to local control of all systems
- OICEW-A4.1 Basic construction and operation principles of air compressors
- OICEW-A4.1 Basic construction and operation principles of fresh water generators
- OICEW-A4.1 Basic construction and operation principles of steering gear
- OICEW-A4.1 Basic construction and operation principles of deck machinery
- OICEW-A4.3 Preparation, operation, fault detection and measures to prevent damage for auxiliary prime movers and associated systems
- OICEW-A4.3 Preparation, operation, fault detection and measures to prevent damage for auxiliary machinery
- OICEW-C2.3 Dismantling, adjustment and reassembling of machinery and equipment
- OICEW-C2.4 The use of appropriate specialized tools
- OICEW-C2.7 The interpretation of piping, hydraulic and pneumatic diagrams

### Demonstrate proficiency in the following skills:

- OICEW-5-1D Start air compressor
- OICEW-5-1E Shut down air compressor
- OICEW-8-2A Centrifugal pump maintenance
- OICEW-8-2B Reciprocating pump maintenance

### Other Objectives

- Read and follow written instructions.
- Read and understand a blueprint.
- Properly handle basic hand tools.
- Gain an appreciation of the dependence of the auxiliary systems serving a power plant.
- Understand the principles of operation and the construction details of Auxiliary Machinery.
- Disassemble and reassemble centrifugal pumps.
- Operate a pump, monitoring suction, discharge pressures and power requirements.
- Disassemble and reassemble a duplex, double acting reciprocating pump, set the steam admission valves properly, prove the correct settings by actual operation in a closed circuit system.
- Disassemble and reassemble a two stage reciprocating air compressor. Run the air compressor to demonstrate correct operation.
- Perform a complete pump alignment. Prove alignment within 0.002".
- Identify hydraulic components.
- Disassemble, inspect and reassemble hydraulic pumps and control devices.
- Construct hydraulic systems on hydraulic simulator.
- Operate hydraulic systems and demonstrate proper operation.

The laboratory consists of the breakdown and repair of operating pumps and compressors including the electrical demand parameters of the machinery both loaded and unloaded. The laboratory uses cutaway equipment and operational trainers and simulators to enhance the understanding of the material presented in the course.

## TOPICS

1. Thermodynamic Properties/Steam Traps
2. Pump Overview
3. Centrifugal Pumps
4. Reciprocating Pumps
5. Rotary Pumps
6. Heat Exchangers
7. Air Compressors and Compressed Air System
8. Hydraulics
9. Air Removal Equipment
10. Demineralizers
11. Evaporators, MSD units and Oil/Water Separator
12. Combined Cycle Operation

## READING ASSIGNMENTS

- Handout/ Blackboard
- Handout/ Blackboard
- pg. 265 – pg. 280/ Blackboard
- pg. 282 – pg. 285/Blackboard
- pg. 286 – pg. 292/Blackboard
- pg. 304 – pg. 310/ Blackboard
- pg. 311 – pg. 318/Blackboard
- pg. 320 – pg. 323/Blackboard
- pg. 328 – pg. 333/Blackboard
- pg. 334 – pg. 339/Blackboard
- Handout/ Blackboard
- Chapter 2      P.P. Presentation