



Subject card

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|---|--|--|--|-------------------------------------|--|------------|-----|
| Subject name and code | Sensors and Actuators, PG_00048150 | | | | | | |
| Field of study | Electronics and Telecommunications | | | | | | |
| Date of commencement of studies | October 2020 | | Academic year of realisation of subject | | 2023/2024 | | |
| Education level | first-cycle studies | | Subject group | | Optional subject group Subject group related to scientific research in the field of study | | |
| Mode of study | Full-time studies | | Mode of delivery | | at the university | | |
| Year of study | 4 | | Language of instruction | | Polish | | |
| Semester of study | 7 | | ECTS credits | | 4.0 | | |
| Learning profile | general academic profile | | Assessment form | | assessment | | |
| Conducting unit | Department of Marine Electronic Systems -> Faculty of Electronics, Telecommunications and Informatics | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | dr inż. Jan Schmidt | | | | |
| | Teachers | | dr inż. Jan Schmidt mgr inż. Aleksander Schmidt | | | | |
| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 15.0 | 0.0 | 30.0 | 0.0 | 0.0 | 45 |
| | 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 | 45 | | 4.0 | | 51.0 | 100 |
| Subject objectives | The aim is the education of an engineer with knowledge and skills of basic and directional range of sensors and actuators in marine electronics devices. The aim is also to prepare to take up studies on the second stage. | | | | | | |
| Learning outcomes | Course outcome | | Subject outcome | | Method of verification | | |
| | [K6_W03] Knows and understands, to an advanced extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex relationships between them and selected specific issues - appropriate for the curriculum | | The student knows the operating principles of the actuators. | | [SW1] Assessment of factual knowledge | | |
| | [K6_U06] can analyse the operation of components, circuits and systems related to the field of study, measure their parameters and examine technical specifications | | Student measures parameters of switching systems with electromechanical and semiconductor relays, discrete drive systems with a stepper motor, and control systems with a hydraulic adjuster and electric actuators. | | [SU1] Assessment of task fulfilment | | |

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| Subject contents | <ol style="list-style-type: none">1. Place and functions of measurement and actuator systems in industrial real time systems2. Classification of sensors and technologies of manufacturing. Intelligent sensors3. Sensors of fundamental mechanical quantities and environmental parameters4. Chemical sensors - atmosphere and water monitoring, measurement of fumes concentration and explosion proof protection5. Magnetic field sensors6. Applications of magnetic field sensors7. Optical and fiber-optic sensors8. Sensors used in control of moving objects and robotics: gyro sensors and compasses, tilt angle sensors9. Sensors used in control of moving objects and robotics, ultrasonic sensors of object velocity, echo sounder and sonar sensors10. Types of actuators: notions of controller, actuator and power amplifier11. Types of controllers and examples of construction12. Classification of actuators related to the kind of energy used. Examples of construction solutions of hydraulic and pneumatic actuators13. Direct current (DC) motors14. Three-phase alternative current (AC) motors15. Single-phase induction AC motors16. Stepping motors – basics of operation17. Types and features of stepping motors18. Controllers for DC and AC motors19. Control of stepping motors. Microstepping drive | | |
| Prerequisites and co-requisites | | | |
| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| | Colloquium at the time of the semester | 60.0% | 50.0% |
| | Reports of laboratory exercises | 60.0% | 50.0% |
| Recommended reading | Basic literature | <ol style="list-style-type: none">1. Turkowski M. Przemysłowe sensory i przetworniki pomiarowe, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2000 (Czytelnia na Wydziale Mechanicznym PG)2. Nawrocki W. Sensory i systemy pomiarowe. Wydaw. Politechniki Poznańskiej, 2001(Czytelnia na Wydziale Elektrotechniki i Automatyki, Magazyn Biblioteki Głównej)3. Zajda Z., Żebrowski L. Urządzenia i układy automatyki. Wyd. Pol. Wrocł., Wrocław 1993 (Czytelnia na Wydziale ETI) | |
| | Supplementary literature | 1. Kostro J. Elementy, urządzenia i układy automatyki. Wydawnictwa Szkolne i Pedagogiczne Warszawa 1983.(Czytelnia na Wydziale ETI) | |
| | eResources addresses | Adresy na platformie eNauczanie: | |
| Example issues/ example questions/ tasks being completed | | | |
| Work placement | Not applicable | | |