

Course unit title:	Automotive Diagnostics		
Course unit code:	AU209		
Type of course unit:	Compulsory		
Level of course unit:	Bachelor (1 st Cycle)		
Year of study:	3		
Semester when the unit is delivered:	5 (Fall)		
Number of ECTS credits allocated :	6		
Name of lecturer(s):	Mr. Julios Vasiliou, Mr. Marios Sevastides		
Learning outcomes of the course unit:	<ol style="list-style-type: none"> 1. Remember a logical way to approach automotive faults and repeat a procedure to locate the source of error 2. Use multiple testing equipment and automotive data sources to approach a fault using a logical sequence 3. Illustrate skills gain from theory to test various systems such cooling, lubrication, fuel and ignition 4. Students must be able to derive a fault on a system and evaluate sub-system proper functionality in a network. 5. Students must be able to construct a model for solving any problem arising on a modern automotive system 		
Mode of delivery:	Face-to-face		
Prerequisites:	AU206	Co-requisites:	None
Recommended optional program components:	None		
Course contents:	<ul style="list-style-type: none"> ● Introduction to diagnostic procedure using the six stage process: Customer/user interface to diagnosis and test procedures – ruling out what is functioning – verify the fault. Evaluation of fault generation and rectification of fault and check of all systems ● Diagnostic Techniques: Mechanical systems- NVH conditions and noises. Electrical systems – Voltage drops, short circuits to earth or supply, on/off load tests, black box technique, Sensor to ECU method, Flight recorder tests ● Diagnostic tools and Workshop equipment: Students must understand the use of diagnostic equipment which include: <ul style="list-style-type: none"> - DDM, tester light, logic probe - Compression and leakage tester - Pressure/Vacuum tester or actuator - Oscilloscope - Scanner/ Fault code readers - Emission analyzer - Source of vehicle data (Bosch database) ● Fault Identification, Tracing and Repair: Fuel and Emission control on Petrol and Diesel fuelled engines and OBD codes. Ignition systems on Petrol fuelled engines and OBD codes. Cooling and Lubrication systems ● Laboratory Work: <ul style="list-style-type: none"> Laboratory 1 – Engine Cylinder compression test Laboratory 2 – Engine cylinder leakage test Laboratory 3 – Power balance test and spark testers Laboratory 4 – Measurement of secondary ignition using oscilloscope 		

	<p>Laboratory 5 – Ignition timing and Emissions Laboratory 6 – Testing glow plugs Laboratory 7 – Injector return flow measurement and injector parameter readout through scan tool</p> <p>Laboratory 8 – Emission measurement on CI engines with and without catalytic converters and/or particulate traps Laboratory 9 – OBDII diagnostics Laboratory 10 – Oil flow rate measurement on turbocharger Unit Laboratory 11 – Lubrication system’s oil pressure measurement Laboratory 12 – Measuring of fuel pressures (high and low) on common rail diesel engines using oscilloscope, scan tool and gauge Laboratory 13 – Measuring of fuel pressure on port (indirect) petrol fuel injection system and evaluation of pressure regulator Laboratory 14 – Measuring the a fuel pump volume flow rate and current drawn on port fuel injection system Laboratory 15 – Adjusting turbocharger’s pressure regulator (wastegate actuator) Laboratory 16 – Reading CAN signals using oscilloscope</p>
Recommended and/or required reading:	
Textbooks:	<ul style="list-style-type: none"> • Tom Denton, “Advanced Automotive Fault Diagnosis”, 3rd Edition, Elsevier LTD, 2012 • James D. Halderman, “Advanced Engine Performance Diagnosis”, 5th edition Prentice Hall, 2012
References:	<ul style="list-style-type: none"> • Tom Denton, “Automobile Electrical and Electronic Systems”, 2nd Edition, Society of Automotive Engineers, 2001 • Bauer Horst, “Automotive Electrics and Electronics”, Robert Bosch, 1999 • Jurgen Ronald, “Automotive Electronics Handbook”, McGraw-Hill, 1999 • “Automotive Electrical and Electronic Systems Manual”, Haynes, 1995 • Robert Bosch GmbH, “Automotive Electrics Automotive Electronics”, 5th edition, 2007 • William B. Ribbens ,”Understanding Automotive Electronics”, 6th Edition, Newnes, 2003
Planned learning activities and teaching methods:	<p>The course is taught in class with the aid of computer presentations. Details lecture notes and presentations as well as any other relevant supporting material (graphs, figures, etc.) are available through the lecturer’s website for the students to use in conjunction with the textbooks.</p> <p>Laboratories are carried in the vehicle systems and ICE Laboratories, in small groups, in order for the students to develop understating of the taught material.</p>
Assessment methods and criteria:	<ul style="list-style-type: none"> • Test 50% • Laboratory Work 25% • Laboratory Assessment 25%
Language of instruction:	English
Work placement(s):	No