MASSACHUSETTS MARITIME ACADEMY ENGINEERING DEPARTMENT CDR. R. Phelan

Spring Semester 2016

COURSE:

EN-3213 Refrigeration

CREDITS:

2-1/2

INSTRUCTORS:

R. Phelan

OFFICE INFO:

Office: H210, voice: ext. 2305

EMAIL:

rphelan@maritime.cdu

OFFICE HOURS:

Monday period 5, Wed. period 5, Thurs. period 4, or by appointment

Blackboard and internet assignments.

OPTIONAL: Althouse, Turnquist, Bracciano, Modern Refrigeration and Air Conditioning 18th Ed,

Goodheart-Willcox, 2004

GRADING:

READINGS:

Individual Exams 40%, Homework 10%, Pop Quiz 10%, Lab Quiz 20%, Lab STCW 20%

LEARNING OBJECTIVES:

Demonstrate knowledge and understanding of the following STCW elements:

OICEW-A4.1 Basic construction and operation principles of refrigeration, air-conditioning and ventilation systems

 OICEW-A4.3 Preparation, operation, fault detection and measures to prevent damage for refrigeration, air-conditioning and ventilation systems

Demonstrate proficiency in the following skills:

- OICEW-5-1B Start refrigeration system
- OICEW-5-1C Shut down refrigeration system

Other Objectives

Explain the purpose and interrelations of the components of a refrigeration system

Explain the basic construction and operating principles of refrigeration, air-conditioning and ventilation systems.

 Properly prepare, start, operate, fault detect and determine through measurement the operating status of refrigeration systems system to ensure damage prevention.

Determine the refrigerant used in a system

Explain the process to perform leak detection, system maintenance and repair

Safely recover, evacuate, recharge a system

Calculate required refrigeration load

Topic	Subject	Assignment
1.*	Safety (quizzed only)	1)Blackboard: "Safety"
		2) QUIZ: First full week of class
2.	Basic Refrigeration	1)Blackboard: Basic Refrigeration
		2)Print and submit a copy of the Danfoss certificate of completion
3.	Commercial Refrigeration Systems	1) Blackboard: Intro to Commercial Refrigeration Systems (Corr. Lab 1)
	1980 H	2) Print and submit a copy of the Danfoss certificate of completion
4.	System Calculations	1) Blackboard: System Calculations (Corr. Lab 2)
		2) Complete homework sheet posted in Blackboard.
5.	Refrigeration Fundamentals	1) Blackboard: Refrigeration Fundamentals (Thermodynamics/Refrigerants) (Corr.
	(Thermodynamics/Refrigerants)	Lab 2)
		2) Print and submit a copy of the Danfoss certificate of completion for both modules
6.	Refrigeration System	1)Blackboard: "Refrigerant System Servicing and Testing Equipment" (Corr. Lab 3
	Servicing/Testing Equipment	&4)
		2)Homework TBA.
7.	Refrigerants and Their Properties	1) Blackboard: "Refrigerants"
8.	Compressors	1)Blackboard: Compressors
		2) Print and submit a copy of the Danfoss certificate of completion
		3)Given a system in class, research and select a compressor. Write a summary
		explaining why you chose that compressor. Include: Mfg., specifications/data
9.	Condensers	1)Blackboard: "Condensers"
		2)TBA.

10.	Metering Devices	1)Blackboard: Metering Devices
	AD 100 100 100 100 100 100 100 100 100 10	2) Print and submit a copy of the Danfoss certificate of completion
11.	Evaporators	1)Blackboard: "Evaporators"
		2)Written assignment TBA
12.		2)Written assignment TBA
13.	Refrigerant Management and the EPA	1)Blackboard: Core, Type I, Type II, Type III 2)Assignment: TBA
14	Coast Guard Diagram review	Marine Engineering Workbook

Course Policy

- Classes are mandatory for all classes and labs. All requests for excuse from class must be presented in <u>writing prior to the absence</u>. There will be 2 point deducted from your final grade for every unexcused class absence. Four (4) unexcused class absences will constitute an immediate course Failure grade. A Failure grade will be given if a lab is missed. There will be <u>NO</u> make-up labs at the end of the semester.
- 2. The <u>uniform of the day will be worn</u> in proper order within the classroom. Non-regimented students will wear professional casual attire. Appropriate attire and safety glasses will be worn in lab.
- 3. Cellphones, tablets and other social/entertainment devices are not allowed during class for any reason (ie as a substitute for a calculator...). If seen during class, it will be confiscated.
- 4. Exams will be given as necessary. Material for the exams may come from material covered in class, labs, reading assignments, handouts, labs, films, Coast Guard study guide (MEWB) and visuals etc...There are NO make-up exams given. ONE exam will be dropped at the end of the semester.
- 5. If you miss a class for any reason, you are responsible for all lessons, assignments...
- 6. NO electronic devices may be used during exams EXCEPT a non-wireless data-transmitting calculator. Calculators MAY NOT be shared during a quiz or exam. Any infringement from this policy will constitute cheating and will be treated as such in accordance with regimental manual/academic policies.
- 7. Except for the Team projects, any work **not** done on an **individual** basis will constitute cheating and will be treated as such in accordance with regimental manual/academic policies.
- 8. The Refrigerant Use Certification exam will be offered near the end of the semester. If a Universal certification is obtained, 10 points will be added to your final grade. If any other certification is obtained, 5 points will be added. These points cannot be used to increase a grade of 60.0 or less.
- 9. There may be periodic assignment changes to this syllabus. You will be required to be cognizant of, and perform to these changes as they are occur. Any update to the revised syllabus will be posted in Blackboard. It WILL NOT be handed out in paper form.

- *This is a STCW course. You must maintain at least a C- (70 average) in order to pass this course!
- * There is a STCW assessment done during the last lab. The assessment must be passed by all majors or a FAILURE will be given for the course!

Lab quiz and assessment grading:

Lab quizzes will account for 20% of your final grade.

STCW assessment grade 20% of your grade: 1^{st} try -100%; 2^{nd} try -80%; 3^{rd} try -60%; 4^{th} try -0%

^{*}MMA is committed to providing reasonable accommodations to students with documented disabilities. Students who believe they may need accommodations for this class are required to contact Prof. Fran Tishkevich, Director of Disability Compliance, within the first two weeks of class at ext. 2208 or by email at ftishkevich@maritime.edu.

^{*}MMA Health Services realizes that students may encounter situations which could impede their academic, personal and social development and success. Counseling services are designed to help students address these concerns, increase their self-awareness and empower them to manage challenging areas in their lives. To schedule a confidential appointment please call ext 1480.