



# Study Plan

## B.Sc. Automotive Mechatronics

### Faculty of Automotive and Construction Machinery Engineering

*Study plan for reference only; may be subject to change.*

This field of study is dedicated to those who want to become engineers and meet the challenges of modern designing, operating and servicing of state-of-the-art recently vehicles and, which have been dominating the automotive and construction machinery and equipment market.

The programme provides students with multidisciplinary knowledge in complex with ability to use modern tools of computer-aided processes of machine design, production, operation and recycling. Knowledge in the field of environment protection related to operation and mechatronics control of automobiles, tractors, special purpose vehicles, construction machinery and equipment is assimilated in classes and laboratories. A novel approach to realisation of the educational offer gives the graduate vital skills in the qualifications in the fields of: vehicle mechanics, safety of vehicles and construction machinery, diagnostics and safety of vehicles and construction machinery.

### 1st semester:

Module Title	Full Time				ECTS credits
	Type of class				
	Lecture	Exercise	Laboratory	Project	
Analysis I	2	2	0	0	5
Algebra	2	1	0	0	4
Basics of Engineering Drawing and Descriptive Geometry	2	0	0	1	4
Structural Materials	3	0	0	0	3
Computing Techniques I	2	0	2	0	5
Environmental Protection	2	0	0	0	2
Workshop	0	0	1	0	0
Chemistry	2	0	0	0	2

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Physics I	2	0	0	0	2
History of engineering (HES)	1	0	0	0	1
Intellectual Property + Health and Safety (HES)	1	0	0	0	1

## 2nd semester:

Module Title	Full Time				ECTS credits
	Type of class				
	Lecture	Exercise	Laboratory	Project	
Analysis II	2	2	0	0	5
Differential Equations	2	2	0	0	5
Electrical Engineering and Electronics I	2	0	1	0	4
Basics of Engineering Drawing and Descriptive Geometry II	0	0	0	3	3
Theoretical Mechanics I	2	2	0	0	5
Manufacturing Technology	3	0	0	0	3
Structural Materials Laboratory	0	0	1	0	1
Geometric Modelling *)	0	0	2	0	2
Physics II	2	0	0	0	2
Introduction to Software Engineering	0	0	1	0	1
Foreign Language 1	0	0	0	0	0
Physical Education 1	0	2	0	0	0

## 3rd semester:

Module Title	Full Time				ECTS credits
	Type of class				
	Lecture	Exercise	Laboratory	Project	
Theoretical Mechanics II	2	2	0	0	5
Material Strength I	2	2	0	0	5

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Electrical Engineering and Electronics II	1	0	1	0	2
Theory of Machines and Automatic Control	2	0	0	1	4
Metrology and Interchangeability	1	1	0	0	2
Fluid Mechanics	2	1	0	0	3
Advanced Geometry Modelling *)	0	0	1	0	1
<i>Introduction to Mechatronics</i>	1	0	1	0	2
Introduction to Microprocesor Systems	1	0	1	0	2
Foreign Language 2	0	4	0	0	4
Physical Education 2	0	2	0	0	0

### 4th semester:

Module Title	Full Time				ECTS credits
	Type of class				
	Lecture	Exercise	Laboratory	Project	
Introduction to Machine Design I	4	0	0	0	4
Project on Machine Design I **	0	0	0	2	2
Mechanical Vibrations	2	1	0	0	3
Thermodynamics	2	1	0	0	3
Laboratory of Fluid Mechanics	0	0	1	0	1
Measurement of Dynamic Variables	2	0	0	0	2
<i>Software Engineering</i>	0	0	2	0	2
<i>Electronic Systems in Control and Regulation Systems</i>	2	0	1	0	3
<i>Mechatronic Sensor and Actuator Systems</i>	1	0	1	0	3
<i>Automation Systems</i>	1	0	1	0	3
Foreign Language 3	0	4	0	0	4
Physical Education 3	0	2	0	0	0

### 5th semester:

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Module Title	Full Time				ECTS credits
	Type of class				
	Lecture	Exercise	Laboratory	Project	
Electric Power Trains	1	0	1	0	2
Internal Combustion Engines	2	0	1	0	3
Project on Machine Design II ***	0	0	0	2	2
Basics of Hydraulic and Pneumatic Power Trains	2	0	1	0	3
Vehicles	2	0	1	0	3
Construction Machinery and Equipment	2	0	1	0	3
Measurement of Dynamic Variables Laboratory	0	0	1	0	1
<i>Introduction to Image Processing</i>	1	0	0	0	1
<i>Computer Systems in Mechatronics</i>	1	0	1	0	2
<i>Basis of mechatronics systems design</i>	1	0	1	0	3
<i>Smart Structures</i>	2	0	0	0	2
<i>Introduction to Robotics /Repair of Vehicle Mechatronic Systems</i>	1	0	0	0	1
Foreign Language 4	0	4	0	0	4

## 6th semester:

Module Title	Full Time				ECTS credits
	Type of class				
	Lecture	Exercise	Laboratory	Project	
Physics III	2	0	0	0	2
Introduction to Diagnostic	1	0	1	0	2
Hydraulic and Pneumatic Systems	2	0	0	0	2
<i>Image Processing and Analysis</i>	1	0	2	0	3
<i>Mechatronics Systems Design</i>	0	0	0	2	2

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<i>Functional Models of Construction Machinery and Equipment</i>	1	1	0	0	2
<i>Diagnostics of Mechatronic Systems / Diagnostic Modeling of Mechatronic Systems</i>	0	0	1	0	1
<i>Basics for Finite Element Method</i>	1	0	1	0	2
<i>Specialization module 1</i>	2	0	1	0	4
<i>Specialization module 2</i>	2	0	1	0	3
<i>Specialization module 3</i>	2	0	1	0	3
<i>Interim Thesis</i>	0	0	0	5	4
<i>Professional Practice</i>	4 weeks				4 <sup>x</sup>

## 7th semester:

Module Title	Full Time				ECTS credits
	Type of class				
	Lecture	Exercise	Laboratory	Project	
Economy (HES)	2	0	0	0	2
Humanities/Economy Subject (HES)	2	0	0	0	2
<i>Reliability and Safety of Mechatronics Systems / PLM - database approach</i>	2	0	0	0	2
<i>Specialization module 4</i>	2	0	0	0	3
<i>Specialization module 5</i>	1	0	1	0	3
<i>Specialization module 6</i>	1	0	1	0	2
<i>Diploma Seminar</i>	0	1	0	0	1
<i>B.Sc. Thesis</i>	0	0	0	10	15

Courses on specialisations (Semester 6 i 7):

Specialisation of Vehicle Mechatronics - specialized subjects:

1. (2W/1L) -Vehicle Mechatronics (IP/ZLM)
2. (2W/1L) -Vehicle Power Trains (IP)

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3. (2W/1L) – On-Board Vehicle Diagnostics (IP)
4. (2W) – Autonomous Vehicles (IP/ZLM)
5. (1W/1L) – IT Vehicle Systems (IP/ZLM)
6. (1W/1L) – Vehicles Acoustics (IP/ZLM)

### **Specialisation of Mechatronics of Construction Machinery - specialized subjects:**

1. (2W/1L) – Automation of Construction Machinery and Equipment (IMRC)
2. (2W/1L) – Construction Machinery (IMRC)
3. (2W/1L) – Passenger Lifts (IMRC)
4. (2W) – Basics of Electro-Mechanical Hybrid Power Trains (IMRC)
5. (1W/1L) – Basics of Modeling and Control of Construction Machinery & Equipment (IMRC)
6. (1W/1L) – Systems for Monitoring Construction Machinery and Equipment (IMRC)

### **Specialisation of Intelligent Structures - specialized subjects:**

1. (2W/1L) – Numerical Techniques in Analysis (IPBM)
2. (2W/1L) – Vibration Theory of Continuous Systems (IPBM)
3. (2W/1L) – Composite Mechanics (IPBM)
4. (2W) – Smart Materials (IPBM)
5. (1W/1L) – Analysis of multidimensional signals (IP/ZLM)
6. (1W/1L) – Active Reduction of Mechanical System Vibrations (IPBM)