

Course: Auxiliary Machinery II (ME)

Department of Marine Engineering
Auxiliary Machines II (EN-2111)
Fall 2015

Instructor: Lt. Donald E. Trudeau, Assistant Professor
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Office Hours: Mon, Wed, and Fri; 3rd period 1000-1100

Text:

- Excerpts from Department of Energy (DOE) Fundamentals Handbook
- Marine Engineering Workbook and Illustrations
- Engineering Training Manual (ETM), TS Kennedy
- Handouts will be distributed during class lectures and lab instruction

Prerequisite: Auxiliaries I (EN-1222)

Course Description:

A continuation of EN-1211 and to prepare the student in understanding the design, operation and function of shipboard power plant auxiliary equipment and their associated systems. The labs will 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

Grading:

Quizzes (60%),
Final (20%)
Class participation (10%)
Labs (10%)

Grading Scale:

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

Course: Auxiliary Machinery II (ME)

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.

Attendance:

Attendance is mandatory for all class lectures and lab instruction. Special Liberties DO NOT COUNT as excused.

Students with perfect attendance will have their lowest quiz grade dropped. There will be NO make-up quizzes offered even with an excused absence and NO QUIZZES WILL BE DROPPED. Missing a quiz equals zero.

Students will be allowed two excused absences from class lectures only provided they notify me twenty-four hours before the scheduled class. Students will have to make-up all required work.

For each unexcused lecture absence, your final grade will be reduced by 2 percent.

Lab instruction classes are **mandatory**. Disciplinary action will be taken if needed. An "Incomplete" grade will be issued if all labs are not completed.

Uniform and Dress Code:

Cadets are expected to be in proper uniform of the day as announced by the Commandant of Cadets. NO BOILER SUITS ARE ALLOWED IN THE CLASSROOM, YOU WILL BE ASKED TO LEAVE THE CLASS AND MARKED ABSENT IF YOU WEAR A BOILER SUIT TO CLASS.

CELL PHONES MUST BE OFF AND PUT AWAY!!!!

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

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.

Student will also understand the importance of "Lock out – Tag out" (LOTO) safe working practices and procedures and also conduct proper LOTO during all lab work.

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