



## Lahore University of Management Sciences

### PHY 204 – Electricity and Magnetism

Fall 2017-18

Instructor	Adam Zaman Chaudhry
Room No.	9-121A
Office Hours	To be announced. Appointment via email always welcome.
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Secretary/TA	
TA Office Hours	To be announced
Course URL (if any)	

Course Basics				
Credit Hours	3			
Lecture(s)	Nbr of Lec(s) Per Week	2	Duration	75 min each
Recitation/Lab (per week)	Nbr of Lec(s) Per Week		Duration	
Tutorial (per week)	Nbr of Lec(s) Per Week	1	Duration	75 min

Course Distribution	
Core	Core for Physics and EE majors
Elective	
Open for Student Category	
Close for Student Category	

COURSE DESCRIPTION
The course is a first introduction to Electricity and Magnetism. It will review static and dynamic electric and magnetic fields, as well as their inter-relationships. Physical models will be presented throughout the course, with a sprinkling of computational exercises and in-class demonstrations.

COURSE PREREQUISITE(S)	
<ul style="list-style-type: none"><li>•</li><li>•</li><li>•</li></ul>	None, but a good understanding of basic calculus will be assumed.

COURSE OBJECTIVES	
<ul style="list-style-type: none"><li>•</li><li>•</li><li>•</li></ul>	The course aims to familiarize the students with the basic concepts regarding electromagnetism. Essentially, the overall objective is to motivate Maxwell's equations and to work out some of their physical consequences.

Learning Outcomes	
<ul style="list-style-type: none"><li>•</li><li>•</li><li>•</li></ul>	At the conclusion of this course, students should be able to: Understand and model electric and magnetic interactions in free space and homogenous matter; Write down the Maxwell equations with a clear understanding of their meaning; Sketch and solve simple problems involving distributions of charges and currents.



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Grading Breakup and Policy
<p>Assignment(s):10%. Four or five in total.</p> <p>Home Work:</p> <p>Quiz(s):20%. Four in total.</p> <p>Class Participation:</p> <p>Attendance:5%</p> <p>Midterm Examination:30%</p> <p>Project:</p> <p>Final Examination:35%</p>

Examination Detail
<p>Midterm Exam</p> <p>Yes/No:Yes</p> <p>Combine Separate:</p> <p>Duration:2 hours</p> <p>Preferred Date:</p> <p>Exam Specifications:</p>
<p>Final Exam</p> <p>Yes/No:Yes</p> <p>Combine Separate:</p> <p>Duration:150 minutes</p> <p>Exam Specifications:</p>

COURSE OVERVIEW			
Week/ Lecture/ Module	Topics	Recommended Readings	Objectives/ Application
1	Electric charge and field, point charge, dipole	University Physics, Chapter 21	
2	Gauss's law, planar, cylindrical, and spherical symmetry	University Physics, Chapter 22	
3	Electric Potential, equipotential surfaces, conductors	University Physics, Chapter 23	
4	Electric fields in matter, capacitors and dielectrics	University Physics, Chapter 24	
5	Direct currents in materials, resistance, Ohm's law	University Physics, Chapter 25	
6	DC circuits	University Physics, Chapter 26	
7	Magnetic force and field, force on point charge	University Physics, Chapter 27	
8	Magnetic force and torque on currents	University Physics, Chapter 27, Chapter 28	
9	Ampere's law, Faraday's law, solenoids	University Physics, Chapter 28, Chapter 29	



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10	Inductance, Alternating currents and circuits, induced electric field	University Physics, Chapter 30, Chapter 31	
11	Displacement current, induced magnetic field, Maxwell equations	Chapter 32	
12	Magnetism in matter, electromagnetic waves	Chapter 32	
13	Plane waves, polarization, reflection/refraction of plane waves	Chapter 33	
14	Review		

### Textbook(s)/Supplementary Readings

University Physics, Young and Freedman, 12<sup>th</sup> Edition (2007).

Essential University Physics: Volume 2, Wolfson, 3<sup>rd</sup> Edition (2015).

Fundamentals of Physics, 10<sup>th</sup> Edition, by Walker, Halliday, and Resnick (2013).

Introduction to Electrodynamics, Griffiths, 4<sup>th</sup> Edition (2012).

Electricity and Magnetism, Purcell and Morin, 3<sup>rd</sup> Edition (2013).