Course Syllabus :

Physics 2: General Electricity

Prepared by :
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Course : General Electricity

Semester	2nd Semester
Level	L1 LMD Mathematics (M) and Mathematics and computer science (MI - repetitive)
Teaching unit	Transversal teaching unit
Manager	Dr. HADJOU BELAID Zakia
Availability and contact	Sunday and Wednesday, 9am-12pm/in Laboratory LRM z_hadjou@yahoo.com
Course period	January-May 2024
Course structure (CM/TD)	Lecture 21h (Wednesday at 11:30 a.m in Amphi 3) (sometimes remote via Teams on Thursday at 10 a.m) Supervised work 21h (Wednesday at 1:30p.m in Amphi 2)
Credit number	3
Coefficient	2

Course description

This course is designed for students in the first-year common barter Mathematics and Mathematics and Computer Science. In this course, we will answer some of the most frequently asked questions about electricity and define some commonly used physical quantities.

We also give the different laws (Ohm's law, Kirchoff's law and Gauss's law) for calculating different physical quantities such as electric field, electric force and electric potential.

This course is divided into four chapters:

Chapter 1 covers the fundamentals of electrostatics, with definitions of coulomb force, electrostatic field and electrostatic potential. Chapter 2 is devoted to Gauss's theorem, with various applications, including the calculation of the electric field of a sphere, a cylinder and a conducting wire. Equilibrium conductors are the subject of Chapter 3. This chapter defines the different types of capacitors, with all the calculations that go with them. The final chapter covers the fundamental principles of electrokinetics, focusing on Ohm's and Kirchhoff's laws for the study of circuits and understanding

- **Objectives**

At the end of this course, students will be able to:

Knowing the origin of electricity.

- Identify the different physical quantities in electricity.
- Differentiate between the laws to be applied to point charges and continuous charge distributions.
- Apply Gauss's theorem to the calculation of the field for a well-defined continuous distribution.
- Differentiate between Ohm's law on microscopic and macroscopic scales.
- Adapt Kirchhoff's laws to different types of circuits.

In order to follow this course successfully, the student must have certain prerequisites, some of which are listed below. The student must :

Necessary pre-requisites	- Know some simple experiments on general electricity and their explanations. - Know the source of electricity. - Master a few mathematical operators for calculating the electrostatic field and force.
Course program	- Chapter I: Electrostatics - Chapter II: Gauss's theorem - Chapter III: Conductors and capacitors - Chapter IV: Electrokinetics
Evaluation type	- Continuous assessment - Final examination
Assessment of learning	Calculation of final average:[Final Exam 60% + CA 40%] In the CA, 50% via Moodle and 50% face-to-face. - Moodle test (CA Part 1) on March 09, 2024, out of 07 points for 30 min. - Face-to-face test (CA Part 2) on 07 points on April 17. - Catch-up of test on Moodle (CA Part 1) on April 27, 2024, for 30min. - Catch-up of Face-to-face test on May 08, 2024. - For those unable to attend the tests, a final exam exercise will be the CA note. - The SW grade will be out of 07 points, and is made up of the attendance grade, the grade for homework and tests on Moodle, and attendance. - Average grade after Catch-up exam [Catch-up exam 60% + CA 40%]

Bibliography and resources

[1] Mosbah AMLOUK, Khaled RAOUADI, Said RIDENE. Cours d'électrocinétique Université virtuelle de Tunis, 2009.

[2] Jimmy ROUSSEL, Cours de physique électrocinétique. Version en ligne – https://femto-physique.fr/electrocinetique. 2021.

[3] Jimmy ROUSSEL. Conducteurs électriques. https://femto−physique.fr/ electromagnetisme /conducteurs−electriques.php. (cf.p.5,17).Fév.2016.

[4]Jimmy ROUSSEL. Séries de Fourier. https://femto−physique.fr/omp/serie−de−fourier. php. (cf.p.56, 57). Jan.2020.

[6] Étienne TISSERAND, Jean François PAUTEX et Patrick SCHWEITZER. Analyse et traitement des signaux 2eéd. Méthodes et applications au son et à l'image. Dunod, 2009.

[5]Jean PÉRICART. Cours d'électricité théorique, Tome1: Electrostatique - Electrocinétique.1962.

[7] Bendaoud MEBAREK. Électricité générale Cours & Exercices corrigés. Université Ibn Khaldoun - Tiaret . 2020.

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