Syllabus

Basic data of the subject	
University	**University of Applied Sciences in Ferizaj**
Academic unit	**Faculty of Engineering and Informatics**
Program	**Industrial Engineering with Informatics**
Title of the subject:	**Mechatronics**
Level:	**Bachelor**
Course Status:	**Elective**
Year of studies:	**III, Semester V**
Number of hours per week:	**3**
Value of Credits - ECTS:	**4**
Time / location:	
Course lecturer:	
Contact details:	
Course description:	*This course will provide students with the basic knowledge and concepts of Mechatronics as well as mechatronics systems. Designing new products by applying mechatronics principles.*
Objectives of the course:	*The aim of the course is to prepare students with the theory, design and construction of intelligent systems, close connection and full integration of products and systems. Integration of mechanisms, materials, sensors, interfaces, actuators, microcontrollers and information technology.*
Learning outcomes:	*After the completion of this module, students will be able to:* • *Know the electro-mechanical systems run by microcontroller technology.* • *Describe the structure of the mechatronic system.* • *Know the close relationship between products and systems.* • *Design of an electro-mechanical system.*
Prerequisites	*N/A*

Contribution to the student load (which must correspond with learning outcomes)			
Activity	**Hour**	**Day/week**	**In total**
Lectures with lab tutorials	3	15	45
Internship			
Contacts with teacher / consultations	1	3	3
Field exercises	1	2	2
Midterm, seminars and projects.	1	2	2
Homework	2	2	4
Self-learning time student (at the library or at home)	2	12	24
Final preparation for the exam	4	5	20
Time spent on evaluation (tests, quiz and final exam)	2	2	4
Projects and presentations.	1	2	2

Total			**100**
Teaching methodology:	*Lectures combined with exercises, presentations, projects from the field of Mechatronics, as well as active collaboration in student teams*		
Assessment methods:	*The student can choose to be assessed one of the two forms of assessment, given below:* *1. Form 1: Evaluation with two tests and the Project* *2. Form 2: Evaluation of the final exam.* ***Form 1:*** *In the first form of assessment "Assessment with two tests and project" the student is assessed in four activities that are carried out during the lectures:* *1. Test 1 (30%), individual assessment* *2. Test 2 (30%), individual assessment* *3. Class activity (10%), individual assessment* *4. Project (30%), group assessment.* ***Additional clarification:*** *If the student in each activity above reaches the maximum points, then he will be evaluated with 100 points.* *Students who pass the exam according to Form 1 of the assessment, are released from the obligation to take the final exam. Only if the student is not satisfied with the grade achieved according to form 1, then he can undergo the final exam to obtain a higher grade.* ***Form 2:*** *In the second form of evaluation, "Evaluation with the final exam", the student will undergo the exam which will be held after the end of the course lectures and is organized in the exam deadlines, determined by the University Senate.* *Through the final exam, the student can achieve a maximum of 70% of the points from the total of 100 points.* *The rest of the 30% points must be completed through group work on the Project, an activity carried out during the lectures.* *In Test 1, Test 2, and the final exam, the evaluation of the students will be done through an evaluation form, which must be completed individually by the student.* *Activity in the class means the student's engagement in dealing with the issues discussed in the class,*		

	during the lectures *Project (30%), group assessment: it is an activity in which students apply the acquired knowledge in a concrete project. It is carried out in groups of 2 or 3 students who are obliged to carry out the activity, document it, and present it to the subject professor.* *For the form of realism and documentation of the activity, all members of the group will be evaluated with the same point (20%), while the evaluation of the presentation skills of the activity is individual and includes 10%.* ***Rating:*** *91-100 points – graded 10 (ten)* *81-90 points – graded 9 (nine)* *71-80 points – grade 8 (eight)* *61-70 points – grade 7 (seven)* *51-60 points – grade 6 (six)* *0-50 points – The student repeats the exam.*
The ratio of theory and practice	70% theory with exercises and 30% laboratory work.
Literature	
Basic Literature:	1. Bolton, W. Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering, Prentice Hall, 6th Edition, 2015 2. Mechatronics, An Introduction, Robert H. Bishop, Tailor&Francis Group, LLC. 2006 3. Mechatronics System Design, SI Version: Devdas Shetty, Richard Kolk. Cenage Learning, 2010. *4.* Mechatronics: Principles and Applications: Godfrey Onwubolu. Elsevier. 2005
Supplementary Literature:	1. A. Amaili and F. Mrad: Applied Mechatronics. United Kingdom, Oxford University Press, 2008. *2.* Norman S. Nise: Control Systems Engineerin. 6th Edition, John Willey&Sons. 2011.

Designed learning plan	
Week	**Lectures and exercises to be held**
Week one:	Introduction to Mechatronics • What is Mechatronics? • Typical Mechatronic System Model • Modules of a mechanical system • Components of a mechanical system
Week two:	Introduction to Mechatronics (Continued) • Open ring system • Closed ring system - Examples of Mechatronic Systems • Benefits of Mechatronic Systems
Week three:	Control systems

	• History of control systems • Examples of contemporary Control systems
Week four:	Control systems (Continued) • Future of the Control Systems Examples of the contemporary control systems
Week five:	Industrial electronics • PLC Computers in Industry • Sensors • Actuators • Controllers
Java e six:	Industrial electronics (Continued) • Electronic package with Arduino or Labview • Programming with C++ Design and implementation of the projects
Week seven:	First intermediary Test
Week eight:	Industrial electronics (Continued) • Electronic package with Arduino or Labview
Week nine:	Industrial electronics (Continued) • Programming with C++ ose Labview
Week ten:	Industrial electronics (Continued) • Design and implementation of the projects with Arduino or Labview
Week eleven:	Production (Manufacturing) • History of production • Introduction to production processes • Designing and producing a product • Classification of various production processes
Week twelve:	Production (Continued) • Methods of production • Designing for production • Automation and computers in production • CNC / CAD / CAM / CIM / CAPP / FMS
Week thirteen:	Hydraulics • Introduction to hydraulic systems • Application of hydraulic systems • Hydraulic pumps
Week fourteen:	Hydraulics (Continued) • Adjustment valves • Pressure relief valves • Graphic representation of hydraulic and pneumatic elements • Determining the hydraulic circuit.
Week fifteen:	Second Intermediary Test

Academic policies and rules of conduct:
Regular attendance of lectures and exercises is necessary, as well as active participation with discussion and solution of tasks. Not impeding the progress required for learning using mobile phones turned off or in silent mode.