Óbuda University Bánki Donát Faculty of Mechanical and Safety Engineering	Insitute of Mechatronics and Vehicle Engineering

Subject title and code: **Vehicle Mechatronics BMXJME4BNE** **Credits:** *4*

Full-time study 2023/24 *ac.* 2 *semester*
year

The course is available at: mechatronical engineering

Supervised by: Dr. Tamás Szakács **Instructors:** Dr. Tamás Szakács

Prerequisite (neptun code): Applied Mathematics (BMXAME1MNE)

Weekly number of lessons

Lecture: 2	Group seminar: 0	Lab: 1	Consultation: 0

Way of assessment: Exam (Choose)

Online consultation *(in case it's required):* *... (BBB link)*

Educational goal: Aim The student acquires knowledge about the development of the mechatronic systems of motor vehicles, their current situation, and their expected evolution. Thematic: The structure of the vehicles based on vehicle mechatronics aspects. Grouping of the main structural parts of motor vehicles, various resources, drive systems, suspensions of superstructures. Vehicle electronics and IT. Engine and drive chain controls. Sensors, controllers, and actuators used in control. Typical elements of torque transmission from the engine to the wheels (transmission clutch, differential, etc.) Active and passive suspensions, shock absorbers, active and passive safety elements. Types of resistances, characteristics, rolling resistance, longitudinal and lateral dynamics of vehicles, brake systems, ABS, operation of longitudinal and transverse stability programs. Typical voltage levels of vehicles, trend of used electricity, one or two (three) wire systems. Energy management. Lighting systems and other vehicle electrical elements. Air conditioning, HVAC.

Schedule

Education week	**Topics**
1.	The basic relationships of the mechatronic systems of vehicles, examination of mechatronic systems and machines, performance, energy conversions, information flows.
2.	The mechanical, electrical and IT structure of vehicles based on vehicle mechatronic aspects
3.	Grouping of the main structural parts of motor vehicles, various resources, drive systems, superstructure suspensions
4.	Vehicle electronics and IT.
5.	Engine and drive chain controls
6.	Sensors, controllers, and actuators used in the control
7.	Typical elements of torque transmission from the engine to the wheels I (clutches, torque converters, differential gear, transfer gear, summing gear, final drives, etc.)
8.	Resistances, and pull-force diagram.
9.	Longitudinal, and lateral dynamics
10.	Typical voltage levels of vehicles, trend of used electricity, one or two (three) wire systems
11.	Energy managements
12.	Lighting systems and other vehicle electrical elements.
13.	Climate control units, HVAC, and ergonomics
14.	Brake systems

Mid-semester requirements

Test	Assignment to be submitted	Lab measurement

amount	dates	amount	deadlines	amount	dates
1	13th week				

According to the Study and Examination regulations of Óbuda University attendance of group seminars and lab exercises are mandatory.

Other requirements for participation in sessions not covered by the regulations and restrictions on substitutions:

Test		Assignment to be submitted		Lab measurement	
maximum points available	minimum score required to pass /test	maximum points available	minimum score required to pass / assignment	maximum points available	minimum score required to pass /lab
100 points	51points	…points	…points	…points	…points

Total number of points achievable in semester: 100points				
Grading thresholds	**satisfactory** 51 % and above	**average** 63 % and above	**good** 76 choose	**excellent** 88 choose

Other evaluation criteria:

Receive a signature denied entry:	During the semester, students write a midterm test for which they receive a grade. The student who writes a midterm test with at least a sufficient grade will receive a signature from the subject. We provide two options for improving a closed-door thesis with an "Insufficient" evaluation in the framework of a consultation. If the student writes the test as insufficient and does not correct it, the student must be banned from the course. During the semester, the signature requirements can be replaced in the following cases: test failed; illness.
Required references:	http://siva.bgk.uni-obuda.hu/~szakacs
Recommended references:	
Quality assurance methods of the subject:	

Things, that are not included, can be found within the regulations of Óbuda University.