

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
Course content	<ul style="list-style-type: none"> ▪ 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:	<p><u>Module 1: Introduction to Hydraulic Power Systems</u></p> <ul style="list-style-type: none"> ▪ The classification of power systems ▪ Basic hydraulic power systems ▪ Advantages and disadvantages of hydraulic power systems ▪ Comparing power systems <p><u>Module 2: Hydraulic oils</u></p> <ul style="list-style-type: none"> ▪ Basic properties of hydraulic oils ▪ Classification of hydraulic oils ▪ Requirements imposed on the hydraulic liquids <p><u>Module 3: Hydraulic transmission lines</u></p> <ul style="list-style-type: none"> ▪ Hydraulic tubing ▪ Hoses ▪ Pressure and power losses in hydraulic conduits <p><u>Module 4: Hydraulic pumps</u></p> <ul style="list-style-type: none"> ▪ Ideal pump analysis ▪ Real pump analysis ▪ Classification of pumps <p><u>Module 5: Hydraulic systems components</u></p> <ul style="list-style-type: none"> ▪ Hydraulic control valves ▪ Hydraulic actuators ▪ Hydraulic accessories – accumulators, filters, pressure switches <p><u>Module 6: Introduction to pneumatic systems</u></p> <ul style="list-style-type: none"> ▪ Peculiarities of pneumatic systems (compressibility) ▪ Advantages and disadvantages of pneumatic systems ▪ Basic elements of pneumatic systems ▪ Basic pneumatic circuits <p><u>Module 7: Fluid Mechanics Laboratory Exercises</u></p> <ul style="list-style-type: none"> ▪ 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