



Course title: Digital Engineering

ECTS credit allocation (and other scores): 4

Semester: spring

Level of study: ISCED-6 - first-cycle programmes (EQF-6)

Branch of science: Engineering and technology

Language: English

Number of hours per semester: 60

Course coordinator/ Department and e-mail: Sławomir Kulesza, Department of Mechatronics,
kulesza@matman.uwm.edu.pl

Type of classes: classes and lectures

Substantive content

CLASSES: 1. Logic gates 2. Logic expressions 3. De Morgan theorem 4. XOR gate 5. Transcoders 6. Design of combinational units (transcoders) 7. Flip-flops 8. Counters 9. Shift registers 10. Design of Finite-State Automata

LECTURES: 1. Introduction to Digital Engineering 2. Numbers and codes 3. Description of digital circuits 4. Boolean algebra 5. Families of digital circuits: TTL, CMOS 6. Synthesis of the switch function 7. Minimization 8. Timing analysis 9. Combinational functional units 10. Arithmetic units 11. Sequential circuits 12. Moore and Mealy automata 13. Synchronous and asynchronous automata 14. State diagrams 15. Coding and minimization of states 16. Computer-aided design and simulation

Learning purpose: Prepare students to design, implement and analyze digital circuits of various kinds

On completion of the study programme the graduate will gain:

Knowledge: Students are expected to differentiate between combinational and sequential digital circuits

Skills: Students are expected to design combinational/sequential digital circuit following given pre-assumptions.

Social Competencies: Students are expected to co-operate in group in order to achieve presumed goals and are aware of the need of lifelong learning

Basic literature: Anand Kumar, Fundamentals of Digital Circuits, PHI, 4th edition, ISBN 978-8120352681

Supplementary literature: Ch. K. Alexander, M.N.O. Sadiku, Fundamentals of electric circuits, ISBN 978-0073380575

The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 70

Student's independent work: 30