
Course title: INTRODUCTION TO MECHATRONICS

ECTS credit allocation (and other scores): 4

Semester: autumn

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. Classification of solids, 2. Charge carriers in solids, 3. Major vs. minor charge carriers, 4. p-n junction, diode characteristics, 5. Stimulated emission, 6. Light-emitting diodes, 7. Photodiode, phototransistor, 8. Thermocouples, 9. Hall effect

LECTURES: 1. Atomic bonds in solids, 2. Semiconductors, 3. Doped semiconductors, 4. Physical phenomena in generation of light, 5. Lasers, 6. Physical phenomena in detection of light, 7. Physical phenomena in detection of thermal signals, 8. Electromagnetic phenomena

Learning purpose: Prepare students to analyse various mechatronic systems in terms of physical phenomena

On completion of the study programme the graduate will gain:

Knowledge: Students are expected to know physical foundations of modern electronic devices

Skills: Students are expected to calculate typical parameters of electronic devices

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: Mechatronics: fundamentals and applications, (ed.) Clarence W. de Silva

Supplementary literature: David Halliday, Robert Resnick, Jearl Walker, Fundamentals of physics

The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 60

Student's independent work: 40