

## Gas Turbines (E037621)

**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 2024-2025**

A (semester 1)

English

Gent

independent work

lecture

seminar

**Lecturers in academic year 2024-2025**

De Paepe, Ward

TW08

lecturer-in-charge

**Offered in the following programmes in 2024-2025**

**crdts**

**offering**

Bridging Programme Master of Science in Electromechanical Engineering(main subject Mechanical Energy Engineering)

3

A

Master of Science in Electromechanical Engineering(main subject Control Engineering and Automation)

3

A

Master of Science in Electromechanical Engineering(main subject Maritime Engineering)

3

A

Master of Science in Electromechanical Engineering(main subject Mechanical Construction)

3

A

Master of Science in Electromechanical Engineering(main subject Mechanical Energy Engineering)

3

A

**Teaching languages**

English

**Keywords**

Gas turbines, aircraft propulsion, axial and radial compressors, axial and radial turbines

**Position of the course**

Study of gas turbine systems.

Detailed analysis of the compressor and the turbine parts.

Study of alternative cycles and working fluids.

**Contents**

- Power Gas Turbines: components, blade cooling, builds, thermodynamic modelling, thermodynamic analysis of power gas turbines
- Thrust Gas Turbines: generation of thrust, propulsive efficiency, engines with single and double jet, technology of the turbofan engine
- Axial Compressors: degree of reaction, work coefficient, flow coefficient, secondary flows, threedimensional shape, vane and blade profiles, performance map
- Centrifugal Compressors: industrial builds, aerobuilds, rotor shape, diffusers, performance map
- Axial and Radial Turbines for Gases: kinematic parameters, blade shapes of axial turbines, layout of radial turbines, operating characteristics
- Alternative advanced cycles and working fluids

**Initial competences**

Transport phenomena, technical thermodynamics

**Final competences**

- 1 Components of power gas turbines; thermodynamic modelling of gas turbines; performance of different cycles for power generation.
- 2 Generation and energetic optimisation of thrust; technology of an aero-engine.

- 3 Layout and performance characteristics of axial and radial compressors.
- 4 Layout and performance characteristics of axial and radial turbines for gases.
- 5 Insight in operation of advanced cycles and/or with alternative working fluid.

**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 guided exercises; Homework assignments

**Study material**

None

**References****Course content-related study coaching****Assessment moments**

end-of-term assessment

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

Oral assessment

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

Oral assessment

**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: oral closed-book exam, written preparation.

**Calculation of the examination mark**