GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

| | | | |
|---|---|---|---|
| Subject name and code | System Identification II, PG_00047415 | | |
| Field of study | Automatic Control, Cybernetics and Robotics | | |
| Date of commencement of studies | February 2027 | Academic year of realisation of subject | 2027/2028 |
| Education level | second-cycle studies | Subject group | Obligatory subject group in the field of study<br>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 | English |
| Semester of study | 2 | ECTS credits | 1.0 |
| Learning profile | general academic profile | Assessment form | assessment |
| 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. Piotr Kaczmarek | |
| | Teachers | dr inż. Piotr Kaczmarek | |

**Lesson types**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 0.0 | 0.0 | 0.0 | 15.0 | 0.0 | 15 |

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 | 15 | 2.0 | 8.0 | 25 |

**Subject objectives**

Practical applications of identification methods

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [K7_U12] is able, to an increased extent, to analyze the operation of components and systems related to the field of study, as well as to measure their parameters and study their technical characteristics, and to plan and carry out experiments related to the field of study, including computer simulations, interpret the obtained results and draw conclusions | The student can implement advanced signal processing algorithms. | [SU1] Assessment of task fulfilment |
| [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 | The student is able to choose the appropriate tools to the task of process identification. The student is able to evaluate the computational complexity of identification algorithms. | [SU1] Assessment of task fulfilment |
| [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 | Student can use identification methods for signal processing. | [SU1] Assessment of task fulfilment |

<table>
<tr><td>Subject contents</td><td>Course content – project<br>Project 1: Comparison of parametric and nonparametric spectrum estimation methods - 7 h. 1.1. Splitting recorded word into separate characters<br>1.2. Implementation of a Hamming window<br>1.3. Design of a program for parametric spectrum estimation using the Durbin-Levinson procedure<br>1.4. Design of a program for nonparametric spectrum estimation using the FFT procedure<br>1.5. Comparison of resulting spectrums<br>1.6. Description of the final program<br>Project 2: Application of system identification to elimination of impulsive disturbances from audio signals - 8 h.<br>2.1. Design of a procedure for handling WAVE audio files<br>2.2. Design of a procedure for AR-based prediction of audio signals<br>2.3. Design of a procedure for prediction-based detection of impulsive disturbances<br>2.4. Design of a procedure for AR-based reconstruction of a fragment of an audio signal<br>2.5. Design of a disturbance elimination program using the available procedure<br>2.6.Evaluation of restoration results (using recordings provided by the supervisor)<br>2.7. Description of methods and algorithms used to solve the problem – written report<br>2.8. Description of the final program</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>The effect of the implemented software</td><td>55.0%</td><td>80.0%</td></tr>
<tr><td>Documentation</td><td>55.0%</td><td>20.0%</td></tr>
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</td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>Söderström T. Stoica P. "Identyfikacja Systemów" PWN 1997</td></tr>
<tr><td>Supplementary literature</td><td>No requirements</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
</table>

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