Hanze

Course: Fluid Mechanics — credits: 5

Course code	WBVP23FM
Name	Fluid Mechanics
Study year	2026-2027
ECTS credits	5
Language	English
Coordinator	T. Munuswamy
Modes of delivery	Education
Assessments	Fluid Mechanics - Written, organised by STAD examinations

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
- analyzes 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. Throughout lectures, literature, and examinations, the primary focus is on hydraulic design, with attention given to pneumatic systems and their similarities and differences in the laboratory work. This course equips students with a profound understanding of fluid systems and actuators, offering valuable insights for designing, modelling, and optimizing these systems for real-world applications.

Included in programme(s)

Mechanical Engineering VWO a 3-year variant

School(s)

Engineering, Life Sciences & ICT

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