Applied Electromagnetism (E900039)

Course size   *(nominal values; actual values may depend on programme)*

    Credits 6.0   **Study time 180 h**

Course offerings and teaching methods in academic year 2023-2024

A (semester 1)	Dutch	Gent	seminar

Lecturers in academic year 2023-2024

Vande Ginste, Dries	TW05	lecturer-in-charge
Huynen, Martijn	TW05	co-lecturer

Offered in the following programmes in 2023-2024

	crdts	offering
Bachelor of Science in Engineering(main subject Electrical Engineering)	6	A
Bridging Programme Master of Science in Electrical Engineering(main subject Communication and Information Technology)	6	A
Bridging Programme Master of Science in Electrical Engineering(main subject Electronic Circuits and Systems)	6	A
Bridging Programme Master of Science in Photonics Engineering	6	A
Preparatory Course Master of Science in Photonics Engineering	6	A
Preparatory Course Master of Science in Photonics Engineering	6	A

Teaching languages

Dutch

Keywords

Maxwell, electrostatics, magnetostatics, plane waves, transmission lines, waveguides, antennas

Position of the course

Basics and applications of Maxwell's equations for the electrical engineer. Part I of the course very briefly treats static phenomena (electrostatics, magnetostatics). Part II is devoted to wave phenomena. Part II first deals with free space propagation (plane waves, antennas). Finally waveguiding phenomena and transmission line representations are studied.

Contents

- Introduction Maxwell's equations
- Electrostatics
- Magnetostatics
- Plane waves
- Transmission lines
- Multiconductor lines and waveguides
- Antennas and radiation

Initial competences

Physics. Mathematics. Informatics course.

Final competences

1 To be able to describe, understand and discuss wave propagation in free space and in waveguides.
2 To understand, calculate and determine voltage and current behaviour on transmission lines.
3 To determine antenna characteristics and array factors.
4 To solve a numerical problem and program it.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Group work, Seminar, Lecture, Independent work

Extra information on the teaching methods

The course consists of lectures about theory and exercises, without making a strict, traditional distinction between them. All lectures are seminars which require interaction with and input from the students. During the semester a numerical problem must be tackled and programmed in Python. The results of this project are written down in a report.

Learning materials and price

Syllabus: hardcopy via VTK (approx. 10 EUR) / elektronic version via Ufora: for free

References

Fundamentals of Applied Electromagnetics F.T. Ulaby Prentice Hall ISBN 0-13-032931-2

Course content-related study coaching

Questions can be asked, e.g., via email or by making an appointment.

Assessment moments

end-of-term and continuous assessment

Examination methods in case of periodic assessment during the first examination period

Written assessment open-book, Written assessment

Examination methods in case of periodic assessment during the second examination period

Written assessment open-book, Written assessment

Examination methods in case of permanent assessment

Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible

Extra information on the examination methods

During examination period: close book exam (theory) and open-book exam (exercises); During semester: graded project report + code.

Calculation of the examination mark

The project counts for 20% of the total score. The project score can be carried over to second examination period but if wanted, the student can submit a new project. The exam counts for 80% of the total score. the total score will be a weighted average of the two partial scores.
For the project (during the semester) and for both aspects of the exam (during the examination period), i.e. the theory part and the exercise part, a minimum score of 40% must be obtained. When the score of one of these three scores is less than 40%, the maximum total score cannot exceed 8/20.