GHENT UNIVERSITY

Course Specifications

Valid in the academic year 2023-2024

Electromagnetism II (E022210)

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

Credits 3.0 **Study time 90 h**

Course offerings and teaching methods in academic year 2023-2024

A (semester 2)	Dutch	Gent	lecture
			seminar

Lecturers in academic year 2023-2024

Rogier, Hendrik	TW05	lecturer-in-charge

Offered in the following programmes in 2023-2024	**crdts**	**offering**
Bachelor of Science in Engineering(main subject Engineering Physics)	3	A

Teaching languages

Dutch

Keywords

3D electromagnetic radiation and antennas, acoustic waves in fluids and gasses, electrodynamic problems for moving sources and media

Position of the course

Providing insight in electromagnetic wave phenomena. Study of three-dimensional electromagnetic field problems in general and of antennas and antenna arrays in particular. Design of elementary antennas. Study of some three-dimensional acoustic problems. Study of some problems pertaining to moving media and/or moving sources. EM levitation.

Contents

- 3D-phenomena and antennas: Far field concepts and scattering, Antennas, Antenna arrays, Antenna gain, Radiation impedance.
- Acoustic waves in fluida and gasses: Concepts and simple source problems
- Field problems in inertial systems: in free space and in the rpesence of moving media. Doppler effect. Cerenkov effect. EM levitation.

Initial competences

Electromagnetics I

Final competences

1 Explain and apply concepts related to antennas and 3D radiations.
2 Describe and apply acustic phenomena.
3 Analyse and calculate the most important antenna characteristics.
4 Computer-aided design simple wire antennas.
5 Understand and apply the principles and methods of electrodynamics of moving sources and materials and apply these concepts (such as Doppler effect) in the framework of special relativity.

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

Seminar, Lecture, Independent work

Extra information on the teaching methods

Classroom lectures; Classroom problem solving sessions; Individual project: Computer-aided

antenna design by means of NEC; Flipped classroom with contact sessions; Lectures on Special Relativity are taught through guided exercise sessions according to the flipped classroom principle.

Learning materials and price

course notes (10 EUR in print, free electronic version on UFora) in english

References

- Jean G. Van Bladel, Electromagnetic Fields, Second Edition, Wiley 2006, Print ISBN:9780471263883 |Online ISBN:9780470124581 |DOI:10.1002/047012458X]

Course content-related study coaching

The docent or his/her collaborators are available for explanations during or between courses

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 in modified form

Extra information on the examination methods

- During examination period: written assessment with closed book; written assessment with open book - problems
- During semester: individual project report

Calculation of the examination mark

- Evaluation throughout semester as well as during examination period. Special conditions: 3/4 theory (written closed book) + excercises (in writing - use of course material allowed) + 1/4 project report.
- Students who eschew one or more parts of the assessment (theory part, excercises part continuous assessment) cannot obtain a pass mark for the course unit. Should the final mark be higher than 7/20, it will be reduced to the highest non-passable mark (i.e. 7/20). When the student obtains less than 8/20 for at least one of the components (theory part, excercises part continuous assessment, they can no longer pass the course unit as a whole. If the total score does turn out to be a mark of ten or more out of twenty, this is reduced to the highest fail mark (9/20).