



## Subject card

|   |   |  |  |                                     |         |   |     |
|---|---|--|--|-------------------------------------|---------|---|-----|
| Subject name and code                       | Introductory CDIO Project, PG_00049763  |  |  |                                     |         |   |     |
| Field of study                              | Power Engineering, Power Engineering, Power Engineering, Power Engineering, Power Engineering   |  |  |                                     |         |   |     |
| 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                           | 2   |  | ECTS credits   |                                     |         | 4.0   |     |
| Learning profile                            | general academic profile  |  | Assessment form  |                                     |         | assessment  |     |
| Conducting unit                             | Department of Controlled Electric Drives -> Faculty of Electrical and Control Engineering   |  |  |                                     |         |   |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor  |  | dr hab. inż. Marek Adamowicz   |                                     |         |   |     |
|   | Teachers  |  | dr hab. inż. Marek Adamowicz   |                                     |         |   |     |
| Lesson types and methods of instruction     | Lesson type   | Lecture  | Tutorial   | Laboratory                          | Project | Seminar   | SUM |
|   | Number of study hours   | 0.0  | 0.0  | 0.0                                 | 45.0    | 0.0   | 45  |
|   | E-learning hours included: 0.0  |  |  |                                     |         |   |     |
|   | Adresy na platformie eNauczanie:  |  |  |                                     |         |   |     |
| 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   | 45   |  | 6.0                                 |         | 49.0  | 100 |
| Subject objectives                          | The aim of this course is to make the students familiar with the team work to design and construct simple electronic circuits. Also, how to write technical and engineering documentation taking in consideration electrical engineering, electronics, CAD and PCB design and computer simulation problems. |  |  |                                     |         |   |     |
| Learning outcomes                           | Course outcome  |  | Subject outcome  |                                     |         | Method of verification  |     |
|   | K6_K02  |  | Student can work individually and in team, can estimate the time needed for the entrusted task.  |                                     |         | [SK2] Assessment of progress of work  |     |
|   | K6_U01  |  | Student can obtain information from technical literature on the construction and design of simple electronic circuits. The obtained information can integrate, interpret and get conclusions. Student can find data in catalog cards and in software documentation. Student can elaborate and present documentation of the prepared project. |                                     |         | [SU4] Assessment of ability to use methods and tools<br>[SU1] Assessment of task fulfilment |     |

| Subject contents   | Design of complete prototype of Simple electronic circuit (DC-DC converter) with control based on %%% integrated circuit. The project is divided into the following stages: <ul style="list-style-type: none"><li>• Get familiar with laboratory equipment (oscilloscope, multimeters, DC power supply, assembly and soldering tools)</li><li>• DC-DC converter computer simulation,</li><li>• Design of control system based on IC timer 555 type,</li><li>• Selection of electronics elements,</li><li>• Design of magnetic coil using simulation software,</li><li>• Draw of mechanical elements for coil winding utilizing 3D CAD software,</li><li>• Assembling of electronics circuit using general, universal board,</li><li>• The initial testing stage of assembled circuit with the possibility to correct connection structure, changing the electronics elements etc.,</li><li>• Designing of the printed circuit board PCB utilizing CSD software,</li><li>• Manufacturing of PCB board,</li><li>• Assembling the electronic elements on PCB board (soldering and connection tests)</li><li>• Starting the operation stage of the assembled electronic circuit</li><li>• Measurements of the assembled circuit (using of multimeters, oscilloscope),</li><li>• Project documentation (final report),</li><li>• Presenting the project with the final results.</li></ul> |  |                   |                               |         |       |        |  |  |
|--|--|--|-------------------|-------------------------------|---------|-------|--------|--|--|
| Prerequisites and co-requisites                          | <ul style="list-style-type: none"><li>• Basic English and elementary computer software skills (Word, Excel, etc.)</li></ul>  |  |                   |                               |         |       |        |  |  |
| Assessment methods and criteria                          | <table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Project</td><td>60.0%</td><td>100.0%</td></tr></table>  | Subject passing criteria   | Passing threshold | Percentage of the final grade | Project | 60.0% | 100.0% |  |  |
| Subject passing criteria                                 | Passing threshold  | Percentage of the final grade  |                   |                               |         |       |        |  |  |
| Project  | 60.0%  | 100.0%   |                   |                               |         |       |        |  |  |
| Recommended reading                                      | Basic literature   | <ol style="list-style-type: none"><li>1. Manual of electronic circuits simulation software LT Spice <a href="http://www.linear.com/designtools/software/">http://www.linear.com/designtools/software/</a></li><li>2. Manual of printed circuit board design software EAGLE Light Edition <a href="http://www.cadsoftusa.com/">http://www.cadsoftusa.com/</a></li><li>3. Manual of magnetic elements simulation software FEMM: David Meeker Finite Element Method Magnetics. User's Manual.</li></ol> |                   |                               |         |       |        |  |  |
|  | Supplementary literature   | <ol style="list-style-type: none"><li>1. By Chen, Wai-Ka, Electrical Engineering Handbook, Elsevier, 2005.</li></ol>   |                   |                               |         |       |        |  |  |
|  | eResources addresses   |  |                   |                               |         |       |        |  |  |
| Example issues/ example questions/ tasks being completed | Design, assembling and constructing, perform and run laboratory tests of DC-DC converter, documentation preparation and presenting the delivering of multimedia presentation.  |  |                   |                               |         |       |        |  |  |
| Work placement   | Not applicable   |  |                   |                               |         |       |        |  |  |