

PHYS 221: Electromagnetism-1
(4th level)

Credit Hours: 3 (3+0+0)

COURSE SYLLABUS

Instructor

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Office hours: Sun-Tues-Thurs/ 9:15am-10:20am.

Text book

Physics for Scientists and Engineers
(7th edition)- R. A. Serway& Jewett

	Chapter & Sections	Sections Contents	Examples
1	3 Vector 1,2,3,4	<ul style="list-style-type: none">• Coordinate Systems• Vector and Scalar Quantities• Some Properties of Vectors• Components of a Vector and Unit Vectors.	1,2,3,4,5,6
2	23 Electric Field 3,4,5,6,7	<ul style="list-style-type: none">• Coulomb's Law• The Electric Field• Electric Field of a Continuous Charge Distribution• Electric Field Lines• Motion of Charged Particles in a Uniform Electric Field.	1,2,3,5,7,8,10,11
3	24 Gauss's Law 1,2,3,4	<ul style="list-style-type: none">• Electric Flux• Gauss's Law• Application of Gauss's Law to Various Charge Distributions• Conductors in Electrostatic Equilibrium	2,3,4,5,6,7,8

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4	<p>25 <u>Electric Potential</u> 1,2,3,4,5,6</p>	<ul style="list-style-type: none"> • Electric Potential and Potential Difference Potential Difference in a Uniform Electric Field • Electric Potential and Potential Energy Due to Point Charges • Obtaining the Value of the Electric Field from the Electric Potential • Electric Potential Due to Continuous Charge Distributions • Electric Potential Due to a Charged Conductor 	1,2,3,4,5,6,7,8,9
5	<p>26 <u>Capacitance And Dielectrics</u> 1,2,3,4,5</p>	<ul style="list-style-type: none"> • Definition of Capacitance • Calculating of Capacitance • Combinations of Capacitors • Energy Stored in a Charged Capacitor • Capacitors with Dielectrics • Electric Dipole in an Electric Field • An Atomic Description of Dielectrics <p>Also,</p> <ul style="list-style-type: none"> • The electric polarization P • Free and bound charges • The electric displacement (D) • Susceptibility, Permittivity, Dielectric Constant in linear dielectrics 	1,4,6,7
6	<p>29 <u>Magnetic Field</u> 1, 2, 4, 5</p>	<ul style="list-style-type: none"> • Magnetic Fields and Forces • Magnetic Force Acting on a Current-Carrying Conductor • Motion of a Charged Particle in a Uniform Magnetic Field • Applications involving charged particles moving in a magnetic field (Velocity Selector - The Mass Spectrometer) • The Hall Effect 	1, 6, 7,8
7	<p>30 <u>Sources of the Magnetic Field</u> 1, 2, 3, 4,5, ,6,8</p>	<ul style="list-style-type: none"> • The Biot -Savart Law • The Magnetic Force Between Two Parallel Conductors • Ampère's Law • The Magnetic Field of a Solenoid • Magnetic Flux • Gauss's Law in Magnetism • Magnetism in matter 	4, 8,10

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8	31 <u>Faraday's Law</u> 1, 2,3,4	<ul style="list-style-type: none"> • Faraday's Law of Induction • Motional emf. • Lenz's Law • Induced emf and Electric Fields 	1,5,7
9	32 <u>Inductance</u> 1, 3	<ul style="list-style-type: none"> • Self-Inductance • Energy in a Magnetic field 	1,2
10	33 <u>Alternating Current Circuits AC</u> 1, 2, 3, 4, 5, 6, 7	<ul style="list-style-type: none"> • AC Sources • Resistors in an AC circuit • Inductors in an AC circuit • Capacitors in an AC circuit • The RLC Series Circuit • Power in an AC Circuit • Resonance in a Series RLC Circuit. 	1, 5, 6, 7

Course Evaluation

	Grade	Date
<i>Midterm1</i>	20%	TBA
<i>Midterm2</i>	20%	TBA
<i>Homework</i>	10%	Thursday
<i>Participation</i>	10%	
<i>Final</i>	40%	TBA