



## Subject card

|   |   |  |   |                                     |  |            |     |
|---|---|--|---|-------------------------------------|--|------------|-----|
| Subject name and code                       | Team Project, PG_00049608   |  |   |                                     |  |            |     |
| Field of study                              | Electrical Engineering  |  |   |                                     |  |            |     |
| 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<br>Subject group related to scientific research in the field of study |            |     |
| Mode of study                               | Part-time studies   | Mode of delivery   |   |                                     | at the university  |            |     |
| Year of study                               | 1   | Language of instruction                                  |   |                                     | Polish   |            |     |
| Semester of study                           | 2   | ECTS credits   |   |                                     | 5.0  |            |     |
| Learning profile                            | general academic profile  | Assessment form  |   |                                     | assessment   |            |     |
| Conducting unit                             | Department of Electrical Power Engineering -> Faculty of Electrical and Control Engineering |  |   |                                     |  |            |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor  |  | dr inż. Piotr Szczeciński                                       |                                     |  |            |     |
|   | Teachers  |  | dr inż. Piotr Szczeciński<br>prof. dr hab. inż. Waldemar Kamrat |                                     |  |            |     |
| Lesson types and methods of instruction     | Lesson type   | Lecture  | Tutorial  | Laboratory                          | Project  | Seminar    | SUM |
|   | Number of study hours   | 0.0  | 0.0   | 0.0                                 | 50.0   | 0.0        | 50  |
|   | 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   | 50   |   | 32.0                                |  | 43.0       | 125 |
| Subject objectives                          | Achieving of electrical structure objects designing competences                             |  |   |                                     |  |            |     |

| Learning outcomes               | Course outcome   | Subject outcome   | Method of verification  |
|---------------------------------|--|---|---|
|                                 | K7_U13   | The student is able to assess the course and effects of work in a team implementing an engineering project of a power facility. The student is able to present the results of his work and acquires the skills of developing technical documentation, and also acquires the skills to use technical documentation developed by other students, as well as available as part of the project. The student is able to creatively use the knowledge and skills acquired during the studies, developing design issues and coordinating them with people from the project group.  | [SU1] Assessment of task fulfilment<br>[SU2] Assessment of ability to analyse information                                       |
|                                 | K7_K03   | The student is able to design the selected one power facility, in terms of various components of the project. The student is able to cooperate in a group, complementing the design assumptions and knowledge from a wider range of design. The student is able to determine the conditions legislative and legal for the facility.   | [SK1] Assessment of group work skills<br>[SK3] Assessment of ability to organize work   |
|                                 | K7_W08   | The student has the knowledge to perform a technical and economic analysis with a variety of possible technical solutions. The student has the knowledge and defines the assumptions enabling the implementation of a project, e.g. a station transformer and distribution 110/15 kV, which is the main supply point for 1st and 2nd category loads. The student, according to his own technical analysis, selects the location of the power station, type of station, selects transformer power, selects switchgear scheme, selects elements of main circuits of switchgears and stations. The student has knowledge in the field of designing, selection of protection automation in selected line bays, including the proposed settings, as well as settings for automatic control systems, etc. | [SW2] Assessment of knowledge contained in presentation<br>[SW3] Assessment of knowledge contained in written work and projects |
|                                 | K7_U11   | The student is able to select electrical power devices using various criteria, including economic ones. The student can choose:<br>- power of transformers<br>- sections of cable and overhead lines<br>- current and voltage transformers  | [SU3] Assessment of ability to use knowledge gained from the subject<br>[SU1] Assessment of task fulfilment                     |
|                                 | K7_K05   | The student is able to act in a creative way and solve design problems. The student proposes technical solutions as well as design constraints and looks for technical solutions on his own.  | [SK1] Assessment of group work skills<br>[SK4] Assessment of communication skills, including language correctness               |
| Subject contents                | Grounds for expediency of building a substation. The location of substation. Conditions for supplying the substation and conveying the transmission lines to substation. Detailed data and reliability specifications for recipients supplied by the substation. The choice of solution of the switching station. The required supply schemes. The selection of main transformers. The selection of major equipment is basic to any substation design. Switching station WN- the required schemes. Switching station SN- the required schemes. The substation's auxiliaries. Own requirements of the substation. The reactive power compensation. The security automatics. Grounding protection of the substation. Effective relaying and insulation of equipment. Electric shock protection. Constructional conception. |   |   |
| Prerequisites and co-requisites | Knowledge of the Basics of Electrical Engineering, Electrical Power Engineering, Power Systems Engineering, Power Industry Engineering,  |   |   |

| Assessment methods and criteria                                | Subject passing criteria  | Passing threshold  | Percentage of the final grade |
|--|---|--|-------------------------------|
|  |   | project  | 50.0%                         |
| Recommended reading  | Basic literature  | 1. Beldowski T., Markiewicz H.: Stacje i urządzenia elektroenergetyczne. WNT, Warszawa 1998.<br><br>2. Nartowski Z.: Stacje elektroenergetyczne 110-750 kV. WNT, Warszawa 1984.<br><br>3. Poradnik Sieci elektroenergetyczne w zakładach przemysłowych t. 2; Elektroenergetyczne stacje i linie; WNT Warszawa, 1990.<br><br>4. Praca zbiorowa: Poradnik inżyniera elektryka, tom 3, rodz.<br><br>5 Sieci elektroenergetyczne, WNT, Warszawa 1997 |                               |
|  | Supplementary literature  | 1. Seidel S.: Rozdzielnie i stacje transformatorowe; wyd. IV; Wydawnictwo Uczelniane Politechniki Poznańskiej; Poznań 1967.<br><br>2. Strojny J., Strzałka J.: Projektowanie urządzeń elektroenergetycznych; AGH, Kraków 2001  |                               |
|  | eResources addresses  |  |                               |
| Example issues/<br>example questions/<br>tasks being completed | transformer station systems, auxiliary devices , system configuration |  |                               |
| Work placement   | Not applicable  |  |                               |