COURSE:	Auxiliaries I	EN-122	Spring 2012
INSTRUCTOR:	LCDR Todd Hibbert	Office: Phone/Email: Office Hours:	Room C210A Harrington Ext. 2014 <u>thibbert@maritime.edu</u> Mon. 3 rd Period, Wed. 4 ^{3rd} Period Fri. 3 rd Period
TEVT.	Execute from DOF	Fundamentala	Handhaak

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
Themodynamics, Heat Transfer and Fluid Flow, DOE-HDBK-1012/1-92

Engineering Training Manual (ETM), TS Kennedy

COURSE INFORMATION

DESCRIPTION: This course lays the foundation for future engineering courses. Students will learn the basic principles of construction, operation, maintenance and repair of piping systems. Topics include pipe and fittings; valves, pumps, and heat exchangers; pressure, temperature, level and flow measurement; piping and instrument diagrams (P&ID) and blueprint reading. Both shoreside and marine applications are discussed.

This is a required course for all engineering students and contains STCW knowledge and practical elements. A grade of "C- "or better is required.

PREREQUISITE: Engineering Systems and Safety (EN-1112) Intermediate Algebra (SM-0112)

Course Goals / Learning Outcomes

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

- Interpret machinery drawings and handbooks
- 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 of 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

The course supports the achievement of the following ABET objectives:

- An ability to apply knowledge of mathematics, science, and engineering
- An ability to identify, formulate, and solve engineering problems
- An ability to communicate effectively

GRADING: Quizzes (20%), Midterm (20%), Final (20%), Writing Project (10%), Design Project (20%) and Labs (10%)

ATTENDANCE: 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. Each missed Lab will cause the final course average to be reduced by 3.33%. Everyone will take the final.

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

TOPICS

READING ASSIGNMENTS

1.	Steam Cycle Review	ETM: p. 16
2.	Fasteners and Hardware	Handout
3.	Piping Identification	Handout
4.	Pipe Connection Methods	Handout
5.	Piping and Instrumentation Diagrams	Pages: # 121 - # 176
6.	Valve Functions and Basic Parts	Pages: # 202 - # 243
7.	Safety Valves and Relief Valves	Pages: # 224 - # 243
8.	Pneumatically Operated Valves	Pages: # 244 - # 250
9.	Steam Traps	Pages: # 251 - # 255
10.	Filters and Strainers	Pages: # 256 - # 263
11.	Temperature Measurements	Pages: # 43 - # 58
12.	Pressure Measurements	Pages: # 59 - # 71

13. Level Measurements	Pages: # 72 - # 88
14. Heat Exchangers	Pages: # 293 - # 310
15. Non Positive Displacement Pump Overview	Pages: # 265 - # 280
16. Positive Displacement Pump Overview	Pages: # 282 - # 292
17. Process Control	Pages: # 346 - #400

****NOTE****

There will be a Semester Summary due the last class by **1600**. "This Project" is **5%** of the Final grade. Every **missing** Summary will be a deduction of **1%** of the Project grade. The Summary should look like the following example:

AUXILIARY 1 SUMMARY

TO:LCDR HibbertFROM:Your NameRE:Semester SummaryDATE:Last Classes' Date

Lt. Hibbert,

During the week of xxxx, we talked about (subject). I learned that (explain what you

learned).

During the week of yyyy, we talked about (subject). I learned that (explain what you

Learned).

Do the same thing for every week during the semester

(Note: Use Microsoft Word. Set the page at 12 font and "Times Roman Numeral." Double space between lines. Use one space after commas, etc. and two spaces after a period. Make sure you use spell check before passing it in.

At the end of the Project put:

Regards, "Your Name"

****NOTE****

There will be a Design Project due the last class by 1600. This "Design Project" is **20%** 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.