GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

| | | | |
|---|---|---|---|
| Subject name and code | , PG_00030015 | | |
| Field of study | Mathematics | | |
| Date of commencement of studies | October 2022 | Academic year of realisation of subject | 2022/2023 |
| Education level | second-cycle studies | Subject group | Optional subject group |
| 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 | 5.0 |
| Learning profile | general academic profile | Assessment form | exam |
| Conducting unit | Zakład Fizyki Teoretycznej i Informatyki Kwantowej -> Instytut Fizyki i Informatyki Stosowanej -> Faculty of Applied Physics and Mathematics | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr inż. Marcin Wilczewski | |
| | Teachers | dr inż. Marcin Wilczewski | |

**Lesson types and methods of instruction**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 30.0 | 0.0 | 30.0 | 0.0 | 0.0 | 60 |

E-learning hours included: 0.0

Address on the e-learning platform: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=19515

Additional information:
Lectures on site

Labs on-line

**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 | 60 | 5.0 | 60.0 | 125 |

**Subject objectives**

To learn the fundamentals of image processing in theory and practice.

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| K7_W11 | Student implements algorithms in a given programming language | [SW3] Assessment of knowledge contained in written work and projects |
| K7_K02 | Student learns and practices how to deal with complicated problems by decomposition to smaller parts | [SK5] Assessment of ability to solve problems that arise in practice |
| K7_U11 | The student learns the methods of image modeling.<br>Learns how to use linear algebra and mathematical analysis to image processing | [SU1] Assessment of task fulfilment |
| K7_U12 | Student learns how to use algebraic structures (vector spaces) to solve image processing problems | [SU1] Assessment of task fulfilment |
| K7_W08 | The student learns the fundamentals of machine learning methods. | [SW1] Assessment of factual knowledge |

<table>
<tr><td>Subject contents</td><td>1. Colorspaces<br><br>2. Point and context operations. Image filters.<br><br>3. Image discretizations: scalar and vector.<br><br>4. CBIR systems<br><br>6. Methods of image compression</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>The fundamentals of mathematical analysis and linear algebra.</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>lab</td><td>0.0%</td><td>60.0%</td></tr>
<tr><td>test</td><td>0.0%</td><td>40.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>1. Gonzalez, Woods, "Digital Image Processing", Person</td></tr>
<tr><td>Supplementary literature</td><td>none</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>1. Basics of matrix operations on images<br><br>2. Implementation of image filters<br><br>3. Discretization<br><br>4. Implementation of CBIR systems</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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