

SYLLABUS

Code/Name	MCE 112 / Physics II
Type	Required
Credit/ECTS	4/5
Hour per Week	4 (3+0+1)
Level/Year	Undergraduate/1
Semester	Spring
Classroom	A004
Content	Coulomb's law and electric fields. Gauss's law. Electric potential. Electrostatic energy. Properties of insulators. Flow and resistance. DC circuits. Magnetic field. Faraday's law. Magnetic fields in matter. Electromagnetic oscillations. AC circuits.
Prerequisites	
Textbooks	<p><u>Primary</u> Physics for Scientists and Engineers, Authors: R.A. Serway and J.W. Jewett.</p> <p><u>Supplementary</u> Fundamentals of Physics Extended, Authors: D. Halliday & R. Resnick, J. Walker.</p>
Objectives	<ul style="list-style-type: none"> • To learn the basic concepts and laws of electricity and magnetism. • To be able to calculate the electric and magnetic fields for some simple charge and current configurations using these basic laws. • To understand how charges are affected by electric and/or magnetic fields. • To gain the ability to understand and use Maxwell's equations that connect the events related to electricity and magnetism.
Course Outcomes	<p>In this course you will be able to:</p> <p>CO1 Explain interactions between stationary charges.</p> <p>CO2 Explain the concepts of electric field and electric potential.</p> <p>CO3 Perform electrical circuit analysis.</p> <p>CO4 Explain direct current, alternating current and related laws.</p> <p>CO5 Explain the concepts of magnetic field and magnetic flux.</p>

Weekly Schedule of Topics

W	Topic
1	Electric charge and electric field (Electric Charge, Coulomb's Law, Electric Field and Electric Forces)
2	Gauss's Law (Charge and Flux, Calculating Electric Flux, Gauss's Law)
3	Gauss's Law (Applications of Gauss's Law, Charges on Conductors)
4	Electric Potential (Electric Potential Energy, Electric Potential)
5	Electric Potential (Calculating Electric Potential, Equipotential Surfaces)
6	Capacitance and Dielectrics
7	Current, Resistance and Electromotive Force
8	Direct Current Force (Kirchhoff's Rules, R-C Circuits)
9	Magnetism, Magnetic Field, Magnetic Field Lines and Magnetic Flux, Motion of Charged Particles
10	Applications of Motion of Charged Particles, Magnetic Force on a Current-Carrying Conductor
11	Magnetic Field of a Moving Charge, Magnetic Field of a Current Element
12	Magnetic Field of a Circular Current Loop, Ampere's Law
13	Electromagnetic Induction (Faraday's Law, Lenz's Law, Maxwell's Equations)
14	Inductance (Mutual Inductance, Self-Inductance, The R-L Circuit)

Professional Contribution	To provide an introduction to fundamental engineering topics for engineering students to establish conceptual relationships between electrical and related engineering sciences.
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Contribution to Program Outcomes*

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	5	5	5	2	2	1	1	1	1	1	2
CO2	5	5	5	2	2	1	1	1	1	1	2
CO3	5	5	5	2	2	1	1	1	1	1	2
CO4	5	5	5	2	2	1	1	1	1	1	2
CO5	5	5	5	2	2	1	1	1	1	1	2

* Contribution Level | 0: None | 1: Very Low | 2: Low | 3: Medium | 4: High | 5: Very High

Special Conditions	The consequence of violation of the attendance rule is to receive a grade of NA .
Requirements	NA
Evaluation	Midterm Exam 40% Final Exam 60% Total 100%
Rubric	NA
Course Policy	<ol style="list-style-type: none"> 1. You must attend at least 70% of the sessions including add-drop period. 2. Be in the class on time. 3. English should always be used to communicate with one another. 4. Mobile phone should be switched off and put away during the class. 5. You cannot talk to your friends during class no matter what the subject is.
Cheating & Plagiarism	<ul style="list-style-type: none"> • Copying or letting someone to copy your work on exams, assignments, or reports is cheating. • Cutting and pasting text, figures and tables from the web sources or any other electronic source is plagiarism. • The consequence of academic dishonesty is to receive a grade of F for the course.

Instructor

Name/Surname	Mustafa Tokaç	Email	Mustafa.tokac@alanya.edu.tr
Room	A003	Office Hours	

Prepared by Mustafa Tokaç