GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Sensors and Actuators, PG_00048150		
Field of study	Electronics and Telecommunications		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2028/2029
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 Signals And Systems -> Faculty Of Electronics Telecommunications And Informatics -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Jan Schmidt	
	Teachers	dr inż. Jan 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

Subject contents

1. Place and functions of measurement and actuator systems in industrial real time systems
2. Classification of sensors and technologies of manufacturing. Intelligent sensors
3. Sensors of fundamental mechanical quantities and environmental parameters
4. Chemical sensors - atmosphere and water monitoring, measurement of fumes concentration and explosion proof protection
5. Magnetic field sensors
6. Applications of magnetic field sensors
7. Optical and fiber-optic sensors
8. Sensors used in control of moving objects and robotics: gyro sensors and compasses, tilt angle sensors
9. Sensors used in control of moving objects and robotics, ultrasonic sensors of object velocity, echo sounder and sonar sensors
10. Types of actuators: notions of controller, actuator and power amplifier
11. Types of controllers and examples of construction
12. Classification of actuators related to the kind of energy used. Examples of construction solutions of hydraulic and pneumatic actuators
13. Direct current (DC) motors
14. Three-phase alternative current (AC) motors
15. Single-phase induction AC motors
16. Stepping motors – basics of operation
17. Types and features of stepping motors
18. Controllers for DC and AC motors
19. Control of stepping motors. Microstepping drive

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="3"></td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Reports of laboratory exercises</td><td>60.0%</td><td>50.0%</td></tr>
<tr><td>Colloquium at the time of the semester</td><td>60.0%</td><td>50.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">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)</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">1. Kostro J. Elementy, urządzenia i układy automatyki. Wydawnictwa Szkolne i Pedagogiczne Warszawa 1983.(Czytelnia na Wydziale ETI)</td></tr>
<tr><td>eResources addresses</td><td colspan="2">Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3"></td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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