



Subject card

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|---|---|--|--|-------------------------------------|--|------------|-----|
| Subject name and code | System Identification I, PG_00048420 | | | | | | |
| Field of study | Automatic Control, Cybernetics and Robotics | | | | | | |
| Date of commencement of studies | February 2027 | Academic year of realisation of subject | | | 2026/2027 | | |
| Education level | second-cycle studies | Subject group | | | Obligatory subject group in the field of study 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 | 1 | Language of instruction | | | Polish | | |
| Semester of study | 1 | ECTS credits | | | 2.0 | | |
| Learning profile | general academic profile | Assessment form | | | exam | | |
| Conducting unit | Department of Automatic Control -> Faculty of Electronics Telecommunications and Informatics -> Faculties of Gdańsk University of Technology | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | dr inż. Artur Gańcza | | | | |
| | Teachers | | dr inż. Artur Gańcza | | | | |
| Lesson types | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 30.0 | 0.0 | 0.0 | 0.0 | 0.0 | 30 |
| | 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 | 30 | | 2.0 | | 18.0 | 50 |
| Subject objectives | Students taking this course get acquainted with the methods of building and validation of simple mathematical models of dynamic systems/processes based on experimental data. | | | | | | |
| Learning outcomes | Course outcome | | Subject outcome | | Method of verification | | |
| | [K7_U03] can design, according to required specifications, and make a complex device, facility, system or carry out a process, specific to the field of study, using suitable methods, techniques, tools and materials, following engineering standards and norms, applying technologies specific to the field of study and experience gained in the professional engineering environment | | Students know selected applications of process identification | | [SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools | | |
| | [K7_W02] knows and understands, to an increased extent, selected laws of physics and physical phenomena, as well as methods and theories explaining the complex relationships between them, constituting advanced general knowledge in the field of technical sciences related to the field of study | | Students know the basic methods of identifying stationary and extramural processes (objects and signals) | | [SW1] Assessment of factual knowledge | | |
| | [K7_U09] can carry out a critical analysis of the functioning of existing technical solutions and assess these solutions, as well as apply experience related to the maintenance of advanced technical systems, devices and facilities typical for the field of studies, gained in the professional engineering environment | | The student critically analyzes existing solutions and uses the experience gained. | | [SU3] Assessment of ability to use knowledge gained from the subject | | |

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| Subject contents | Course content – lecture Project 1: Comparison of parametric and nonparametric spectrum estimation methods - 7 h. 1.1. Splitting recorded word into separate characters 1.2. Implementation of a Hamming window 1.3. Design of a program for parametric spectrum estimation using the Durbin-Levinson procedure 1.4. Design of a program for nonparametric spectrum estimation using the FFT procedure 1.5. Comparison of resulting spectrums 1.6. Description of the final program Project 2: Application of system identification to elimination of impulsive disturbances from audio signals - 8 h. 2.1. Design of a procedure for handling WAVE audio files 2.2. Design of a procedure for AR-based prediction of audio signals 2.3. Design of a procedure for prediction-based detection of impulsive disturbances 2.4. Design of a procedure for AR-based reconstruction of a fragment of an audio signal 2.5. Design of a disturbance elimination program using the available procedure 2.6. Evaluation of restoration results (using recordings provided by the supervisor) 2.7. Description of methods and algorithms used to solve the problem – written report 2.8. Description of the final program | | |
| Prerequisites and co-requisites | No requirements | | |
| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| | Project | 50.0% | 100.0% |
| Recommended reading | Basic literature | T. Sonderstrom, P. Stoica, " Identyfikacja systemów", PWN 1997 | |
| | Supplementary literature | No requirements | |
| | eResources addresses | | |
| Example issues/ example questions/ tasks being completed | | | |
| Practical activities within the subject | Not applicable | | |

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