Course: Energy transport — credits: 5

Course code	WBVB24ETR
Name	Energy transport
Study year	2026-2027
ECTS credits	5
Language	English
Coordinator	C.E. Knowler
Modes of delivery	Education
Assessments	Energy transport - Assignment

Learning outcomes

The student:

- calculates pressure differences and flows in hydraulic systems using Bernoulli's law and the continuity equation.
- calculates losses due to major and minor factors within the system.
- interprets basic hydraulic circuits, including series and parallel piping networks
- selects appropriate displacement or centrifugal pumps and interpret/apply their parameters and characteristics
- describes the working principles of hydraulic and pneumatic systems and components
- calculates pressures, forces, powers, and energy of hydraulic components within a given hydraulic system
- analyses the operation of a hydraulic system from a schematic representation and additional information, supported by relevant calculations.

Content

In this comprehensive course, we delve into the world of fluid carrying systems with a focus on design considerations. From specifying system requirements to ensuring alignment with desired behaviours, we explore the application of key equations such as the Bernoulli equation, Darcy-Weissbach equation, and Moody diagrams. The investigation of Reynolds numbers and their correlation to laminar and turbulent flow is a key aspect. The hydraulic networks, encompassing both series and parallel piping systems, are thoroughly studied.

The course extends its reach to actuators found in various processes and machines, with a particular emphasis on hydraulic and pneumatic actuators. Hydraulic actuators are renowned for their precision and absolute force delivery, while pneumatic drives play a crucial role in control systems, manipulating the state of components like switches. The course addresses essential questions such as the structure of a complete drive system, the design process based on requirements and calculations, and the modelling of drive systems through schematization.

Included in programme(s)

Mechanical Engineering

School(s)

Engineering, Life Sciences & ICT

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