Applied Electromagnetism (E900039)

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

Credits 6.0   **Study time 180 h**   **Contact hrs**   60.0h

Course offerings and teaching methods in academic year 2022-2023

A (semester 1)	Dutch	Gent	seminar	60.0h

Lecturers in academic year 2022-2023

Vande Ginste, Dries		TWO5	lecturer-in-charge

Offered in the following programmes in 2022-2023

	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

Basic Physics. Basic mathematical courses. Basic 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

Lecture: plenary exercises, Demonstration, Seminar, Lecture, Self-reliant study activities, Project, Seminar: coached exercises

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 examination, Open book examination

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

Written examination, Open book examination

Examination methods in case of permanent assessment

Report

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 + matlab code.

Calculation of the examination mark

Project counts for 20% of the total score. Project score can be carried over to second examination period but if wanted, the student can submit a new project. For both parts (project during semester and exam during examination period), a minimum score of 40% must be obtained. The total score is the weighted average of both parts, but the total score cannot exceed 8/20 if the previously formulated condition is not met.