

Course Title	Mechatronics I				
Course Code	MME 226				
Course Type	Compulsory				
Level	Undergraduate				
Year / Semester	2 nd Year / 3 rd Semester				
Teacher's Name	Matthew Zervos				
ECTS	5	Lectures / week	3+1 hours	Laboratories / week	9 hours total
Course Purpose and Objectives	<p>This course is an introduction to mechatronics which is the union of mechanical, electronic and computer programming. It focuses on electronic engineering given that it is taken by mechanical engineering students. Computer and visual programming languages are dealt with in detail in MME 228. The purpose of MME 226 is to complement and broaden the basic knowledge and skills of mechanical engineering students which is necessary in understanding mechatronics and as such give them a competitive edge in their careers. The objective of the course is to give mechanical engineering students a working knowledge of electrical and electronic engineering which is necessary for the design and implementation of mechatronic systems.</p>				
Learning Outcomes	<ul style="list-style-type: none"> • Analyze DC and AC circuits consisting of passive elements e.g. R, L, C. • Understand single phase, three phase and other forms of signals, how and where they are used. • Understand the principles of operation and use of active circuits elements. • Understand the operation of amplifiers with feedback. • Design amplifiers. • Design and analyze simple digital and logic circuits. • Understand the principles of operation of different sensors and actuators. • Build, test and analyze basic circuits consisting of active and passive elements. 				
Prerequisites	MME 105, MME 107	Required	None		
Course Content	<p>Circuit elements, waveforms, DC and AC circuits including RLC, complex notation. Thevenin and Norton theorem, maximum power transfer theorem, power and power factor, transformers. Also, semiconductors, diodes, transistors, types and operation, rectifiers, photodiodes. Operational amplifiers, inverting, non-inverting, sum and difference, integrator, differentiator, buffer amplifiers. Digital electronics, binary arithmetic, logic gates NOT, OR, AND, NOR, NAND, XOR truth tables and circuits. Half/full adders. Introduction to sensors and actuators. The course also includes three lab sessions on circuits including passive and active elements thereby extending the skills and knowledge of students which were acquired in MME 105 on how to use multi meters, oscilloscopes, and waveform generators to build and analyze circuits.</p>				

	<p>Laboratory Exercises</p> <ul style="list-style-type: none"> • Half and full wave rectifier • RLC circuits • Transformers • RLC-DC circuits • RLC-AC circuits • Digital circuits and logic gates
Teaching Methodology	<ul style="list-style-type: none"> • Lectures • Communicative, Collaborative • During the first week of the semester the students receive the course syllabus, which includes the course content, bibliography, learning outcomes, assessment and office hours.
Bibliography	<ul style="list-style-type: none"> • Alciatore, D.G. and M.B. Histan, <i>Introduction to Mechatronics and Measurement Systems</i>. McGraw-Hill.
Assessment	<ul style="list-style-type: none"> • Laboratory Exercises 20% • Midterm Exam 30% • Final Exam 50 %
Language	Greek