GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

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|---|---|---|---|
| Subject name and code | Renewable energy seminar I, PG_00037311 | | |
| Field of study | Technical Physics | | |
| Date of commencement of studies | October 2025 | Academic year of realisation of subject | 2027/2028 |
| Education level | first-cycle studies | Subject group | Optional subject group<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 | 3 | Language of instruction | Polish |
| Semester of study | 5 | ECTS credits | 1.0 |
| Learning profile | general academic profile | Assessment form | assessment |
| Conducting unit | Institute of Physics and Applied Computer Science -> Faculty of Applied Physics and Mathematics -> Faculties of Gdańsk University of Technology | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr inż. Daniel Pelczarski | |
| | Teachers | | |

**Lesson types**

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

E-learning hours included: 0.0

eNauczanie source address: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=46626

**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**

To consolidate and systematize the knowledge acquired during lectures and learn how to present it by delivering a lecture on a given topic.

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [K6_U08] can prepare written works and speeches in Polish and English, concerning detailed issues of physics and related fields, and scientific disciplines | Has the ability to prepare oral presentations on a selected topic. | [SU1] Assessment of task fulfilment |
| [K6_K05] presents own work results, transfers information in a commonly understandable manner, communicate and self-evaluate, as well as constructively evaluate the effects of other persons' work | Is able to present a selected issue in a clear and communicative manner and to evaluate the presentations of others. | [SK4] Assessment of communication skills, including language correctness |

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|---|---|
| Subject contents | Course content – seminar<br><br>Presentation topics:<br><br>1. Energy generation methods. Directions of renewable energy development<br><br>2. Hydropower.<br><br>3. Wind energy. Wind farm design.<br><br>4. Photovoltaics - inorganic cells.<br><br>5. Photovoltaics - organic cells.<br><br>6. Photovoltaics - dye-sensitized solar cells.<br><br>7. Photovoltaics - perovskite cells.<br><br>8. Solar radiation angles and tracking systems.<br><br>9. Photovoltaics - multijunctions and radiation concentrators.<br><br>10. Practical aspects of photovoltaics.<br><br>11. Photovoltaic installations - modules, off-grid and on-grid systems . Elements of a PV installation.<br><br>12. Overview of the largest PV installations in Poland.<br><br>13. Prospects for the development of photovoltaics.<br><br>14. PV/T hybrid systems.<br><br>15. Solar collectors.<br><br>16. Biofuels - biomass and biogas.<br><br>17. Geothermal energy.<br><br>18. Heat pumps.<br><br>19. Renewable energy sources in building sector.<br><br>20. The concept of a self-sufficient building powered by renewable energy sources.<br><br>21. Energy storage - cells, batteries and accumulators.<br><br>22. Hydrogen energy - fuel cells.<br><br>23. New energy sources for transportation.<br><br>24. Environmental pollution related to renewable energy sourcrs. |

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="2">Knowledge of mechanics, electricity and magnetism, quantum physics, and thermodynamics, within the scope of the basic academic course.</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Assessment of the oral presentation: the content and the manner of its presentation.</td><td>50.0%</td><td>100.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>1. S. C. Capareda, Introduction to Renewable Energy Conversions-CRC Press 2019.<br><br>2. M.A.Hanif, F. Nadeem, R. Tariq, U. Rashid, Renewable and Alternative Energy Resources, Academic Press 2021.<br><br>3. D. Ginley, D. Kahen, Fundamentals of materials for energy, Cambridge University Press 2011.</td></tr>
<tr><td>Supplementary literature</td><td>1. T.K. Ghosh, M.A. Prelas, Energy resources and systems, vol.2: Renewable Resources, Springer 2011.<br><br>2. J-C. Sabonnadiere, Renewable Energies, Wiley 2009.<br><br>3. J. Twidell, T. Weir, Renewable Energy Resources, Taylor & Francis 2005.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">See list of topics.</td></tr>
<tr><td>Practical activites within the subject</td><td colspan="2">Not applicable</td></tr>
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