GHENT UNIVERSITY

Course Specifications

From the academic year 2021-2022 up to and including the academic year

Composites (E900069)

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)	English	Gent	practicum	15.0h
			lecture	30.0h
			seminar: practical PC room classes	15.0h
B (semester 1)	Dutch	Gent	practicum	15.0h
			guided self-study	30.0h
			seminar: practical PC room classes	15.0h

Lecturers in academic year 2022-2023

Van Paepegem, Wim	TW11	lecturer-in-charge

Offered in the following programmes in 2022-2023	**crdts**	**offering**
Bridging Programme Master of Science in Materials Engineering	6	B
Bridging Programme Master of Science in Sustainable Materials Engineering	6	A
Master of Science in Engineering: Architecture(main subject Architectural Design and Construction Techniques)	6	A
Master of Science in Electromechanical Engineering(main subject Control Engineering and Automation)	6	A
Master of Science in Electromechanical Engineering(main subject Electrical Power Engineering)	6	A
Master of Science in Industrial Engineering and Operations Research(main subject Manufacturing and Supply Chain Engineering)	6	A
Master of Science in Electromechanical Engineering(main subject Maritime Engineering)	6	A
Master of Science in Electromechanical Engineering(main subject Mechanical Construction)	6	A
Master of Science in Electromechanical Engineering(main subject Mechanical Energy Engineering)	6	A
Master of Science in Industrial Engineering and Operations Research(main subject Transport and Mobility Engineering)	6	A
Master of Science in Engineering: Architecture(main subject Urban Design and Architecture)	6	A
International Master of Science in Sustainable and Innovative Natural Resource Management	6	A
Master of Science in Electromechanical Engineering Technology	6	A
Master of Science in Materials Engineering	6	B
Master of Science in Sustainable Materials Engineering	6	A
Exchange Programme Architecture	6	A

Teaching languages

English, Dutch

Keywords

Composites, fibre reinforced plastics, technology, fabrication, sandwiches, mechanical behaviour, non-destructive characterisation

Position of the course

This course deals with an introduction to the technology and the mechanics of fibre reinforced

materials. In general, products made of those materials are quite different from traditional isotropic materials, such as metals and plastics.
The course treats on the technology, the basic mechanics, and some specific aspects of fibre reinforced materials.
As this course is also meant for other disciplines than pure materials science, it mainly focuses on the mostly used fibre reinforced plastics.

Contents

- Technology of fibre reinforced materials: fibre reinforced composites, review of reinforcing fibres and matrices, properties and applications, fabrication processes, sandwich constructions
- Stiffness and strength: micromechanics of a layer, macromechanics of a layer, classical laminate theory, interlaminar stresses
- Mechanical behaviour and testing: fracture and damage mechanics, static testing, fatigue, impact, non-destructive testing and characterisation
- Design aspects

Initial competences

Mechanics of materials, basic material science

Final competences

1 To understand and to know basic terminology of the technology and the manufacturing of composite materials
2 To be able to deal with the mechanics and the design of layered, orthotropic materials
3 To be able to handle in a judicious way orders of magnitude and estimations of material properties
4 To be able to make a founded choice of a candidate material (class) for a specific application
5 To be able to calculate the stiffness and strength of laminates under simple load situations

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

Practicum, Guided self-study, Lecture, Seminar: practical pc room classes

Extra information on the teaching methods

Classroom lectures; Lab sessions; Computer-assisted problem solving
Due to the COVID19 context, the proposed teaching methods might be changed during the semester. These changes will be clearly communicated on Ufora.

Learning materials and price

Detailed as well as supporting lecture slides are at the students' disposal through the electronic learning environment.
For the PC room exercises the student has access to a free laminate calculation tool.

References

- An introduction to composite materials, Derek Hull, Cambridge Solid State Science Series, ISBN 0 521 28392
- Materials Science and Engineering an introduction, W.D. Callister Jr.

Course content-related study coaching

Assessment moments

end-of-term assessment

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

Written examination

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

Written examination

Examination methods in case of permanent assessment

Possibilities of retake in case of permanent assessment

not applicable

Extra information on the examination methods

During examination period: written examination with closed books
The calculation of the final score and the examination method can differ, due to the COVID19 context, especially if one or more evaluations can not be organised on campus or can not be organised at all.

Calculation of the examination mark