NAU NORTHERN ARIZONA UNIVERSITY

Course Title: PHY 332 Electricity And Magnetism II
Term: Fall 2022
Instructor: TBA
Course Credit: 3
Mode of Instruction: Online

Course Description:

Designed for the students who have finished *PHY 331 Electricity And Magnetism I*, This course covers the following topics: Maxwell's equations, scalar and vector potentials, Laplace's equation, boundary value problems, plane waves, and radiation. In addition, electric and magnetic forces, the electric potential, capacitance and inductance, electric and magnetic energy will be also surveyed. This course is aimed at providing students with the ability to understand the fundamentals of electricity and magnetism and their relation to some of their most exciting current applications.

Course Prerequisites:

PHY 331 Electricity And Magnetism I

Learning Outcomes:

By the end of the course, the student should be able to:

A. Demonstrate a mastery of the Biot-Savard law for the magnetic field, and apply it to calculate the field due to various distributions of current;

B. Calculate solutions to physics problems using the fundamental principles of physics and algebraic, trigonometric, and calculus principles;

C. Apply Ampere’s law to obtain the magnetic field of various current distributions;

D. Employ basic measurement equipment and laboratory techniques to study the laws and principles used in the course;

E. Formulate all the laws of electromagnetism in the form of Maxwell's equations.

F. Appreciate some of the connections between electromagnetism and special relativity.

Course Material:

Matthew N.O. Sadiku, ***Elements of Electromagnetics***, 6th, Oxford University Press, USA, 2014.

Evaluation:

- 4 Lab Reports [40%]
- Mid-term Exam [25%]
- Final Exam [35%]

Description of the Evaluation tasks:

Assignment/ Essay/ ... : During the term, students will be required to finish several evaluation tasks within due date. All the tasks are linked with specific course topics/outcomes and will adequately assess students' competence and learning outcomes. Students are encouraged to meet with instructor about these tasks at any point.

Mid-term/ Final Exams/ Quiz/... : There may be periodic quizzes given at the beginning of lecture sessions; the feedback from these quizzes will monitor the progress of the learners and help to set learning priorities. There will be mid-term exam/ final exam for the course. They are the basic criteria for the evaluation of students' learning outcomes and final grade.

Grading Policy:

Students are supposed to finish each online lecture. Prior to each class, students should finish the required readings. During the class time, students are encouraged to make use of all relevant online course resources and communicate with the instructor. Students' grades are accumulated based on the cumulative evaluations.

Students' letter grade will be assigned according to the following scale:

A+ 90-100	A 85-89	A- 80-84
B+ 77-79	B 73-76	B- 70-72
C+ 67-69	C 63-66	C- 60-62
D+ 57-59	D 53-56	D- 50-52
F < 50		

Academic Integrity:

Students must strictly adhere to the university's academic integrity rule; and all essays, exams and any other form of academic assignments must adhere to these rules. Any form of plagiarism, cheating, or misappropriation of materials will be considered a violation of academic integrity and will be punishable by the university.

Withdrawal from the Course(s):

Students will be able to apply for a transfer or withdrawal within 3 days of the starting date of the course. If a withdrawal is applied for within 3 working days, the tuition fee will be fully refunded. After 3 days, the tuition fee will not be refunded. If a withdrawal is applied for in the first two weeks, it will be recorded as W (Withdraw) on the course transcript. After this initial two-week period, the class will be recorded as F (Fail).

Tentative Schedule:

Week 1

1	Vector Algebra
2	Coordinate System and Transformations
3	Vector Calculus
4	Electrostatic Fields
5	Electric Fields in Material Space **Lab report#1**

Week 2	
6	Electrostatic Boundary-Value Problems
7	Magnetostatic Fields
8	Magnetic Forces, Materials, and Devices
9	Maxwell's Equations
10	Electromagnetic Wave Propagation **Lab report#2**
Week 3	
11	Transmission Lines
12	Waveguides
13	**Mid-term Exam**
14	Antennas
15	Numerical Methods **Lab report#3**
Week 4	
16	Forces Due to Magnetic Fields
17	Magnetic Torque and Moment
18	A Magnetic Dipole
19	Magnetization in Materials
20	Magnetization in Materials (Cont.) **Lab report#4**
Week 5	
21	Classification of Materials
22	Magnetic Boundary Conditions
23	Inductors and Inductances
24	Magnetic Energy
25	**Final Exam**