

Vehicle Diagnostics

Code: MK3JDIAJ04JJ20-EN

ECTS Credit Points: 4

Evaluation: mid-semester grade

Semester: 6th semester

Its prerequisite(s): Measurement Technology

Further courses are built on it: Yes/No

Number of teaching hours/week (lecture + practice): 0+4

Topics:

Theoretical foundations of Technical Diagnostics. Methods and equipment of Technical Diagnostics. Automobile systems condition monitoring, fields of application. The role of Technical Diagnostics in quality assurance.

Chassis dynamometers, performance test of automobile power, simulation of the road surface and the vehicle working conditions. Duty cycles, load simulation. Brake diagnostics, brake certification procedures. Vehicle undercarriage diagnostics. Gas emission measurement systems. On-board diagnostics, data-management, protocols and functions.

Laboratory measurements: vibration measurement, vehicle undercarriage measurement, shock absorber measurement, brake measurement. Investigation of the injection systems: petrol and diesel engines, common rail diagnostics. Emission measurement. Official vehicle tests.

Literature:

Compulsory:

- Tom Denton, Advanced Automotive Fault Diagnosis (4th edition), Routledge, 2012
- Tracy Martin, How to use automotive diagnostic scanners, Quarto Publishing Group USA Inc., 2015
- Allan Bonnick, Derek Newbold, A Practical Approach to Motor Vehicle Engineering and Maintenance (2nd edition), Elsevier, 2005

Schedule

1st week Registration week

2nd week:

Practice: Role of the technical vehicle diagnostics in the vehicle-industry
Derivation of the vehicle-diagnostics history
Vehicle, like a mechatronic system
Electrotechnics basic-knowledge
Types of the vehicle-diagnostics

4th week:

Practice: Technical and status diagnostics of ICE

3rd week:

Practice: Type of the diagnostics's information
Source,handle and store of the diagnostics's information
Wired and wire-less data-connection
Informatics basic-knowledge
Methods of the vehicle-diagnostics

5th week:

Practice: Measurement and analysis of vehicle with chasiss-dynamometer

Measurement, diagnostics and analysis of operating characteristics Different cylinder measurements Case study 6th week: Practice: Technical diagnostic analysis of controlled systems Features of serial and parallel diagnostics Interventional, active operation tests	Structure and operating method of the dynamometer Procedure of the performance measuring Determination and analysis of losses using dynamometer measurements 7th week: Practice: Ignition diagnostics Analysis of the vehicle's ignition system, examination of parameters Oscilloscopic examinations
8th week: 1st drawing week	
9th week: Practice: Technical diagnostic testing of the power supply and starting system of motor vehicles; Battery diagnostics, software integration with the vehicle; Conventional and Smart Generator Diagnostics 11th week: Practice: Examination and diagnostics of vehicle lighting systems; Official measurements of lighting equipment; Inspection and operation of LED headlights 13th week: Practice: OBD, EOBD on-board diagnostics; Exhaust after-treatment system diagnostics ; OBD connector design, communication channels; Guided troubleshooting	10th week: Practice: Brake system diagnostics Types of brake measurement, measurable values; Brake measurement on a roller dynamometer; Method of official brake measurement; Technical diagnostics of the braking system of vehicles equipped with air brakes 12th week: Practice: Noise load of motor vehicles; Measurement of vehicle noise; EMC measurement methods, possibilities; Thermographic, endoscopic, ultrasound and vibration diagnostic devices 14th week: Practice: Expert systems in vehicle diagnostics; Remote diagnostic methods and options; Application of expert systems in practice
15th week: 2nd drawing week	

Requirements

Students have to visit the practices. Three misses are permissive for the practice

On the first and second drawing week they have to write a test from the lecture extended with practical diagnostics tasks. Based on these result they will get the final practice mark.