

Text: Operating, Testing, and Preventive Maintenance of Electrical Power Apparatus, Charles I. Hubert, PE, Prentice Hall, ©2003

Learning Objective: To provide the student with an operational understanding of power systems, motors, and generators including single and three phase AC systems, DC systems, and storage batteries. While not an exclusive list, not a complete list, at the conclusion of the course, the student must be able to:

- Distinguish between single and three phase systems
- Provide an electrical load analysis of an AC system
- Mathematically correct the power factor of an AC system
- Define the differences in various types of transformers and compute electrical loads on them
- Describe the design and operation of electric motors, including single and three phase AC motors and DC motors.
- Describe the design and operation of electric generators, including single & three phase AC generators and DC generators.
- Describe the methodology for correctly paralleling two AC generators and balancing the electrical loads on each.
- Describe the construction, maintenance, and operation of DC battery systems.

Grading: Quizzes: 45%; Exams 25%; Final Exam 20%; Homework 10%. The quizzes may include both in-class quizzes and Excel® based special projects.

Class format: The objective of this course is to provide the student with a thorough knowledge of electric circuits and machines with an emphasis on shipboard and industrial applications.

The class makes extensive use of the Blackboard computer system. Students are expected to have access to this system for class notes and assignments. All students are encouraged to purchase a personal color printer to better utilize class notes available on Blackboard. Quizzes may be given on any class day. Make-up quizzes and/or exams will only be considered for extraordinary circumstances. Homework is to be passed in every Friday and will not be accepted late. Homework shall be legible, completed on 8.5" x 11" paper, free of tears, rips, or frays, and stapled if on more than one sheet. Homework must be hand written. Attendance is mandatory; each absence will result in a one point deduction from the final course grade. Classes are held MWF from 1100-1150 or 1200-1250. Tardiness and walkabouts¹ are expressly prohibited. Regimental students are required to be in the uniform of the day for all classes, without exception. See the back of this page for additional course regulations.

Electric Machines is an STCW required course. For students in the USCG Marine Engineering license track, a minimum grade of C- (70%) is required to pass the course and to receive STCW credit. All other students must receive a minimum grade of 70% to pass the course.

Schedule²:

WEEK	CLASS WEEK	SUBJECT	BOOK CHAPTER(S)	HOMEWORK
1	4 September	Capacitance, Inductance, Single Phase	4-6	Ch 4: problems 16, 17, 18 Ch 5: problems 10, 11
2	10 September	Power Factor	6-8	Ch. 6: even problems, 7-1 Ch. 8: even problems
3	17 September	Three Phase Systems	9	Ch. 9: odd problems
4	24 September	Transformers	10	Ch 10: even problem
5	1 October	Three Phase Induction Motors	11	Ch 11: All Questions
6	8 October	Three Phase Induction Motors	11	Ch 11: All Problems
7	15 October	Synchronous Motors	12	Ch 12: All Questions
8	22 October	3 Phase Motor Operation	13	Ch 13: Q 1-5 Ch 13: Problems 1, 3, 5,
9	29 October	AC Generators	14	Ch 14: All odd questions
10	5 November	AC Generators	14	Ch 14: All problems
11	12 November	Single Phase AC Motors	16	Ch 16: All questions and problems
12	19 November	DC Generators	17	Ch 17: All odd questions
13	26 November	DC Motors	18	Ch 18: All even problems
14	3 December	Battery Systems	27	Ch 27: All odd questions Ch 27: All odd problems
15	10 December	Review	27	

¹ Walkabout: The act of leaving the class for any reason after class has begun. Students may leave the class at any time, however they will not be allowed to return.

² Subject to change

A. A. Gillis

Office Hours: MWF: 1000 - 1050 and by appointment.

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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

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