

## Courses in English Course Description

<b>Department</b>	03 Mechanical, Automotive and Aeronautical Engineering
<b>Course title</b>	<b>Digital Circuit Design and Analysis (with Laboratory)</b>
<b>Course number</b>	L-W-8
<b>Hours per week (SWS)</b>	4
<b>Number of ECTS credits</b>	5
<b>Course objective</b>	This course is a practical exploration of microcontrollers with applications especially in the field of sensors and control. It covers digital logic fundamentals, including number systems, logic gates, truth tables, and flip-flops. Students will learn microcontroller peripherals, programming, interfacing, and applications. The course focuses on equipping students with the skills to design and analyze digital circuits, exemplified using industry standard Arduino microcontroller boards. Fundamental hardware, programming, feedback, sensor and control concepts for digital circuits are introduced, enabling students to create typical sensor and control systems with Arduino microcontrollers.
<b>Prerequisites</b>	Fundamentals in Physics related to electricity (helpful but not mandatory)
<b>Recommended reading</b>	Announced in class later on
<b>Teaching methods</b>	Classroom lectures and laboratory
<b>Assessment methods</b>	Final report and presentation
<b>Language of instruction</b>	English
<b>Name of lecturer</b>	John M. Pavlina, Ph.D.
<b>Email</b>	<a href="mailto:pavlinaj@erau.edu">pavlinaj@erau.edu</a>
<b>Link</b>	
<b>Course content</b>	<ul style="list-style-type: none"> <li>- Digital circuits basics (binary numbers, A/D, D/A)</li> <li>- Design, construct, and trouble-shoot digital electronic circuits</li> <li>- Interface digital circuitry with various devices (LEDs, switches, 7-segment displays, etc.)</li> <li>- Coding basics (pseudocode, for, while, if, switch)</li> <li>- Control using digital signals</li> <li>- Arduino basics</li> <li>- Microcontrollers interfacing with various external sensors and devices</li> <li>- Feedback control</li> <li>- Specialized topics on demand</li> </ul>
<b>Remarks</b>	This course is a condensed block course – with extended classroom time compared to a usual course.