

COURSE: **Auxiliaries II (F.E.)** **EN-2121** **Fall 2022**

INSTRUCTOR: CDR Todd Hibbert Office: Room C210A Harrington
Phone/Email: Ext. 2014 thibbert@maritime.edu
Office Hours: 3rd period Monday, Wednesday, Friday

TEXT: **Excerpts from DOE Fundamentals Handbook**
Engineering Symbology, Prints and Drawings, DOE-HDBK-1016/193
Instrumentation and Control, DOE-HDBK-1010/1-92
Mechanical Science, DOE-HDKB-1018/1-92
Thermodynamics, Heat Transfer and Fluid Flow, DOE-HDBK
1012/1-92

Engineering Training Manual (ETM), TS Kennedy

PREREQUISITE: Auxiliaries 1 (EN-1222)

GRADING: Quizzes (60%), Final (30%), Labs (10%)

NOTE: Programmable calculators are not allowed during quizzes and exams.
Cell Phones are not allowed in class. If a cell phone or any other electronic
communication device is found during class there will be a zero given for
a test
grade.

ATTENDANCE: Students with no unexcused absences will have the lowest quiz grade
dropped. There will be **NO** quiz make-ups. For each *unexcused* absence there will be a 1%
deduction from the final course average. Labs are mandatory. Missed Labs will have to be made
up at the Instructor's convenience.

*MMA is committed to providing reasonable accommodations to students with documented
disabilities. Students who believe they may need accommodations in this class are required to
contact Ms. Elaine Craghead, Director of Disability Compliance, within the first two weeks of
class at ext. 5120 or by email at ecraghead@maritime.edu*

TOPICS

READING ASSIGNMENTS

- | | | |
|--|---------|-------------------|
| 1. PUMP OVERVIEW | Handout | |
| 2. CENTRIFUGAL PUMPS | | pg. 265 – pg. 280 |
| 3. RECIPROCATING PUMPS | | pg. 282 – pg. 285 |
| 4. ROTARY PUMPS | | pg. 286 – pg. 292 |
| 5. HEAT EXCHANGERS | | pg. 304 – pg. 310 |
| 6. AIR COMPRESSORS AND
COMPRESSED AIR SYSTEMS | | pg. 311 – pg. 318 |
| 7. HYDRAULICS AND SYSTEMS | | pg. 320 – pg. 323 |
| 8. AIR REMOVAL EQUIPMENT | | pg. 328 – pg. 333 |

9. DEMINERALIZERS	pg. 334 – pg. 339
10. COMBINED CYCLE OPERATION	Chapter 2 P.P. Presentation
11. INTRODUCTION TO PROCESS CONTROL	pg. 341 – pg. 400

STUDENT LEARNING OUTCOMES: The main objective of the course is to give the student an understanding of the Installation, Operation and Maintenance of Auxiliary Equipment and Systems in the Facility and Power Industry.

Learning Objectives:

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

- Understand the installation, operation, maintenance, and repair of operating machinery
- Understand the types of steam traps and how each one operates
- Understand the types of strainers and how each one operates
- Understand how to identify both positive and non-positive displacement pumps and how each operate.
- Understand and demonstrate how air compressors operate
- Understand the different types of heat exchangers and how each operates
- Understand and demonstrate how vacuum pumps, air injectors and deaerators operate
- Understand and demonstrate how hydraulic systems operate down to the component level
- Understand and demonstrate how pneumatic systems operate down to the component level
- Understand the basic operating characteristics of combined-cycle operation.
- Understands the basics of process control

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.