

# Automotive Operation Systems

Code: MK3GEPUJ04JG20-EN

ECTS Credit Points: 4

Evaluation: mid-semester grade

Semester: 6<sup>th</sup> semester

Its prerequisite(s): Vehicles and Mobile Machinery

Further courses are built on it: Yes/No

Number of teaching hours/week (lecture + practice): 2+2

## Topics:

In the lectures we deal with the different vehicle maintenance systems and focus on the reasons of malfunction of car parts and main units arising during operation. We deal with the vehicle diagnostics in detail which is a special field of the technical diagnostics. Because of the special operation features of the vehicle units, the application of many particular condition inspection methods is needed.

In the lecture the followings are discussed: vehicle diagnostics systems; failure detection diagnostics methods; failure repair methods detected on bench test; technical reliability and probability; rules of accident analysing; vehicle accident analysing measures; technical evaluation; recycling processes of car parts, units: relevant domestic and EU rules and measures; specific constructions in terms of recycling (special materials, modality of components connections)

Laboratory measurements:

Brake test; suspension inspection and adjustment; wheel balancing; shock absorbers test; diagnostics of ICE; periodic technical inspection (identification; checking the accessories; checking the towing conditions; brake and emission tests; applied diagnostics tests necessary for keeping the usage permission).

## Literature:

*Compulsory:*

- Alternative Propulsion for Automobiles. Springer 2018
- Seiffert, Wech: Automotive Safety Handbook, SAE International. 2003.
- Menyhárt J.: Basics of Maintenance Engineering. DUPRESS 2019
- Mohamed Ben-Daya: Handbook of maintenance management and engineering. Dordrecht; New York: Springer, cop. 2009 9781848824713

## Schedule

### 1<sup>st</sup> week Registration week

#### 2<sup>nd</sup> week:

**Lecture:** Vehicle maintenance systems

**Practice:** Brake test

#### 3<sup>rd</sup> week:

**Lecture:** Reasons of malfunction of car parts and main units

**Practice:** Suspension inspection and adjustment

**4<sup>th</sup> week:**

**Lecture:** Reasons of malfunction of car parts and main units

**Practice:** Suspension inspection and adjustment. Electricity supply to vehicles on board. Electricity network construction. Protections. Actuators

**Practice:** Vehicle diagnostic, Bus systems

**6<sup>th</sup> week:**

**Lecture:** Failure detection diagnostics methods

**Practice:** Diagnostics of ICE

**8<sup>th</sup> week: Mid-term test****9<sup>th</sup> week:**

**Lecture:** Failure repair methods

**Practice:** Diagnostics of ICE

**11<sup>th</sup> week:**

**Lecture:** Rules of accident analysing; vehicle accident analysing measures

**Practice:** Checking the towing conditions

**13<sup>th</sup> week:**

**Lecture:** Recycling processes of car parts, units: relevant domestic and EU rules and measures

**Practice:** Applied diagnostics tests necessary for keeping the usage permission

**5<sup>th</sup> week:**

**Lecture:** Failure detection diagnostics methods

**Practice:** Shock absorbers test

**7<sup>th</sup> week:**

**Lecture:** Vehicle and ICE diagnostics, failure repair methods

**Practice:** Diagnostics of ICE

**10<sup>th</sup> week:**

**Lecture:** Technical reliability and probability

**Practice:** Periodic technical inspection

**12<sup>th</sup> week:**

**Lecture:** Rules of accident analysing; vehicle accident analysing measures

**Practice:** Emission test

**14<sup>th</sup> week:**

**Lecture:** Recycling processes of car parts, units: relevant domestic and EU rules and measures

**Practice:** Applied diagnostics tests necessary for keeping the usage permission

**15<sup>th</sup> week: End-term test****Requirements****A, for signature:**

Attendance at **lecture** is recommended, but not compulsory. Attendance at the **practice classes** is compulsory.

Students must attend practices and may not miss more than three lectures during the semester. In case a student misses more than three, the subject will not be signed and the student must repeat the course. Being late counts as an absence. In case of further absences, a medical certificate needs to be presented.

Missed practice classes should be made up for at a later date, to be discussed with the tutor. Active participation in the class and the laboratory is evaluated by the teacher. If a student's behavior or conduct doesn't meet the requirements of active participation, the teacher may evaluate his/her participation as an absence because of the lack of active participation in class.

Students have to **submit all the measuring reports** as scheduled minimum on a sufficient level.

During the semester there are two tests: the mid-term test in the 8<sup>th</sup> week and the end-term test in the 15<sup>th</sup> week. Students have to sit for the tests.

### **B, for a grade:**

The course ends with a **mid-term grade**. Based on the average of the grades of the measuring tasks and the midterm tests, the midterm grade is calculated as an average of them:

- the average grade of the measuring tasks
- the result of the midterm tests

The minimum requirement for the mid-term and end-term tests respectively is 60%. Based on the score of the tests separately, the grade is given according to the following table:

| Score  | Grade            |
|--------|------------------|
| 0-59   | fail (1)         |
| 60-69  | pass (2)         |
| 70-79  | satisfactory (3) |
| 80-89  | good (4)         |
| 90-100 | excellent (5)    |

If the score of any test is below 60, students can take a retake test in conformity with the EDUCATION AND EXAMINATION RULES AND REGULATIONS.