GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

| | | | |
|---|---|---|---|
| Subject name and code | Vehicle Hydraulics, PG_00040105 | | |
| Field of study | Mechanical Engineering, Mechanical Engineering | | |
| Date of commencement of studies | October 2020 | Academic year of realisation of subject | 2022/2023 |
| Education level | first-cycle studies | Subject group | Optional subject group<br>Subject group related to scientific research in the field of study |
| Mode of study | Part-time studies | Mode of delivery | at the university |
| Year of study | 3 | Language of instruction | Polish |
| Semester of study | 6 | ECTS credits | 2.0 |
| Learning profile | general academic profile | Assessment form | assessment |
| Conducting unit | Zakład Hydrauliki i Pneumatyki -> Institute of Mechanics and Machine Design -> Faculty of Mechanical Engineering and Ship Technology | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | |
| | Teachers | | |

**Lesson types and methods of instruction**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 22.0 | 0.0 | 0.0 | 0.0 | 0.0 | 22 |

E-learning hours included: 0.0

**Learning activity and number of study hours**

| Learning activity | Participation in didactic classes included in study plan | Participation in consultation hours | Self-study | SUM |
|---|---|---|---|---|
| Number of study hours | 22 | 5.0 | 23.0 | 50 |

**Subject objectives**

The aim of the course is to familiarise students with the application of hydraulic and electro-hydraulic drive and control in the construction of automobiles, particularly steering, braking and suspension systems.

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [K6_W08] possesses basic knowledge including the methodology of designing machine parts, mechanical devices, selection of construction materials, manufacturing and operation, with the lifetime cycle | The student has knowledge of hydraulic drive and control in automobile construction. The student explains the use of hydraulic assistance in steering gears with kinematic, hydraulic and electric feedback. The student is able to design and select elements of a full hydraulic steering gear. The student describes the structure of the elements and operation of a hydraulic braking system with a brake force booster and corrector. The student is able to calculate working parameters of hydraulic braking system. The student understands the operation of a braking system equipped with ABS valves and the operation of ESP. The student will describe the construction of the hydraulic and pneumohydraulic elements of the suspension system with height and lateral tilt corrector in automobiles. | [SW3] Assessment of knowledge contained in written work and projects |
| [K6_U05] is able to plant an experiment within the range of measuring the basic operating parameters of mechanical devices using a specialized equipment, interpret the results and reach the correct conclusions | The student is able to carry out calculations and solve design tasks related to steering, braking and suspension systems used in automobiles. | [SU3] Assessment of ability to use knowledge gained from the subject |

| | |
|---|---|
| Subject contents | Development of automotive hydraulics. Application of hydraulics in passenger cars. Varieties and requirements for steering servos. Hydromechanical and full-hydraulic steering servos. Electro-hydraulic steering servos. Requirements and components of the automotive braking system. Circuits and hydraulic components of the braking system. Electrohydraulic braking systems ABS, ASR. Elements of vehicle suspension. Hydropneumatic suspension. Hydropneumatic levelling systems. Electronic stability control system ESP. |
| Prerequisites and co-requisites | Fundamentals of general mechanics, hydraulics and electrical engineering |

**Assessment methods and criteria**

| Subject passing criteria | Passing threshold | Percentage of the final grade |
|---|---|---|
| project task | 56.0% | 20.0% |
| test | 56.0% | 80.0% |

**Recommended reading**

| | |
|---|---|
| Basic literature | Szydelski Z.: Napęd i sterowanie w pojazdach i samojezdnych maszynach roboczych. WNT Warszawa 1980<br><br>Reński A.: Budowa samochodów. Układy hamulcowe i kierownicze oraz zawieszenia. Oficyna Wydawnicza Politechniki Warszawskiej. Warszawa 2004 |
| Supplementary literature | Leiter R.: Hamulce samochodów osobowych i motocykli. Wydawnictwa Komunikacji i Łączności. Watrszawa 198<br><br>Katalogi firm: Danfoss, Bosch-Rexroth |
| eResources addresses | Adresy na platformie eNauczanie: |

| | |
|---|---|
| Example issues/ example questions/ tasks being completed | Full-hydraulic steering servo design.Principle of operation of ABS, ESPOperation and application of retarder |
| Work placement | Not applicable |