

Contents

- Principles: axial machines (examples), flow analysis, work transfer, energy analysis, degree of reaction, radial machines, characteristics
- Components: foils, cascades, channels, diffusers
- Fans: types, flow analysis, characteristics
- Compressible fluid: flow in nozzles
- Measurement: measurement of pressure, flow rate, rotational speed, torque
- Steam turbines: application, basic principles, impulse turbines, reaction turbines, design
- Dynamic similitude: nondimensional groups, characteristic numbers, design diagrams
- Pumps: cavitation, design, constructive aspects, self priming, unstable operation, special pumps
- Hydraulic turbines: application, types
- Wind turbines: application, types, performance, matching to a wind regime

Initial competences

Transport Phenomena, Technical Thermodynamics

Final competences

- 1 Derive basic functioning of turbomachines and the flow in their components
- 2 Derive parameter choice and layout of fans, steam turbines, pumps, hydraulic turbines and wind turbines
- 3 Calculate the flow in a turbomachine using one-dimensional analysis

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, Practical, Independent work

Extra information on the teaching methods

Practical on pump, fan and Pelton turbine

Study material

Type: Handbook

Name: Turbomachines

Indicative price: Free or paid by faculty

Optional: no

Language : English

Online Available : Yes

Type: Slides

Name: Slides

Indicative price: Free or paid by faculty

Optional: no

Language : English

Available on Ufora : Yes

References

[1] Erik Dick, Fundamentals of Turbomachines: Fluid Mechanics and Its Applications, Springer, 2015.

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

During examination period: oral closed-book exam on theory, written preparation;
written open-book exam on exercises.

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.