

2.2.4 Digital Electronics

Digital Electronics

Module Summary
Module code: EEIB240
Module coordinator: Prof. Dr. Philipp Nenninger
Credits (ECTS): 6 Points
Semester: 2. Semester
Pre-requisites with regard to content: High school level mathematics and physics
Pre-requisites according to the examination regulations: Regarding to the examination regulations no pre-requisites are required
Competencies: With the successful completion of the module students can design and implement digital circuits by: <ul style="list-style-type: none"> • Representing numbers in numeral systems with different radices • Formulating and simplifying expressions in Boolean algebra • Minimizing sequential circuits • Composing complex sequential circuits from simple logic gates • Specifying simple digital circuits using a hardware description language • Analyzing digital signals and systems in order to control systems with digital systems.
Lecture: written exam (120 min) Lab: Assessment of all projects and documentation (pass/fail)
Usability: A basic understanding of digital systems are part of the core competences of an engineer and are the foundation for a lifelong learning in this area. Digital electronics are a requirement for other fields like microcontrollers, digital signal processing and software engineering.

Course: Digital Electronics
Module code: EEIB241
Lecturer: Prof. Dr. Philipp Nenninger
Scope of weekly semester hours (SWS): 4
Semester of delivery: Summer semester
Type/mode: Lecture with integrates exercises, Compulsory subject
Language of instruction: English
<ul style="list-style-type: none"> • Content: • Number systems

<ul style="list-style-type: none"> • Codes • Boolean Algebra • Karnaugh-Veitch-Diagrams • Basic circuits of digital technology • Calculation circuits • Multiplexer • Digital Circuits • Deraillleurs • Shift register
<p>Recommended reading:</p> <ul style="list-style-type: none"> • Tocci, Ronald; Widmer, Neal and Moss, Greg: Digital Systems: Principles and Applications (11th Edition), Pearson, 2010 • Ashenden, Peter J.: The Designer's Guide to VHDL. Morgan Kaufmann Publishers, 3. Edition.

Course: Digital Electronics Lab
Module code: EEIB242
Lecturer: Prof. Dr. Philipp Nenninger, Prof. Dr. Michael Bantel
Scope of weekly semester hours (SWS): 2
Semester of delivery: Summer semester
Type/mode: Labor, Compulsory subject
Language of instruction: English
<p>Content:</p> <p>Experiments on:</p> <ul style="list-style-type: none"> • Implementation of a digital circuit using a PLD • Definition of a digital circuit using VHDL • Definition of a circuit in the Schematic Editor • Use of Lattice Diamond • Test of circuits on a given hardware • 6 experiments: Two's complement and comperator, adder and ALU, Hamming-Code, chaser lights and counter, traffic signal and 7-segment-disply, Stop watch
<p>Recommended reading:</p> <ul style="list-style-type: none"> • See lecture.