The basic course information:	
Academic unit:	**Faculty of Engineering and Informatics** **Industrial Engineering with Informatics**
Title of the subject:	**Mechatronics**
Level:	**Bachelor**
Course Status:	**Elective**
Year of studies:	**III**
Number of hours per week:	**3**
Value of Credits - ECTS:	**4**
Time / location:	
Course lecturer:	**Riad Ramadani**
Contact details:	**riad.ramadani@ushaf.net**
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.*

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.*		
Assessment methods:	*First assessment 45%* *Second assessment 45%* *Seminar papers (design assignments) 10%* ***Or through final exam*** *Final exam 90 %* *Seminar papers (design assignments) 10%*		
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:	*5.* A. Amaili and F. Mrad: Applied Mechatronics. United Kingdom, Oxford University Press, 2008. *6.* 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.