GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2026-2027

Powertrains for Sustainable Transportation (E032650)

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

Credits 3.0 **Study time 90 h**

Course offerings in academic year 2027-2028

A (semester 1) English Gent

Lecturers in academic year 2027-2028

Verhelst, Sebastian TW08 lecturer-in-charge

Offered in the following programmes in 2027-2028	crdts	offering
Master of Science in Electromechanical Engineering	3	A
Master of Science in Engineering: Ships and Marine Technology	3	A
Master of Science in Mechanical and Electrical Systems Engineering	3	A

Teaching languages

English

Keywords

engines, fuel cells, renewable fuels, critical thinking

Position of the course

This is an advanced academic elective course in the learning line thermo-fluids.

Contents

- Course positioning: transportation modes, their energy use, load profiles and impact, options for making them sustainable, important criteria depending on the application
- Hydrogen: origin, energy density, properties, application
- Renewable fuels for combustion engines: origin, production efficiency, fuel properties, application (storage, energy and power density, emissions, efficiency), life cycle impact analysis
- New combustion concepts
- Fuel cells, battery-electric drives and hybrid powertrains: basics

Initial competences

- Transport Phenomena
- Technical Thermodynamics
- Heat and Flow Engineering
- Thermal Machines

Final competences

1 Synthesize, present and explain scientific literature on powertrains for sustainable transportation
2 Explain trends in powertrain technologies and fuels
3 Be able to choose an energy carrier and powertrain technology for a specific application, depending on its features, and present the pros and cons of your choice

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

Extra information on the teaching methods

Theory lectures, presentations in small groups of scientific paper

Study material

None

References

Course content-related study coaching

- Interactive support through the electronic learning platform (forums, e-mail), in person: after agreement on date, fixed contact hour: immediately before and after lectures.

Assessment moments

end-of-term and continuous assessment

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

Oral assessment, Presentation

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

Oral assessment, Written assessment

Examination methods in case of permanent assessment

Possibilities of retake in case of permanent assessment

not applicable

Extra information on the examination methods

- oral examination (open book)

Calculation of the examination mark

The end score (S) is determined as: S = 0.5*T + 0.5*A , with T the score for the theory exam and A the score for the assignment.