

COURSE: **Auxiliaries II (F.E.)** **EN-2121** **FALL 2012**

INSTRUCTOR: LCDR Todd Hibbert Office: Room C210A Harrington
 Phone/Email: Ext. 2014 thibbert@maritime.edu
 Office Hours: Mon. 5th period, Wed. 5th period, Fri. 5th period

TEXT: **Excerpts from DOE Fundamentals Handbook**
 Engineering Symbology, Prints and Drawings, DOE-HDBK-1016/1-93
 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 (20%), Midterm (20%), Final (30%), Project (10%),
 Labs (10%), Weekly Reports (10%)

NOTE: Programmable calculators are not allowed during quizzes and exams.
 Cell Phones are not allowed in class.

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. Fran Tishkevich, Acting Director of Disability Compliance, within the first two weeks of class at ext. 2208 or by email at ftishkevich@maritime.edu

<u>TOPICS</u>	<u>READING ASSIGNMENTS</u>
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 AND

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.

*****NOTE*****

There will be a weekly Summary due the last class of the Semester. Below is “The Weekly Report”, which is **10%** of the grade. Every missing Summary will be a deduction of **1%** of the Report grade.

The Summary should look like the following example:

AUXILIARY SUMMARY

TO: LCDR Hibbert
FROM: Your Name
RE: Weekly Reports
DATE: xxxx

Lt. Hibbert,

During the week of xxxx, we talked about (subject). I learned that (tell me what you learned this week), I didn't understand (tell me what you didn't understand)

(Note: Use one space after commas, etc. and two spaces after a period. Set the page at 12 font and “Times Roman Numeral”. Double space between lines). Finish with the following:

Regards,

Your Name

*****NOTE*****

There will be a Design Project due the last class by 1600. This “Design Project” is **10%** of the Final grade. The objective of this Project is to design an operating system that works. To complete the project you must:

1. Chose a fluid product to pump from “A” to “B”
2. Include the following in the system you design:
 - Type of Fluid
 - Type of Pump
 - Type and Number of Valves
 - Type, size, length of pipe runs, and fittings to be used
 - Pressure Indication (PI)
 - Temperature Indication (TI)
3. Include a legend in the bottom of the right hand corner of the page that explains the symbols used in the P&ID.
Example: Pump, valves, pipe size changes, pipe fittings, pressure indication, and temperature indication.

