VEHICLE MOTION CONTROL SYSTEMS

1	Course Title:	VEHICLE MOTION CONTROL SYSTEMS
2	Course Code:	OTOZ201
3	Type of Course:	Compulsory
4	Level of Course:	Short Cycle
5	Year of Study:	2
6	Semester:	3
7	ECTS Credits Allocated:	4.00
8	Theoretical (hour/week):	2.00
9	Practice (hour/week):	0.00
10	Laboratory (hour/week):	2
11	Prerequisites:	Course in basic machine elements to be taken
12	Language:	Turkish
13	Mode of Delivery:	Face to face
14	Course Coordinator:	Öğr.Gör. ÖMER ÖZKOCA
15	Course Lecturers:	Meslek Yüksekokulları Yönetim Kurullarının görevlendirdiği öğretim elemanları.
16	Contact information of the Course Coordinator:	Öğr.Gör.Ömer Özkoca (ozkoca@uludag.edu.tr, Tel: 2242942343, B.U.Ü.Teknik Bil.M.Y.O. Bursa)
17	Website:	
18	Objective of the Course:	This course is intended to make maintenance and repair of motion control systems.
19	Contribution of the Course to Professional Development:	To provide students with knowledge and skills about vehicle motion control systems that they can use in their professional lives
20	Learning Outcomes:	

	1	Basic tasks of the vehicles chassis and superstructures, the importance of different structures and properties of the chassis to comprehend
	2	Front and rear suspension hardware and components to recognize the motion and torque transmission patterns of these elements to understand the work. Chassis, bodywork and suspension enhancements relate to other motion control systems.
	3	Pre-order parameters by geometry. Angular and dimensional geometric detail to comprehend the relationship between vehicle directional control. Camber, caster, king pin and the angle of rotation, opening and closure rod geometry with the pre-order to comprehend the physical principles of
	4	Relate the geometry of the layout with the front steering system, to analyze the geometric and physical. To know the elements of steering system.
	5	Hydraulic steering and electro-mechanical, electro-hydraulic steering systems, understand. To understand and define the methods for eliminating defects in steering system failures.
	6	To understand the dynamic effects of vehicle suspension systems. Count the effects of vehicle performance suspension systems and engine performance and relate these effects.

	7	The leaf spring suspension system, the function of the springs and helical springs Count To understand the structural properties. Function of shock absorber, working principles, types of learning
	8	To know the different suspension systems. Suspension equipment suspension systems with different structural features of the bonds and be able to comprehend. Bellows, power assisted systems to recognize and understand the uses and purposes. Recognize and understand the working principles of electronically controlled suspension systems.
	9	The concept of friction, variations of the physical principles and braking. To know the elements of the classic brake system and understand their work. Central pump, wheel cylinders and other intermediate elements and recognize vestinghouse. Drum and disc brake systems to recognize and understand the properties.
	10	To understand the theory to analyze and study the structure of ABS brake systems. To understand the theory to analyze and study the structure of the ASR and ESP systems. Engine brake, shaft brakes recognize and understand the working mechanisms. To know the characteristics of the parking brake. Fault in brake system search, find, acquire knowledge and skills in tune

21	Course Content:

Course Content:

Week	Theoretical	Practice
3	Steering systems, tasks, components, steering mechanisms. Gear type systems,	Automotive steering system available on the laboratory
4	Steering system, fasteners, pitman arm, rod, break the long rod, per rod, steering joint, steering system, the elements, the operating principle. Advantages and disadvantages.	Examination of images, and images related to the steering system on the Internet. Be part of systems analysis. composing a work of investigation should be described.
5	Electro-mechanical steering systems. Elements, operation, advantages and disadvantages of failures. Electro-hydraulic steering systems, elements, advantages and disadvantages of work	Several automotive manufacturers and to read a prepared educational cd s electro-mechanical and electro-hydraulic steering systems analysis studies. Examination of the control and repair operations
6	Pre-order the task definition of camber angle, caster, king pin, toe, toe-out angle in the definition, characteristics and importance of control of vehicle direction. Rotation angle. Track follow-up and trace the causes of deterioration of the pursuit	The figures of the examination of vehicles over the angles of pre-order

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	24	1.00	24.00
Practicals/Labs	24	1.00	24.00
Self study and preperation	14	2.00	28.00
Homeworks	1	14.00	14.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	15.00	15.00
Others	0	0.00	0.00
Final Exams	1	15.00	15.00
Total Work Load			135.00
Total work load/ 30 hr			4.00
ECTS Credit of the Course			4.00

7	Tasks of suspension systems, vehicle components and vehicle types on the release on the settlement types. Suspension system components, springs, spring varieties, leaf spring suspension systems connecting. Coil springs front and rear suspension systems used. Coil springs properties. Torsion bar springs. Air springs. Hydro-pneumatic springs. Springs controls, failures and repairs.	Available on the vehicle suspension system in the laboratory of automotive components and systems analysis work
8	Course repetition and Midterm Exam	
9	Dampers tasks, characteristics, types and operation. Single and double acting shock absorbers, single-and double-tube shock absorbers, hydraulic shock absorbers and gas. Symptoms of Shock failures, vehicle shock absorber on the effects of failures. And defects iron task of cornering control study.	Several automotive manufacturers and to read a prepared educational cd s suspension system staff work, examination of control and repair operations
10	Swing arms, Ball joints and faults controlled studies. Elements of the suspension system and work hard. Free suspension systems, components and operation. Advantages and disadvantages of the systems.	Several automotive manufacturers and to read a prepared educational cd s suspension system staff work, examination of control and repair operations
11	Brake systems tasks, the central elements of pumps, brake assist system, disc brake systems and brake wheel cylinders, brake hydraulic control and operation of the brake system failures classic varieties of oils.	Automotive brake system components available on the vehicle in the laboratory study and analysis of the system. Drum and disc brake systems, disassembly and reassembly. Examination of brake systems, automatic adjustment assembly.
12	Brake mechanics, locked wheel ABS braking systems, electronic and hydraulic circuit of the drawbacks of the systems operation and control failures.	Several automotive manufacturers and to read a prepared educational cd s ABS brake system staff work, examination of control and repair operations
13	Dynamic driving systems. Task of the ESP systems, components and control operation and failures	Everal automotive manufacturers and to read a prepared educational cd s ESP brake system staff work, examination of control and repair operations
14	Duties of the tires, tires expected features, tire types, the symbols on the disclosure of tires, tire checks, failures, tire rotation.	Several tire manufacturers in the automotive industry to read a prepared training CD s and the acquisition of information about tires

22	Textbooks, References and/or Other Materials:	Motion Control Systems (Lecture notes) (Aegean University.) HELP BOOKS: Chassis 1.Otomobil Volume I-II, William H. Crause translation İbrahim ANLAŞ 2.Megep textbook 3.Fiat Study Notes 4.WWEğitim 5.Renault Study Notes 6.Çeşitli obtained from the websites of pictures, diagrams, animations, and movies COURSE TOOLS: The chassis of the vehicle in the laboratory, Doblo brand car, the rear bridges, computer, projector device.
23	Assesment	

TERM LEARNING ACTIVITIES	**NUMBER**	**WEIGHT**
Midterm Exam	1	30.00
Quiz	0	0.00
Home work-project	1	10.00
Final Exam	1	60.00
Total	3	100.00
Contribution of Term (Year) Learning Activities to Success Grade		40.00
Contribution of Final Exam to Success Grade		60.00
Total		100.00

Measurement and Evaluation Techniques Used in the Course	Measurement and evaluation is carried out according to the priciples of Bursa uludag University Associate and Undergraduate Education Regulation.

24 ECTS / WORK LOAD TABLE

25 CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS

	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PQ9	PQ10	PQ11	PQ12	PQ13	PQ14	PQ15	PQ16
ÖK1	3	0	0	0	0	5	4	3	0	3	0	0	0	0	0	0
ÖK2	2	0	0	0	0	4	4	3	0	3	0	0	0	0	0	0
ÖK3	3	0	0	0	0	4	0	3	0	3	0	0	0	0	0	0
ÖK4	3	0	0	0	0	5	3	3	0	3	0	0	0	0	0	0
ÖK5	4	0	0	0	0	5	5	4	0	4	0	0	0	0	0	0
ÖK6	3	0	0	0	0	4	3	3	0	3	0	0	0	0	0	0
ÖK7	2	0	0	0	0	4	2	3	0	2	0	0	0	0	0	0
ÖK8	3	0	0	0	0	4	5	4	0	4	0	0	0	0	0	0
ÖK9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LO: Learning Objectives PQ: Program Qualifications

Contribution Level:	**1 very low**	**2 low**	**3 Medium**	**4 High**	**5 Very High**