GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2026-2027

Multidisciplinary Design (E048900)

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

Credits 6.0 **Study time 180 h**

Course offerings in academic year 2026-2027

A (semester 2)	English	Gent
B (semester 2)	Dutch	Gent

Lecturers in academic year 2026-2027

Lecompte, Steven	TW08	lecturer-in-charge
Crevecoeur, Guillaume	TW08	co-lecturer
Degroote, Joris	TW08	co-lecturer
König, Florian	TW08	co-lecturer
Sergeant, Peter	TW08	co-lecturer

Offered in the following programmes in 2026-2027	crdts	offering
Bridging Programme Master of Science in Mechanical and Electrical Systems Engineering	6	A
Master of Science in Electromechanical Engineering	6	B
Master of Science in Mechanical and Electrical Systems Engineering	6	A

Teaching languages

English, Dutch

Keywords

System oriented design, technical innovations, design sustainability, design optimization, collaborative work, multi-disciplinary

Position of the course

This course aims to guide students through the systematic design process, both individually and in group, to develop technically relevant innovations. Students will explore the principles of system-oriented design, engage in collaborative projects, and apply their learning to real-world challenges. By the end of the course, participants will have a deeper understanding of how to create impactful solutions that address current needs in various fields.

Contents

Each group performs a design on one out of two relevant and innovative applications, each of which touches on the program's four learning paths, i.e. control engineering, thermal engineering, mechanical engineering and electrical engineering. To that end, the students align their work with design methodology principles that are offered during the four distinct phases of the course:

Orientation Phase

In the orientation phase, lectures are provided on system-oriented design methods, sustainable design strategies and project management, offering foundational knowledge and insights into the project's context and relevant theories and methodologies. As such it sets the stage for informed decision-making as students move forward.

Concept Phase

From the concept phase onwards, students collaborate in groups on a common design. The focus of this phase is on generating innovative concepts that address the project's objectives. As such it emphasizes brainstorming, creativity and teamwork and allows to explore different ideas and approaches. The latter are

substantiated with basic lumped OD or 1D techniques. The phase ends with a poster fair where the groups present their conceptual work to each other.

Detailed Phase

In the detailed phase, numerical simulations are conducted for each of the four learning paths, bringing along iterative refinements of the group design. This phase allows to verify the design concepts, enables to analyze the performance and results in the necessary adjustments to enhance the designs.

Condensation Phase

Finally the group's findings are compiled and presented in a comprehensive report. This stage involves synthesizing the results from previous phases, critically reflecting on the strengths and weaknesses of the design, drawing conclusions and clearly communicating the design process (the steps the group has undertaken to come to the final design) and outcomes to both peers and instructors.

Initial competences

Competences gained in the course Numerical Modelling and Design of Electrical and Mechanical Systems

Final competences

1 Students organize their work according to the different phases of a design process and apply a suitable design methodology.
2 Students apply advanced knowledge and recent numerical techniques from their specialization creatively and critically when designing an innovative solution to a new, complex problem statement.
3 Students align their integrative and system-oriented design with incomplete, uncertain and conflicting boundary conditions.
4 Students communicate results and conclusions in English to experts
5 Students work professionally in a self-managing team (e.g. taking on and fulfilling responsibilities, defending and communicating joint decisions
6 Students organize their individual, technical work in function of the overall design
7 Students reflect critically on both their own thinking and actions, and the functioning within and of the team.
8 Students take into account various perspectives when assessing their technological and innovative design against current societal challenges.
9 Students act ethically and with scientific integrity.

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, Peer teaching

Study material

Type: Slides

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

References

Engineering Design, McGraw-Hill

Course content-related study coaching

The lecturers answer questions during and after classes. Additional assistance is provided through the interactive learning platform. Students can also request a personal meeting

Assessment moments

end-of-term and continuous assessment

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

Presentation

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

Presentation

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 not possible

Extra information on the examination methods

Continuous evaluation: each student assesses the poster of two other groups based on fixed criteria.
Continuous evaluation: peer/assesment at various stages during the poroject
Periodical assessment: presentation + Q&A

Calculation of the examination mark

Continuous assesment: Product (poster, 1/5 of 30%), Process (Peer assessment, 1/5 of 30%)
Periodic assessment: Product (final report, 4/5 of 30%), Proces (Final peer assessment, 4/5 of 30%), Exam (Presentation + Q&A, 40%)