School of Engineering and Natural Sciences / Electrical and Electronics Engineering (English)

2024 - 2025 Academic Year

ELECTROMAGNETICS

Syllabus

Course Description					
Name	**Code**	**Semester**	**T+A Hour**	**Credit**	**ECTS**
ELECTROMAGNETICS	EEE3134020	Fall Semester	3+0	3	6

Prerequisites Courses	MATEMATİK III
Recommended Elective Courses	Introduction to RF and Microwave Engineering
Language of Instruction	English
Course Level	First Cycle (Bachelor's Degree)
Course Type	Required
Course Coordinator	Assoc.Prof. Hüseyin Şerif SAVCI
Name of Lecturer(s)	Assoc.Prof. Hüseyin Şerif SAVCI
Assistant(s)	Ismail Karnak
Aim	In this course, the key concept that makes up electromagnetics are studied so that students are able to understand how electromagnetic waves are generated and radiated. This way the transfer of energy or information from a point to another will be better understood whether the medium is wired or wireless.
Course Content	This course contains; Coulomb law, electric field and potential,dielectrics.,Gauss' law, capacitance, boundary valueproblems.,DC current, Ohm's and Kirchoff's current laws.,Energy, Joule's law, resistance.,Biot-Savart law and applications.,Ampere's law, magnetization, and applications,Magnetic materials and energy.,Force, torque and magneto statics boundaryvalue problems.,Inductances,Faraday's law. Lenz's law.,Maxwell equations.,Plane Waves.,Fresnel's and Snell's law,Introduction to RF Transmission Lines..

Course Learning Outcomes	**Teaching Methods**	**Assessment Methods**
1. Understanding of Coulomb's law and the related concepts.	12, 21, 9	A, D, E, G
2. Understanding of Gauss' law and the related concepts.	12, 21, 9	A, D, E, G
4. Understanding Faraday's and Lenz's laws.	12, 21, 9	A, D, E, G
5. Understanding magnetism.	12, 21, 9	A, D, E, G
5. By understanding Maxwell's equation, developing the ability to generate electromagnetic waves.	12, 21, 9	A, D, E, G

Teaching Methods	12: Problem Solving Method, 21: Simulation Technique, 9: Lecture Method
Assessment Methods	A: Traditional Written Exam, D: Oral Exam, E: Homework, G: Quiz

Lecture Schedule

Sequence	**Topics**	**Preliminary Preparation**
1	Coulomb law, electric field and potential,dielectrics.	Related chapters/sections of the Notes and Textbook
2	Gauss' law, capacitance, boundary valueproblems.	Related chapters/sections of the Notes and Textbook
3	DC current, Ohm's and Kirchoff's current laws.	Related chapters/sections of the Notes and Textbook
4	Energy, Joule's law, resistance.	Related chapters/sections of the Notes and Textbook
5	Biot-Savart law and applications.	Related chapters/sections of the Notes and Textbook
6	Ampere's law, magnetization, and applications	Related chapters/sections of the Notes and Textbook
7	Magnetic materials and energy.	Related chapters/sections of the Notes and Textbook
8	Force, torque and magneto statics boundaryvalue problems.	Related chapters/sections of the Notes and Textbook
9	Inductances	Related chapters/sections of the Notes and Textbook
10	Faraday's law. Lenz's law.	Related chapters/sections of the Notes and Textbook
11	Maxwell equations.	Related chapters/sections of the Notes and Textbook
12	Plane Waves.	Related chapters/sections of the Notes and Textbook
13	Fresnel's and Snell's law	Related chapters/sections of the Notes and Textbook
14	Introduction to RF Transmission Lines.	Related chapters/sections of the Notes and Textbook

Evaluation Methods	**Weight(%)**
Midterm Exam	30
General Exam	70

Resources

Fawwaz T. Ulaby, Umberto Ravaioli, Fundamentals of Applied Electromagnetics, 2020, 8th Ed., Galobal Ed. Pearson, ISBN 10: 1-292-43673-5.
David K. Cheng, Fundamentals of Engineering Electromagnetics, 2013, Pearson, ISBN :9781292026589
Other electromagnetics books.