School of Engineering and Physical Sciences
Department of Mathematics and Physics

Course Name and Course Code	**General Physics – II, Phy 108**
Semester	Summer 2025
Instructor Name	Zaid Bin Mahbub, Initial: ZBM
Office & Phone	South Academic Building (SAC) Room 1065B, NSU Ext: 6216
Office Hours	Sunday, Monday, Tuesday, Wednesday: 10.00am-11.15am; 12.00pm-12.30pm
Email Address	zaid.mahbub@northsouth.edu
Prerequisite(s)	Physics I (PHY 107) and Calculus II (MAT 130)
Credit Hours	Three (3)
Referred Textbooks	Fundamentals of Physics (10th Ed.). Author(s): Halliday, Resnick and Walker (available in the NSU library).
Course Objectives	By the end of this course, students will have demonstrated the ability to analyze a variety of phenomenon in electromagnetism such as electric charges and their interaction with electric and magnetic fields as well as current, inductors, capacitors, and electrical properties of circuits.
Course Description	Students analyze Coulomb's law, Gauss' law, Kirchhoff's laws, Ampere's law, Ohm's law, Faraday's Law, Lenz's law and energy theorems as well as their applications to a variety of phenomena including static charges, currents and magnetic fields, circuits, power, induction, coils, and solenoids. Students participate in interactive lectures and are evaluated by assignments, quizzes, and exams. This course has a separate mandatory laboratory session every week as PHY 108L.
Rationale for the Course	Physics II provides students with essential concepts and techniques from electricity and magnetism for core engineering science courses.
Student Learning Outcomes	After successful completion of the course, a student will achieve certain skills, and these skills are classified as the Course Learning Outcome (CLO)s according to Bloom's Taxonomy. For this course, the CLOs along with their assessment methods and tools are the following.

Mapping of Course Outcomes

	Course Outcomes (CO)	Bloom's taxonomy domain/level	Delivery methods and activities
CO-1	Calculate electrical quantities such as electric force, electric field, electric flux and electric potential of distributions of electric charge and different combination of electric charges using Coulomb law and Gauss' law.	**C2, C3, P2**	Lecture, Demonstration, Discussion
CO-2	Compute capacitance and resistance of simple capacitors and resistors as well as series, parallel and series-parallel arrangements of capacitors and resistors.	**C2, C3, P2**	Lecture, Demonstration, Discussion
CO-3	Analyze Ohm's and Kirchhoff's laws by evaluating electric current and power in simple DC circuits involving resistors and batteries.	**C4, P2**	Lecture, Interactive simulation, Discussion
CO-4	Analyze the effect of magnetic fields on the motion of an electric charge, as well as the force and torque on a current carrying wire in a magnetic field.	**C4, P2**	Lecture, Demonstration, Discussion
CO-5	Calculate the magnetic field due to currents in wires, coils, and solenoids using Biot-Savart law and Ampere's law.	**C2, C3, P2**	Lecture, Demonstration, Discussion
CO-6	Apply Faraday's law of induction and Lenz's law to analyze induced emf and current as well as the phenomenon of self-induction and mutual induction.	**C3, P2**	Lecture, Demonstration, Discussion

Cognitive domain (knowledge-based): **C** 1: Knowledge, 2: Comprehension, 3 Application, 4 Analysis, 5: Synthesis, 6: Evaluation

The affective domain (emotion-based): **A** 1: Receiving, .2: Responding, 3: Valuing, 4: Organizing, 5: Characterizing

The psychomotor domain (action-based): **P** 1: Perception, 2: Set, 3: Guided response, 4: Mechanism, 5: Complex overt response, 6: Adaptation, 7: Origination.

TEACHING STRATEGY

My main teaching goal is to create an effective learning environment that will help student acquire both problems solving skills and a deep conceptual understanding of the subject. It is my intention to teach according to the state-of-the-art results in physics education research and be especially aware of the student needs and misconceptions.

- Keep students actively engaged in the class, since an active classroom environment is a prerequisite for knowledge construction.
- Develop and teach cognitive maps of the subject and general problem-solving strategies.
- Students must always be aware how the goals of a particular topic are related to the big picture of the course.
- Moreover, they must learn to differentiate general strategies to solve problems with the particular techniques involved in each case.
- Foresee conceptual difficulties and deal explicitly with expected student misconceptions.
- Design exam problems that combine qualitative and quantitative analysis of physical phenomena.
- Organize the material around a few fundamental ideas.
- Stress common concepts and avoid cover subjects superficially.
- I would focus on phenomena rather than abstractions.

ASSESSMENT STRATEGY AND GRADING SCHEME

NSU's grading and performance evaluation policies will be followed in assigning your grade. Please note that all final grades are subject to departmental review and approval. A guideline of course assessment as follows-

Class Attendance	Class Assessment + Assignments	Quiz	Mid Term	Final
5%	5% + 5% = 10%	20%	30%	35%

CLASSROOM RULES OF CONDUCT

1. The ground rule for our class is respectful, open communication. We have many things to learn from one another. Every single question is appreciated!
2. When you come to the class, you become part of a learning community. Please be conscious of your community role, and work toward creating a healthy learning atmosphere in the class.
3. Don't chat during the class. If you have to, then feel free not to attend the class at the expense of your attendance for the day. Inability to refrain from unnecessary, disruptive chatting may result in a request to leave the classroom.
4. If you have to leave the class when it is in progress, sit near the door and leave silently.
5. While in class, please switch off your cell phone. Inability to do so may result in some penalty.
6. **Academic Integrity Policy:** The North South University does not tolerate academic dishonesty by its students. At a minimum, you must not be involved in cheating, copyright infringement, submitting the same work in multiple courses, significant collaboration with other individuals outside of sanctioned group activities, and fabrications. You are advised that violations of the Student Integrity Code will be treated seriously, with special attention given to repeated offences. Please refer to NSU Code of Conduct at http://www.northsouth.edu/student-code-of-conduct.html

EXAMS AND MAKE UP EXAMS POLICY

- You must prepare for all your exams.
- You must attend the exam on time.
- Being late does not necessarily guarantee that you are going to get extra time for writing your tests and exam.
- All cell phones must be switched off.
- Any deviation from the standard procedures will not be taken lightly.
- Any unfair means adopted in the tests and exam will be seriously dealt with.
- Academic misconduct or failure to comply with NSU Examination Code of Conduct may result in F.

LECTURE DETAILS:

Tentative lecture and examination schedule are given below. These may be changed/reordered if necessary.

MODULE 1:

L1 - Electric Charge, Coulomb's Law

L2 - Electric field, Electric field lines, Electric field due to a point charge

L3 - Electric dipole, line of charge and charged disk, Movement of charge in an electric field

MODULE 2:

L4 - Flux, Gauss' Law

L5 - Application of Gauss' Law: Cylindrical, spherical and planar symmetry

MODULE 3:

L7 - Electric potential energy and electric potential, Equipotential surface, Calculating potential from the field

L8 - Potential due to a point charge and a group of point charges, Potential due to continuous charge distribution Conductors in electrostatic equilibrium

MODULE 4:

L9 - Capacitance, Capacitors in series and in parallel

L10 - Energy stored in an electric field, Capacitors with dielectric

Mid Term

MODULE 5:

L11 - Electric current, resistance and Ohm's law, Resistors in series and parallel

L12 - Power in electric circuits, Kirchhoff's laws and solving circuits

L13 - RC circuits

MODULE 6:

L14 - Magnetic fields, Hall effect, Biot-savart law

L15 - Torque on a current loop, Magnetic dipole moment, Magnetic field due to a current, Force between two parallel currents

L16 - Ampere's law, Solenoid

MODULE 7:

L17 - Faraday's law of induction, Lenz's law

L18 - Induction and energy transfer, Induced electric field, Inductors and inductance

L19 - Self-induction, Energy stored in a magnetic field, Mutual induction

L20 - LR circuit

MODULE 8:

L21- LC circuit

L22- Maxwell's equations

L23- Review

- *1 lecture slot required for the Mid Term Examination*

Final Exam

The date of final exam will be announced from exam controller office near the end of the semester.