Course Unit Title	**AMEE 310 Hydraulics and Pneumatics**
Programme of study	BSc in Mechanical Engineering
Lecturer	Dr.-Ing. Paris A. Fokaides
Type of course unit	Compulsory
ECTS	5
Year of study:	2
Semester(s) offered	Fall Semester 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020
Course content	▪ Introduction to hydraulic power systems ▪ Ideal and real analysis of hydraulic systems components, including oils, transmission lines, pumps, valves, actuators and accessories ▪ Introduction to pneumatic power systems
Course modules:	Module 1: Introduction to Hydraulic Power Systems ▪ The classification of power systems ▪ Basic hydraulic power systems ▪ Advantages and disadvantages of hydraulic power systems ▪ Comparing power systems Module 2: Hydraulic oils ▪ Basic properties of hydraulic oils ▪ Classification of hydraulic oils ▪ Requirements imposed on the hydraulic liquids Module 3: Hydraulic transmission lines ▪ Hydraulic tubing ▪ Hoses ▪ Pressure and power losses in hydraulic conduits Module 4: Hydraulic pumps ▪ Ideal pump analysis ▪ Real pump analysis ▪ Classification of pumps Module 5: Hydraulic systems components ▪ Hydraulic control valves ▪ Hydraulic actuators ▪ Hydraulic accessories – accumulators, filters, pressure switches Module 6: Introduction to pneumatic systems ▪ Peculiarities of pneumatic systems (compressibility) ▪ Advantages and disadvantages of pneumatic systems ▪ Basic elements of pneumatic systems ▪ Basic pneumatic circuits Module 7: Fluid Mechanics Laboratory Exercises ▪ Laboratory Exercise 1: Demonstration of hydraulics power unit ▪ Laboratory Exercise 2: Flow rate and velocity ▪ Laboratory Exercise 3: Cylinders in series ▪ Laboratory Exercise 4: Pressure reducing valves ▪ Laboratory Exercise 5: Introduction to pneumatics ▪ Laboratory Exercise 6: Pressure drop in hydraulic and pneumatic systems
Textbooks:	Rabie, M. G., & Ph. D. (2009). Fluid power engineering (pp. 91-96). New York, NY, USA: McGraw-Hill.
Instruction language	English
External reference	link