GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2025-2026

Construction Techniques (E056600)

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 2025-2026

A (semester 2)	Dutch	Gent	
B (semester 2)	English	Gent	lecture excursion seminar
C (semester 2)	English	Gent	practical lecture seminar

Lecturers in academic year 2025-2026

De Waele, Wim	TW08	lecturer-in-charge

Offered in the following programmes in 2025-2026	crdts	offering
Bridging Programme Master of Science in Electromechanical Engineering(main subject Maritime Engineering)	3	B
Bridging Programme Master of Science in Engineering: Ships and Marine Technology	3	B
Master of Science in Electromechanical Engineering(main subject Control Engineering and Automation)	3	A
Master of Science in Electromechanical Engineering(main subject Electrical Power Engineering)	3	A
Master of Science in Electromechanical Engineering(main subject Maritime Engineering)	3	A
Master of Science in Electromechanical Engineering(main subject Maritime Engineering)	3	B
Master of Science in Electromechanical Engineering(main subject Mechanical Construction)	3	A
Master of Science in Electromechanical Engineering(main subject Mechanical Construction)	3	B
Master of Science in Electromechanical Engineering(main subject Mechanical Energy Engineering)	3	A
International Master of Science in Advanced Design of Sustainable Ships and Offshore Structures	3	B
Master of Science in Electromechanical Engineering Technology	3	C
Master of Science in Engineering: Ships and Marine Technology	3	A
Master of Science in Engineering: Ships and Marine Technology	3	B

Teaching languages

English, Dutch

Keywords

Joining techniques, welding, mechanical joining, adhesive bonding

Position of the course

The students are getting insight in different welding techniques and other joining techniques (eg. adhesive bonding) for metals. Besides the physical principles, the technological aspects of the different joining techniques are studied as well as the practical implications on the design of the joint. In addition, attention is given to the strength calculation (static and fatigue) of weld joints.
This course is both offered to students from engineering programmes (course

offerings A and B) as well as to studens engineering technology (course offering C).

Contents

Lectures

- Welding and allied processes:
  - General principles, advantages and disadvantages, quality control
  - Structural aspects of weldments
  - Weldability and problems during welding
  - Fusion welding: gas flame welding, electric arc welding, electric resistance welding, ...
  - Solid-state pressure welding: friction welding, explosion and pulse welding, ...
  - Fusion pressure welding: electric arc and electric resistance
  - Soldering and brazing
  - Laser welding and operations
- Adhesive bonding:
  - Principles, bonding process, types of adhesives, advantages and disadvantages
  - Load transfer and structural design

Coached exercises (only for students in the engineering programmes)

- Static strength calculations of welded joints
- Fatigue strength calculations of welded joints

Practicals (only for students in the engineering technology programmes)

- Fatigue strength calculations of welded joints
- Practical experience with electric arc welding

Initial competences

This course builds on certain learning outcomes of the course 'Mechanica van Materialen' (engineering programmes) or Materialen and Mechanica (engineering technology programmes)

Final competences

1 Understand the physical principles of joining techniques.
2 Describe the technological aspects of joining techniques.
3 List the advantages and disadvantages of joining techniques.
4 Know the applications of joining techniques.
5 Understand terminology specific to joining techniques.
6 Critically compare different joining techniques.
7 Select the most suited joining technique for a specific application.
8 Be aware of societal aspects (safety, economy, sustainability) specific to joining techniques.
9 Analyse and explain the load transfer in joints.
10 Constructive design of joints.
11 Recognize and remediate defects in joints.
12 Calculate the strength of joints.
13 Analyse, summarize and present scientific literature related to joining techniques (only for the engineering programmes).

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, Excursion, Lecture, Practical

Study material

Type: Handbook

Name: Welding processes handbook
Indicative price: Free or paid by faculty
Optional: yes
Language : English
Author : Weman
ISBN : 978-0-85709-518-3
Online Available : Yes

Type: Slides

Name: slides teacher
Indicative price: Free or paid by faculty
Optional: no
Language : English
Available on Ufora : Yes

Type: Audiovisual Material

Name: various movies
Indicative price: Free or paid by faculty
Optional: yes
Language : English
Available on Ufora : Yes

References

Welding processes handbook, 2nd Edition, Ed. K. Weman, Woodhead Publishing, ISBN 978-0-85709-518-3, 2012

Course content-related study coaching

The lecturer is available before and after the lectures. A personal meeting is possible upon e-mail request.
Individual guidance during practicals (engineering technology programmes).

Assessment moments

end-of-term and continuous assessment

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

Oral assessment, Written assessment open-book

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

Oral assessment, Written assessment open-book

Examination methods in case of permanent assessment

Peer and/or self assessment, Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible

Extra information on the examination methods

Engineering programmes (course offering B):
Periodic evaluation:
- Theory: oral closed-book exam;
- Exercises: written exam with open book

Permanent evaluation:
- Presentation of a literature study (1st period: by a group of students; 2nd period: individual)
- Peer evaluation (only in 1st period)

Engineering technology programmes (course offering C):
Periodic evaluation:
- Theory: oral closed-book exam;
- Exercises: written exam with open book

Calculation of the examination mark

Engineering programmes: the final quotation is based on a weighted average of the scores obtained for theory (10/20), exercises (7/20) and microteaching (3/20).
Engineering technology programmes: the final quotation is based on a weighted average of the scores obtained for theory (12/20) and exercises (8/20).
If the student does not participate to the evaluation of one or more parts, he/she cannot pass this course. If the final score in this case would be 10/20 or more, the score is reduced to the highest unsuccessful score (9/20).