

ANNEX 2 – COURSE DESCRIPTION

Course Title	Vehicle Electrical and Electronic Systems			
Course Code	AU203			
Course Type	Compulsory			
Level	BSc (Level 1)			
Year / Semester	2 nd			
Teacher's Name	Julios Vasiliou			
ECTS	5	Lectures / week	3	Laboratories/week 2
Course Purpose	<p>The course aim is to introduce students to the concept of vehicle Electric and Electronic Systems, basic considerations and terminology. Students should be able to recognize basic components, comprehend the fundamental background theory of vehicle Electric and Electronic Systems, and practical skills and attitudes on servicing and repairs of the vehicles Electric and Electronic systems in the automotive laboratory.</p>			
Learning Outcomes	<p>By the end of the course, students must be able to:</p> <ul style="list-style-type: none"> • Explain of the historical trends regarding the power consumption in vehicle and analysis of predictions for the future. Student also must be able to read and draw wiring diagrams, clearly defining each symbol. • Analyse of production line techniques regarding wiring harnesses and necessary components. Students must be able to describe of newer wiring systems available to the market and analysis of the future trends. • Illustrate of the function of the alternator and starter, the generation of current and how DC motors work. In addition, students must be to carry analysis of power storage devices will be carried out. • Explain of various electric systems such us wipers, indicators, lights, instrumentation systems and displays. • Describe of other electronic systems such electronically controlled transmission units, electronically controlled throttle unit, and other drive-by-wire systems. Analyse of future trends in vehicle electronics. 			
Prerequisites	AU108	Corequisites	None	
Course Content	<ul style="list-style-type: none"> • Introduction to the Vehicle Electrics and Electronics <ul style="list-style-type: none"> - History of vehicle electrical systems - Increase in power consumption • Vehicle Wiring <ul style="list-style-type: none"> - Production issues - DIN regulations on wiring diagrams - Electrical symbols, codes and numbers according to DIN regulations 			

	<ul style="list-style-type: none"> - Test Equipment - Multiplex Wiring systems • Instrumentation and Display systems <ul style="list-style-type: none"> - Operation, sensors, categories, digital and analogue systems • Charging and Starting systems and batteries <ul style="list-style-type: none"> - Layout and function of AC generator, current rectification and regulating - Layout and function of starting system with solenoid and sliding rotor and, starting motors with permanent magnetic, with magnetic coils - Manufacture and capacity of batteries • Signals, Wipers and Lighting <ul style="list-style-type: none"> - Operation, wiring and legislation - Automatic lighting systems • Safety Systems, Body Electrics and Control <ul style="list-style-type: none"> - ABS systems, SRS systems, Traction control systems, electric Windows/mirrors, air conditioning, sound system, Alarm system and Information systems (Operation and design) • Future Trends in electronics <ul style="list-style-type: none"> - Higher power demands, increase in loads and probable advances <p>Laboratory Work:</p> <ul style="list-style-type: none"> - Experiment 1: Simulation of Alarm and Antitheft system - Experiment 2: Simulation of Windscreen Wipers/Washers - Experiment 3: Simulation of Electric Sunroof and Radio - Experiment 4: Simulation of Electric Windows - Experiment 5: Simulation of Electric Seat - Experiment 6 : Simulation of Digital instruments - Experiment 7: Simulation of Lighting System - Experiment 8: Simulation of power generation, rectification and regulation - Experiment 9: Vehicle wiring design and manufacturing, connection of major components and relays. - Experiment 10: Disassembly, repair and assembly of vehicle alternator - Experiment 11: Disassembly, repair and assembly of vehicle starter-motor - Experiment 12: Testing of vehicle batteries and use of oscilloscope to evaluate proper operation of alternators and starter motors
Teaching Methodology	<p>The taught part of course is delivered to the students by means of lectures, conducted with the help of computer presentations. Lecture notes and presentations are available through the e-learning platform for students to use in combination with the textbooks. Furthermore theoretical principles are explained by means of demonstration examples and solution of specific problems.</p> <p>Lectures are supplemented with laboratory work carried out with the supervision of a lab assistant. Students, in small groups, apply knowledge gained in class into development of practical skills in real vehicle components and simulation boards.</p>
Bibliography	(a) <u>Textbooks:</u>

	<p>Tom Denton, "Automobile Electrical and Electronic Systems", 5th Edition, Society of Automotive Engineers, 2017.</p> <p>(b) <u>References:</u> Julian Edgar, "Car Electrical & Electronic Systems", Veloce, 2019</p> <p>William B. Ribbens, "Understanding Automotive Electronics", 8th Edition, Newnes, 2017</p> <p>Tom Denton, "Automobile Mechanical and Electrical Systems", 2nd Edition, Routledge, 2017</p>						
Assessment	<p>The assessment consists of following methods for both the theoretical and practical part of the course. Each assessment method is assigned with a weight, which is used for the calculation of the final grade.</p> <table data-bbox="571 748 1125 853"> <tr> <td>Mid-term exams:</td> <td>30%</td> </tr> <tr> <td>Laboratory work:</td> <td>20%</td> </tr> <tr> <td>Final Exam (written):</td> <td>50%</td> </tr> </table>	Mid-term exams:	30%	Laboratory work:	20%	Final Exam (written):	50%
Mid-term exams:	30%						
Laboratory work:	20%						
Final Exam (written):	50%						
Language	English						