<table>
<tr><td>Course Title</td><td colspan="5">Mechatronics II</td></tr>
<tr><td>Course Code</td><td colspan="5">MME 228</td></tr>
<tr><td>Course Type</td><td colspan="5">Compulsory</td></tr>
<tr><td>Level</td><td colspan="5">Undergraduate</td></tr>
<tr><td>Year / Semester</td><td colspan="5">2nd Year / 4th Semester</td></tr>
<tr><td>Teacher’s Name</td><td colspan="5">Matthew Zervos</td></tr>
<tr><td>ECTS</td><td>6</td><td>Lectures / week</td><td>3+1 hours</td><td>Laboratories / week</td><td>1 hour</td></tr>
<tr><td>Course Purpose and Objectives</td><td colspan="5">The purpose of this course is to complete the introduction to mechatronics that started in MME 226. This includes computer and visual programming languages and simple but relevant laboratory exercises on data acquisition, signal processing and control. In addition, the course will focus on sensors and actuators in the context of mechatronics.</td></tr>
<tr><td>Learning Outcomes</td><td colspan="5">• Understand the structure of a LabView program, implement control using conditionals and implement iteration using loops.
• Use timers and timing, basic data acquisition and signal processing in LabView.
• Store and recover data in LabView.
• Design, build, analyze and trouble shoot simple mechatronic systems involving sensors and actuators.
• Understand the theory of electromechanical energy conversion of DC motors.
• Develop dynamic models of DC motors, brushless DC motors, stepper motor, servo motors.
• Develop models for motor energy losses and derive characteristic torque-speed curve.
• Understand and develop models of motor drives.</td></tr>
<tr><td>Prerequisites</td><td colspan="2">MME 226</td><td>Required</td><td colspan="2">None</td></tr>
<tr><td>Course Content</td><td colspan="5">The first half of Mechatronics II is focused on LabView which will be taught in a computer lab. It will cover basics aspects of LabView such as the front panel, block diagram, numeric types, logical variables and operations, strings, arrays, matrices, graphs, controls, indicators, timing, structure, while and for lops, conditionals, data acquisition, signal processing and control. Students will be evaluated by programming exercises. During the second half the basic background notions of electrical motors will be introduced: magnetic circuits, energy conversion, torque production and motor drives. These notions will be used to understand the operation of DC, brushless DC, stepper and servo motors. Laboratory exercises using various types of DC electric motors are included.</td></tr>
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	Laboratory Exercises • Familiarization with the front panel and block diagram environment of LabView • Manipulation and interconversion of numeric types, logic variables and operations • Introduction to strings, arrays matrices • Timing and timers, indicators and controls • Iteration control and conditionals • Data acquisition and signal processing • Dynamic analysis and parameter identification of DC, brushless DC, stepper, servo motors • Design and implementation of motor drive
Teaching Methodology	• Lectures • Laboratory • 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	• Alciatore, D.G. and M.B. Histand, *Introduction to Mechatronics and Measurement Systems*. McGraw-Hill. • Chang-liang Xia, *Permanent Magnet Brushless DC Motor Drives and Controls*. Wiley. • Filizadeh, S., *Electric Machines and Drives: Principles, Control, Modeling, and Simulation*. CRC Press.
Assessment	• Weekly exercises 50% • Project 30% • Final Exam 20%
Language	Greek