



## Subject card

|   |   |  |                                     |            |  |         |     |
|---|---|--|-------------------------------------|------------|--|---------|-----|
| Subject name and code   | , PG_00037548   |  |                                     |            |  |         |     |
| Field of study  | Green Technologies  |  |                                     |            |  |         |     |
| Date of commencement of studies   | October 2020  | Academic year of realisation of subject  |                                     |            | 2020/2021  |         |     |
| Education level   | first-cycle studies   | Subject group  |                                     |            | Obligatory subject group 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   | 1   | ECTS credits   |                                     |            | 4.0  |         |     |
| Learning profile  | general academic profile  | Assessment form  |                                     |            | assessment   |         |     |
| Conducting unit   | Department of Physical Chemistry -> Faculty of Chemistry  |  |                                     |            |  |         |     |
| Name and surname of lecturer (lecturers)  | Subject supervisor  | prof. dr hab. inż. Jacek Czub  |                                     |            |  |         |     |
|   | Teachers  | prof. dr hab. inż. Jacek Czub<br>mgr Cyprian Kleist  |                                     |            |  |         |     |
| Lesson types and methods of instruction   | Lesson type   | Lecture  | Tutorial                            | Laboratory | Project  | Seminar | SUM |
|   | Number of study hours   | 15.0   | 0.0                                 | 45.0       | 0.0  | 0.0     | 60  |
|   | E-learning hours included: 0.0  |  |                                     |            |  |         |     |
| Adresy na platformie eNauczanie:<br>Computer science -- lecture and practicals - Moodle ID: 6620<br><a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=6620">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=6620</a> |   |  |                                     |            |  |         |     |
| 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   | 2.0                                 |            | 38.0   |         | 100 |
| Subject objectives  | The aim of the subject is to teach the students skills in usage of computers for evaluation and analysis of the experimental results. Skills in using software for engineers, esp. chemical engineers, including data bases, will also be trained. Another aim is to give students basic knowledge in statistics of one variable and two variables (linear regression), as well as in the fundamentals of algorithms and hardware of digital computers. |  |                                     |            |  |         |     |
| Learning outcomes   | Course outcome  | Subject outcome  |                                     |            | Method of verification   |         |     |
|   | [K6_K06] has awareness of the importance of non-technical aspects and effects of engineering activities, including its impact on the environment and the associated responsibility for decisions.   | Student acquires knowledge about modern computers, including computer architecture, representation of various types of data in computer memory and basic programming.<br><br>Student acquires introductory knowledge on numerical methods and statistics.        |                                     |            | [SK2] Assessment of progress of work<br>[SK5] Assessment of ability to solve problems that arise in practice<br>[SK3] Assessment of ability to organize work |         |     |
|   | [K6_U03] is able to use information and communication technologies relevant to the common tasks of engineering, is able to use known methods and mathematical-physical models to describe and explain phenomena and chemical processes  | Student knows how to effectively use text editors and spreadsheets and is capable of creating simple python programs for solving engineering and scientific problems.<br><br>Student knows how to apply rudimentary statistical reasoning and numerical methods. |                                     |            | [SU4] Assessment of ability to use methods and tools<br>[SU2] Assessment of ability to analyse information<br>[SU1] Assessment of task fulfilment            |         |     |

| Subject contents   | <p>LECTURES:<br/>History of computers, architecture of a numerical computer, algorithms and flow charts, numerical formats of different types of data, basic classes of software (operating systems), digital-to-analog and analog-to-digital conversion, basic programming in python; elementary statistics of one and two variables, linear regression, statistical tests, numerical instability, solving non-linear equations (e.g. bisection method), numerical interpolation and integration.</p> <p>LABORATORY:<br/>General section: using advanced functionalities of MSOffice class software (Word, Excel), basic programming in python</p> <p>Applied section: solving four assigned problems in linear regression, solving non-linear equations, numerical interpolation and numerical integration.</p> |   |  |                          |                   |                               |                        |       |       |                                    |        |       |
|--|---|---|--|--------------------------|-------------------|-------------------------------|------------------------|-------|-------|------------------------------------|--------|-------|
| Prerequisites and co-requisites                                |   |   |  |                          |                   |                               |                        |       |       |                                    |        |       |
| Assessment methods and criteria                                | <table border="1"> <thead> <tr> <th data-bbox="456 568 794 595">Subject passing criteria</th> <th data-bbox="799 568 1137 595">Passing threshold</th> <th data-bbox="1142 568 1481 595">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 602 794 629">final test in lectures</td> <td data-bbox="799 602 1137 629">50.0%</td> <td data-bbox="1142 602 1481 629">30.0%</td> </tr> <tr> <td data-bbox="456 636 794 663">solving four numerical assignments</td> <td data-bbox="799 636 1137 663">100.0%</td> <td data-bbox="1142 636 1481 663">70.0%</td> </tr> </tbody> </table>  |   |  | Subject passing criteria | Passing threshold | Percentage of the final grade | final test in lectures | 50.0% | 30.0% | solving four numerical assignments | 100.0% | 70.0% |
| Subject passing criteria                                       | Passing threshold   | Percentage of the final grade   |  |                          |                   |                               |                        |       |       |                                    |        |       |
| final test in lectures   | 50.0%   | 30.0%   |  |                          |                   |                               |                        |       |       |                                    |        |       |
| solving four numerical assignments                             | 100.0%  | 70.0%   |  |                          |                   |                               |                        |       |       |                                    |        |       |
| Recommended reading  | Basic literature  | 1. R. Johnson, Elementary Statistics, Boston 1992 and later editions<br>2. B. Carnahan, H. A. Luther, J. O. Wilkes, Applied Numerical Methods, New York 1984 and later editions                       |  |                          |                   |                               |                        |       |       |                                    |        |       |
|  | Supplementary literature  | 1. Lecture notes, examples, text problems and briefs published in the website of the Department of Physical Chemistry or given to the students.   |  |                          |                   |                               |                        |       |       |                                    |        |       |
|  | eResources addresses  | Computer science -- lecture and practicals - Moodle ID: 6620<br><a href="https://enauczenie.pg.edu.pl/moodle/course/view.php?id=6620">https://enauczenie.pg.edu.pl/moodle/course/view.php?id=6620</a> |  |                          |                   |                               |                        |       |       |                                    |        |       |
| Example issues/<br>example questions/<br>tasks being completed |   |   |  |                          |                   |                               |                        |       |       |                                    |        |       |
| Work placement   | Not applicable  |   |  |                          |                   |                               |                        |       |       |                                    |        |       |