



## SYLLABUS

Course Code	Course Num.	Course Name	Credit Hours	Lec.	Lab.	Tut.	Private study	Pre-requisites	Course Level	Language
PHY	106	General Physics (2)	4	2	2	2	6	PHY 101	3	English

### A. Course Description

This course describe the relationships that hold for electricity and magnetism and the interactions between them and also the magnetic fields, forces, and potentials involved in the interaction of point charges and of currents. Application of different laws (Coulomb, Ohm, Lenz, Kirchhoff, Faraday to solve problems in electromagnetism). The lecture will also cover what is expected in the lab-report. Attendance and participation is mandatory. Experiments will usually be performed in groups, but each student will turn in an individual lab report.

### B. Course Outcomes

At the end of this course the student will be able to:

1. Learn and understand the basic knowledge in electrostatics and magnetostatics.
2. Demonstrate the ability to formulate, interpret and draw inferences from their knowledge.
3. Show competence with a wide variety of mathematical tools and techniques.
4. Develop a good understanding and appreciation of electrostatics and
5. Magneto-statics.
6. Observe and analyze physical data relevant to some of the experiments in electrostatics and magnetostatics.
7. Use of the laboratory equipment to collect and record data, apply relevant mathematical models and perform required computations, and present the derived results as an application of a measured observation of the electronic physics.
8. Understand the basic concepts of physics and the methods scientists use to explore natural phenomena, including observation, hypothesis development, measurement and data collection, experimentation, evaluation of evidence, and employment of mathematical analysis.

### C. References

#### Required Textbook

Serway R.A. and Jewett J.W., *Physics for Scientists and Engineers with Modern Physics*, 9<sup>th</sup> Edition, Brooks/Cole, Belmont, CA, USA (2014).

#### Other references

- Halliday D. and Resnick R., *Physics*, 9<sup>th</sup> Edition, John wiley & sons (2011).
- Laboratory Manual supplied by the Department of Physics.

**Course Website:** <http://www.imamm.org/>



## D. Topics Outline

1. **Sources of the Magnetic Field:** *The Biot-Savart's law, the magnetic force between two parallel conductors, Ampere's law, the magnetic field of a solenoid, magnetic flux, Gauss's law in magnetism, displacement current and the generalized Ampere's law (Contact hours: 12).*
2. **Faraday's law:** *Faraday's law of induction, motional emf, Lenz's law, induced emfs and electric fields, generators and motors, Eddy currents (Contact hours: 8).*
3. **Capacitance and Dielectrics:** *Definition of capacitance, calculating capacitance for parallel plate capacitors, connection of capacitors, energy stored in a charged capacitor, capacitors with dielectrics, RC circuits (Contact hours: 8).*
4. **Inductance:** *Self-inductance, RL circuits, energy in a magnetic field, mutual inductance, oscillation in an LC circuit, the RLC circuit (Contact hours: 12).*
5. **Alternating Current Circuits:** *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, the transformer (Contact hours: 12).*
6. **Electromagnetic Waves:** *Maxwell's equations, plane electromagnetic waves, energy carried by electromagnetic waves, momentum and radiation pressure (Contact hours: 8).*

## Topics to be covered in the Laboratory

1. **Experiment 1:** *Determining the capacitance of a plate capacitor.*
2. **Experiment 2:** *Determining the dielectric constant of a dielectric by using plate capacitor.*
3. **Experiment 3:** *Parallel and Series Connection of Capacitors.*
4. **Experiment 4:** *Charging and discharging a Capacitor (The RC circuit).*
5. **Experiment 5:** *Measuring the Magnetic Field for a Straight Conductor and on Circular Conductor Loops.*
6. **Experiment 6:** *The Magnetic Field of an Air Coil.*
7. **Experiment 7:** *Electromagnetic Induction (Induction in a moving conductor loop).*
8. **Experiment 8:** *RL circuit.*
9. **Experiment 9:** *Alternating Current with Coil and Ohmic Resistors.*
10. **Experiment 10:** *Determining the Capacitive Reactance of a Capacitor in an AC Circuit.*

## E. Office Hours

Office hours give students the opportunity to ask in-depth questions and to explore points of confusion or interest that cannot be fully addressed in class.



## F. Exams & Grading System

The semi-official dates of the exams for this course are:

- **Midterm 1:** 6<sup>th</sup> or 7<sup>th</sup> week.
- **Midterm 2:** 11<sup>th</sup> or 12<sup>th</sup> week.
- **Quizzes & Homeworks:** During the semester.
- **Final Exam:** 16<sup>th</sup> week.

Your course grade will be based on your semester work as follows:

<b>Midterm 1:</b> 10 %	<b>Midterm 2:</b> 10 %	<b>Final Exam:</b> 40 %
<b>Quizzes, Homework, Attendance &amp; Participation:</b> 10 %		
<b>Laboratory:</b> 30 %		

The grading distribution:

<b>A<sup>+</sup></b>	<b>A</b>	<b>B<sup>+</sup></b>	<b>B</b>	<b>C<sup>+</sup></b>	<b>C</b>	<b>D<sup>+</sup></b>	<b>D</b>	<b>F</b>
[95, 100]	[90, 95)	[85, 90)	[80, 85)	[75, 80)	[70, 75)	[65, 70)	[60, 65)	[0, 60)

## G. Student Attendance/Absence

Only three situations will be considered as possible excused absences:

- Occurrence of a birth or death in the immediate family will be excused. (“Immediate family” is defined by the University as spouse, grandparents, parents, brother, or sister).
- Severe illness in which a student is under the care of a doctor and physically unable to attend class will be excused. Students are not excused for a doctor's appointment. Do not make appointments that conflict with rehearsals. Notes from the University Health Center will be accepted.

[Executive Rules for Study Regulations and Exams](http://goo.gl/ykm7t3)

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