

**MASSACHUSETTS MARITIME ACADEMY
ENGINEERING DEPARTMENT
CDR. R. Phelan / R, McMurray
Fall Semester 2012**

COURSE:	EN-3213 Refrigeration	CREDITS:	2-1/2
INSTRUCTORS:	R. Phelan / R. McMurray	OFFICE INFO:	Office: H210, voice: ext. 2305
EMAIL:	rphelan@maritime.edu		
OFFICE HOURS:	Monday / Wednesday. period 1, Tuesday period 4 or by appointment		
READINGS:	Blackboard and internet assignments.		
GRADING:	Individual Exams 40%, Group exams 20%, Team Projects/Homework 10%, Lab Quiz 10%, Lab STCW 10%, Participation 10%		
LEARNING OUTCOMES:	<p>To give the students an understanding of the principles of refrigeration, its operation, system, maintenance, repair and new laws/regulations. At the completion of this course, each student should be able to display knowledge and competency in the following. The student should be able to:</p> <ul style="list-style-type: none"> • Explain the major components of a refrigeration system <ul style="list-style-type: none"> ○ Explain the purpose and interaction of these components • Properly start, operate, and determine the operating status of a system • Determine the refrigerant used in a system • Explain the process to perform leak detection, system maintenance and repair • Safely recover, evacuate, recharge a system 		

Topic	Subject	Assignment
1.	Safety	1)Blackboard: "Safety" 2) http://www.facilitiesnet.com/hvac/article/Refrigerant-Safety-101--4833 3)[I] In bullet form outline "Refrigerant Safety" as per the internet article
2.	Thermodynamics / System Components and Operation	1)Blackboard: "Thermodynamics" 2) http://www.rfmaonline.com/resource/resmgr/crfp/howdoesbasicrefrigerationcyc.pdf 3)[G] In bullet form, outline the refrigeration cycle (start with the compressor) and within, describe what is happening using these terms: Heat, BTU, Temperature, Hot/Cold, Superheat/Subcool, Pressure, Liquid/Vapor.
3.	Plotting the Refrigeration Cycle	1) Blackboard: "Plotting the Refrigeration Cycle"
4.	Refrigeration System Servicing/Testing Equipment	1)Blackboard: "Refrigerant System Servicing and Testing Equipment" 2)[I] Research any 2 service/test equipment and submit a brief description and its specifications/data
5.	Compressors	1)Blackboard: "Compressors" 2) http://en.wikipedia.org/wiki/Gas_compressor 3)[G] Given a system in class, research and select a compressor. Write a summary explaining why you chose that compressor. Include: Mfg., specifications/data
6.	Condensers	1)Blackboard: "Condensers" 2) http://www.refrigers.com/technical-information/161-refrigeration-/32530-types-of-condensers.html 3) http://www.refrigers.com/content/view/31579/28/ 4) http://www.refrigers.com/technical-information/161-refrigeration-/32576-condenser-water-valve.html 5) http://www.health.vic.gov.au/environment/downloads/whatisacoolingtower.pdf 6) [I] Research routine maintenance needed for peak operation of the 3 types of condensers. Write a summary in outline form.
7.	Metering Devices	1)Blackboard: "Metering Devices" 2) http://www.refrigers.com/technical-information/161-refrigeration-.html?start=20 Read the following topics in the website above: 24,26-28, 30-42 3)Written assignment TBA

8.	Evaporators	1)Blackboard: "Evaporators" 2) http://www.lincolncollege.com/pdf/evap-coil-primer.pdf 3) http://www.process-heating.com/Archives/e0bcb787ff268010VgnVCM100000f932a8c0 4)Written assignment TBA
9.	Refrigerants and Their Properties	1) Blackboard: "Refrigerants" 2) http://www.mcquay.com/mcquaybiz/literature/lit_ch_wc/AppGuide/AG31-007.pdf 3)Written assignment TBA
10.	Refrigerant Management and the EPA	1)Blackboard: Core, Type I, Type II, Type III 2)Assignment: TBA
11.	Coast Guard Diagram review	Marine Engineering Workbook

Course Policy

1. Classes are mandatory for all classes and labs. All requests for excuse from class must be presented in writing prior to the absence. 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 **NO** make-up labs at the end of the semester.
2. The uniform of the day will be worn in proper order within the classroom. Appropriate attire and safety glasses will be worn in lab.
3. Cellphones 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 an 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 and Group exams, 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 69.0 or less.
9. Because of the new format of this class (regarding reading material and assignments), 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 announced. An 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 10% of your final grade.

STCW assessment grade 10% of your grade: 1st try – 100%; 2nd try – 80%; 3rd try-60%; 4th 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 email kshineobrien@maritime.edu or call ext 1480.