EN-3111 Electrical Machines

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Preferred contact is by email or in-person during office hours. Don't expect me to remember something mentioned briefly between classes!

Office Hours: MWF 0900–1000, or anytime arranged in advance.

Course Website: https://weh.maritime.edu/EN-3111

This website is the central hub for the course. Here you will find the course policy (syllabus) and the lecture schedule.

Each lesson is linked to reading assignments, homework, and an associated lesson page containing supplementary material: YouTube videos, interactive diagrams, and any handouts distributed in class.

Schedule: The official schedule is posted on the course website. It contains the daily topics, exam dates, reading and homework assignments. This calendar is my best estimate of how the class will progress, but is subject to change, and will be updated as necessary (with notice).

Blackboard: All homework assignments must be submitted through Blackboard by the due date for full credit. Late work will be accepted until midnight Friday of the week due for half credit.

Grades shown on Blackboard are not necessarily correct or up-to-date. In the event of disputes, the *official* grades are the ones in my grade book.

Accommodations: Massachusetts Maritime Academy is committed to providing accommodations to students who qualify. If you are entitled to extended time on exams, you must make arrangements with me at least 48 hours before each exam. My preference is for you to start the exam early or end late, but another option is to take the exam in the testing center, but this requires prior planning.

Technology: Cell phones, tablets, laptops, other and internet-connected technology are prohibited during class. These instruments must be silenced and out of view at all times. I reserve the right to throw your device in the canal if you repeatedly violate this policy.

Programmable calculators are permitted in class, but not during exams. Non-programmable calculators are welcome at all times.

Dress Code: Students must be in the uniform of the day when attending class, unless explicitly excused by Comcad.

Decorum: Do not consume food or drink into the classroom.

If you must leave the room for any reason during class, raise your hand and ask for permission. Permission will generally be granted, but during exams you must pass in your exam and will not be permitted to return and continue.

Attendance: This course is governed by the S*tandards for Training and Certification of Watchkeepers*, (STCW), which requires that a student attend at least 90% of the approved training; in this case, no more than four absences in a 40 lesson course. More than 4 unexcused absences will result in course failure.

Please notify me in advance by email if you will be missing a class for any reason and explain why. Also see me if you miss four classes, to discuss your situation.

Only absences approved in advance by the Dean, such as athletics, firefighting and commercial shipping, or armed forces orders AND discussed in advance with the instructor will be considered *excused*.

Learning Objectives:

The objective of this course is to give students an understanding of operating principles, design and operation of electrical machinery including transformers, AC and DC motors and generators, single and three phase AC power distribution and storage batteries.

At the conclusion of the course, students should be able to demonstrate knowledge and understanding of the following **STCW elements:**

- OICEW-B1.1 Basic configuration and operation principles of electrical generators
- OICEW-B1.1 Basic configuration and operation principles of electrical distribution systems
- OICEW-B1.1 Preparing, starting, paralleling and changing over generators
- OICEW-B1.1 Basic configuration and operation principles of electrical motors
- OICEW-B1.1 Electrical motor starting methodologies
- OICEW-B1.1 Basic configuration and operation principles of high-voltage installations
- OICEW-B2.1 Safety requirements for working on shipboard electrical systems
- OICEW-B2.1 Safe isolation of electrical equipment required before personnel are permitted to work on such equipment
- OICEW-B2.2 Maintenance and repair of electrical system equipment
- OICEW-B2.2 Maintenance and repair of electrical switchboards
- OICEW-B2.2 Maintenance and repair of electric motors and generators
- OICEW-B2.2 Maintenance and repair of DC electrical systems and equipment
- OICEW-B2.3 Detection of electric malfunctions
- OICEW-B2.3 Location of faults causing electrical malfunctions
- OICEW-B2.3 Measures to prevent damage caused by electrical malfunctions
- OICEW-B2.4 Construction of electrical testing and measuring equipment
- OICEW-B2.4 Operation of electrical testing and measuring equipment

Course Grade:

This is an STCW Knowledge course with a minimum passing grade is 70%, **C-**.

Grades will be based on the following assessments and weights:

Three Hour Exams	45%
Homework	30%
Final Exam	25%

Final average will be adjusted downward by 2% for each unexcused absence.

Letter grades will be assigned as follows:

A >= 95 **A–** >=90,

B+ >= 87 **B** >= 83 **B–** >= 80

C+ >= 77 **C** >= 73 **C–** >= 70

F < 70

Homework:

Electrical Machines is a broad subject, much of it will be new to you, and we cover a lot and go fast in class. Don't think that you can learn it all simply by showing up. You will also need to study outside of class to do well. You should expect to put in about two hours of study time for each class hour.

Your homework consists of the assigned readings and three graded HW components, each worth 10% of your final course grade.

It should be possible for you to score 100% on the homework and you are advised to do so in order to compensate for potentially lower grades on the hour exams and final. Remember, 70% is required for passing.

Assignments are **due every Monday at midnight** for full credit. Late homework will be accepted until the following Friday at midnight for half credit.

All homework must be submitted to Blackboard. The time of submission recorded by Blackboard will be used to determine timeliness. Unreadable or corrupted submissions will receive a grade of zero.

Plan ahead and manage your time so that all assignments are submitted on time.

Reading:

The textbook for this course is *Operation, Testing, and Preventive Maintenance of Electrical Power Apparatus*, by Charles I. Hubert and is available on Blackboard. This course is organized around this text. Chapters are assigned on the syllabus and usually discussed over several classes.

You should read or at least skim the assigned chapter before we start the topic, and then re-read it as you become more familiar.

In addition, supplemental handouts are often provided which you should read to pick up additional background.

Reading is one of the most effective methods to acquire information and become familiar with a subject, so read carefully and for understanding.

All information covered in class and in Hubert is fair-game for exam questions.

Question HW:

Questions about the recent material are assigned weekly. Your answers should be a couple of sentences long, possibly containing sketches and should demonstrate your understanding.

You may use the textbook, handouts, and the internet for research but formulate your answers in your own words. Remember, the goal is learning, not shortcuts. I may call on students to answer these questions in class.

- **DO NOT copy directly from the textbook, your classmates, the internet, or AI**.
- Your submission **MUST be HANDWRITTEN** by you.
- Your submission must be of **professional quality**: legible, neat sketches, complete sentences, proper grammar and punctuations.
- **Include a copy of the question** followed by your answer.
- Scan your work and post it to to Blackboard by the deadline.

You will be graded on these criteria as well as technical content.

Problem HW: These are numerical problems taken from material covered in Hubert. Generally these are fairly simple and the formulas and examples in the book should help a lot.

The problems are randomized by Numbas, graded automatically, and you get unlimited attempts. You will need to use the Numbas Lockdown Browser to access the. See handout distributed at Lesson 1 with tips for using Numbas.

Although the point values per week vary widely, there are a total of about 2400 points available. You must earn 2100 points for full credit, any additional points earned will be considered extra credit.

You can expect to see problems similar to these on the exams.

USCG Multiple Choice HW: These are short, randomly-selected, auto-graded multiple choice quizzes chosen from the USCG License Exam Bank.

Each Quiz contains 30 questions, but will be graded as though it has 20, so you 100% if you get 20 right. This is to adjust scores for bad questions, or questions not covered in class

100% is the maximum score; no extra credit for getting more than 20 correct.

Hour Exams: There will be three hour long exams on the dates indicated on the schedule, each worth 15% of your course grade.

The exams will include of a mixture of questions, problems and multiple choice questions.

Final Exam: The final exam will consist of twenty terms or concepts covered in the lectures or readings, selected from a list provided in advance.

For each you must write two or more complete sentences to demonstrate your understanding of the concept.