GHENT UNIVERSITY

Course Specifications

From the academic year 2024-2025 up to and including the academic year

Fluid Mechanics (E040560)

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 2026-2027

A (semester 1)	English	Gent	seminar practical lecture excursion

Lecturers in academic year 2026-2027

Degroote, Joris	TW08	lecturer-in-charge

Offered in the following programmes in 2026-2027	crdts	offering
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 Mechanical Construction)	3	A
Master of Science in Electromechanical Engineering(main subject Mechanical Energy Engineering)	3	A

Teaching languages

English

Keywords

Lift, compressible fluid, shock wave, unsteady flow

Position of the course

Introductory course on internal and external aerodynamics. Analysis of lift, effects of compressibility and viscosity, analysis of running waves in unsteady flows.

Contents

- One-dimensional applications: compressible flow equations, sound wave, shock wave, compressible flow in tube with variable section, friction, heat transfer
- Unsteady flow: linearized Euler equations, acoustic and convective waves, Sod problem, waves of incompressible fluid in an elastic tube, fluid-structure interaction
- General equations for an ideal fluid: Euler equations, transport of vorticity, vortex, force on an object, wind tunnel measurement of force on aerofoil
- Steady incompressible potential flow: flow around a cylinder, Magnus effect, flow around flat plate with incidence, lift force of aerofoil, induced drag of a finite wing
- Steady compressible flow: perturbation potential for subsonic and supersonic flow, supersonic flow: two dimensional expansion waves and oblique shock waves, transsonic flow
- Aerofoils: experimentally and computationally developed aerofoils, laminar and turbulent aerofoils
- Experimental methods in fluid mechanics: Pitot tubes, hot wire, optical flow measurement techniques

Initial competences

Transport Phenomena

Final competences

1 Explain the influence of compressibility of the fluid on a flow
2 Explain running waves in unsteady flows
3 Compute one-dimensional and two-dimensional flow with a compressible 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, Excursion, Lecture, Practical

Study material

Type: Syllabus

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

Type: Slides

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

References

- J. Anderson. Modern compressible flow, with historical perspective. McGraw-Hill. ISBN 0070016747.
- F. White. Viscous fluid flow. McGraw-Hill. ISBN 0070697124.

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, Written assessment

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

end-of-term evaluation: written open book examination on exercises, oral closed book examination with written preparation on theory

Calculation of the examination mark

- Exam on theory 50% and exam on exercises 50%.
- Special condition: If the student scores less than 8/20 for at least one component of the assessment, a pass mark for the course unit in question is not possible. If the final mark does turn out to be a 10/20 or more, this will be reduced to the highest non-deliberative mark, i.e. 7/20.