

EE 473 Fall 2022

Electromagnetics I: 3 CH

Instructor: Gordon Emslie, Office KTH 2013, email: gordon.emslie@wku.edu

Class Meetings: TR 4:30 – 5:50

Office Hours: by appointment

Prerequisite(s): MATH 237, 331, PHYS 265

Text: Matthew N. O. Sadiku, “Elements of Electrodynamics,” Seventh Edition, Oxford University Press, 2018. This e-book will be provided to you automatically via Blackboard through the Big Red Backpack program: <https://www.wku.edu/bigredbackpack/>. In the Blackboard site for this course click on the “Tools” link located on the bottom left of the screen. Then click on the “Course Materials” link on the right. You will then see the icon for launching the e-book.

If you opt-out of the Big Red Backpack program, you will lose this access to the e-book, and will need to obtain it some other way, either in print or e-book format. The WKU Store will have the e-book available as a stand-alone purchase and the print book can be ordered from any of the typical websites that sell textbooks.

Course Description

EE 473 explores electrodynamics beyond the elementary principles covered in previous courses. Topics include vector calculus and its applications, electrostatics, electric and magnetic fields in a vacuum and in materials. The course culminates in the development of Maxwell’s equations, with application to propagation of electromagnetic waves.

Learning Objectives

1. Demonstrate an understanding of the underlying principles of electrodynamics, leading to Maxwell’s equations.
2. Apply these principles to solve, and interpret the solutions of, illustrative and real-world problems, both analytically and numerically.

Homework (20%)

A number of Practice Problems and Homework Problems will be assigned from the text. While students are encouraged to attempt all the Practice problems (this will prepare you well for the Tests!), only the Homework Problems will be used in determining the Homework grade.

Tests (3 @ 20% each)

Tests will consist of both conceptual questions and problems (similar to the practice and homework problems), and may be either take-home or in-class.

Everyone is expected to take in-class exams during the regularly scheduled exam periods with the rest of the class. As a general rule, makeup examinations will NOT be given. If there are extraordinary, documented circumstances that lead to an inability to be present at a scheduled test, then, if the instructor is satisfied with the nature of the circumstances, the grade for the missed assignment may be rolled into the value of the other course assignments.

Final (20%)

The final will be comprehensive, covering material from the entire semester.

Grading

Your grade for the course will be based on your performance on the homework, tests, and examinations. The weights assigned to the homework and exams are as follows:

Homework	20%
Exam 1	20%
Exam 2	20%
Exam 3	20%
Final	20%

Total Score	Grade
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90 - 100	A
80 – 89	B
70 - 79	C
60 – 69	D
< 59	F

Attendance

Regular and punctual attendance is expected of everyone during every class meeting. Class time will be spent doing activities that are designed to help you understand the material we are studying, not to simply transpose material from the text to the board to your notes. *If you miss class then you are seriously jeopardizing your chances of success.*

University Policies

Information on a variety of topics, including the Student Code of Conduct, ADA Accommodations, Emergency Preparedness, etc. is available at www.wku.edu/syllabusinfo/.

Academic Dishonesty

Academic dishonesty (including plagiarism, test-sharing, etc.) will not be tolerated. According to the WKU Student Handbook: “Students who commit any act of academic dishonesty may receive from the instructor a failing grade in that portion of the course work in which the act is detected, or a failing grade in a course without possibility of withdrawal. The faculty member may also present the case to the Office of Student Conduct for disciplinary action.”

ADA Accommodation

In compliance with University policy, students with disabilities who require academic and/or auxiliary accommodations for this course must contact the Student Accessibility Resource Center located in Downing Student Union, 1074. SARC can be reached by phone number at 270-745-5004 [270-745-3030 TTY] or via email at sarc.connect@wku.edu. Please do not request accommodations directly from the professor without a faculty notification letter from The Student Accessibility Resource Center.

Title IX Misconduct/Assault

Western Kentucky University is committed to supporting faculty, staff and students by upholding WKU's Title IX Sexual Misconduct/Assault Policy and the Discrimination and Harassment Policy. If you experience an incident of sex/gender-based discrimination, harassment and/or sexual misconduct, you are encouraged to report it to the Title IX Coordinator, Andrea Anderson, 270-745-5398 or Title IX Investigators Michael Crowe (270-745-5429) or Joshua Hayes (270-745-5121). Please note that while you may report an incident of sex/gender based discrimination, harassment and/or sexual misconduct to a faculty member, WKU faculty are Responsible Employees of the University and MUST report what you share to WKU's Title IX Coordinator or Title IX Investigator. If you would like to speak with someone who may be able to afford you confidentiality, you may contact the WKU Counseling and Testing Center at 270-745-3159.

Academic Dishonesty

Academic dishonesty (including plagiarism, unauthorized test-sharing, etc.) will not be tolerated. According to the WKU Student Handbook: “Students who commit any act of academic dishonesty may receive from the instructor a failing grade in that portion of the course work in which the act is detected, or a failing grade in a course without possibility of withdrawal. The faculty member may also present the case to the Office of Student Conduct for disciplinary action.”

Safety and Evacuation

A review of safety and evacuation procedures include exit from the room during an active alarm. Normally we will exit to the main stairwell and the front of the building moving to the sidewalk. Do not attempt to use the elevators.

Practice Problems and Homework Assignments

It is strongly recommended that you complete all of the “Practice Problems,” plus any other problems in the text that have similar content. This will ensure that you have mastered the material and is an excellent preparation for the course tests. We can schedule class time to address any issues that arise in attempting these problems. However, only the problems listed as “Homework Problems” are required to be submitted for grading; these grades will be used in evaluating your Homework grade.

Chapter 1

Practice Problems: 1.1, 1.6, 1.9

Homework Problems: 1.29, 1.30

Chapter 2

Practice Problems: 2.1, 2.11, 2.16

Homework Problems: 2.2, 2.3

Chapter 3

Practice Problems: 3.1, 3.2, 3.3, 3.8, 3.11, 3.12, 3.17, 3.20, 3.28, 3.31, 3.40, 3.41, 3.44, 3.55

Homework Problems: 3.7, 3.18, 3.27, 3.56

Chapter 4

Practice Problems: 4.1, 4.3, 4.7, 4.8, 4.14, 4.22, 4.23, 4.25, 4.26, 4.35, 4.36, 4.45, 4.52, 4.64, 4.65

Homework Problems: 4.6, 4.39, 4.40

Chapter 5

Practice Problems: 5.1, 5.3, 5.6, 5.7, 5.12, 5.14, 5.15, 5.18, 5.20, 5.21, 5.25, 5.26, 5.29, 5.32

Homework Problems: 5.2, 5.17, 5.30

Chapter 6

Practice Problems: 6.9, 6.10, 6.11, 6.12, 6.25, 6.32, 6.38, 6.39, 6.43, 6.47, 6.51, 6.57

Homework Problems: 6.31, 6.37, 6.52

Chapter 7

Practice Problems: 7.2, 7.3, 7.12, 7.34, 7.36, 7.40, 7.41, 7.50, 7.52

Homework Problems: 7.19(b), 7.31, 7.51

Chapter 8

Practice Problems: 8.1, 8.2, 8.5, 8.16, 8.45, 8.48, 8.49

Homework Problems: 8.3, 8.21, 8.43

Chapter 9

Practice Problems: 9.1, 9.2, 9.4, 9.8, 9.12, 9.30, 9.38, 9.44

Homework Problems: 9.3, 9.32, 9.45

Chapter 10

Practice Problems: 10.3, 10.24, 10.36, 10.38, 10.41

Homework Problems: 10.18, 10.35