<table>
<tr><td>Course code</td><td></td></tr>
<tr><td>Type and description</td><td>Elective Course</td></tr>
<tr><td>ECTS credit</td><td>1</td></tr>
<tr><td>Course name</td><td>Modern Renewable Electrical Power Systems</td></tr>
<tr><td>Course name in Polish</td><td>Nowoczesne systemy elektroenergetyczne ze źródłami odnawialnymi</td></tr>
<tr><td>Language of instruction</td><td>English</td></tr>
<tr><td>Course level</td><td>8 PRK</td></tr>
<tr><td>Course coordinator</td><td>dr hab. inż. Irena Wasiak, prof. PŁ</td></tr>
<tr><td>Course instructors</td><td>dr inż. Tomasz Siewierski</td></tr>
<tr><td>Delivery methods and course duration</td><td>
<table>
<tr><th></th><th>Lecture</th><th>Tutorials</th><th>Laboratory</th><th>Project</th><th>Seminar</th><th>Other</th><th>Total of teaching hours during semester</th></tr>
<tr><td>Contact hours</td><td>0</td><td>0</td><td>0</td><td>15</td><td>0</td><td>0</td><td>15</td></tr>
<tr><td>E-learning</td><td>No</td><td>No</td><td>No</td><td>No</td><td>No</td><td>No</td><td></td></tr>
<tr><td>Assessment criteria (weightage)</td><td></td><td></td><td></td><td>1,00</td><td></td><td>0,00</td><td></td></tr>
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<tr><td>Course objective</td><td>Providing students with knowledge regarding the directions of power distribution networks development, integration of new technologies, and challenges in control and management of the network operation.</td></tr>
<tr><td>Learning outcomes</td><td>1.Student knows and understands recent trends in the development of dispersed generation systems and modernisation of distribution networks – W4.
2. Student is able to assess economic impacts and regulatory requirements of the transformation process towards sustainable power sector – K1.
3. Student can apply software tools to design distributed generation systems, integrate it into the grid and conduct techno-economic analysis – U4.</td></tr>
<tr><td>Assessment methods</td><td>Final report including calculation spreadsheets, presenting technical and economic outcomes of the conducted studies</td></tr>
<tr><td>Prerequisites</td><td></td></tr>
<tr><td>Course content with delivery methods</td><td>1. Dimensioning of renewable energy sources for residential and small business customers 2. Selection of the generation unit grid integration method 3. Selection and dimensioning of the local energy storage technology and optimization of the use of the storage capacity 4. Demand side management and its integration within local micro energy systems in the case of residential prosumers and small enterprises 5. Feasibility study of the decarbonization of the residential energy systems and small business economies 6. Analysis of the impact of the electromobility on the distribution networks and local energy systems 7. Calculation of the economic and environmental effects (carbon footprint) of the implementation of the considered energy system using LCA (Life Cycle Assessment) approach</td></tr>
<tr><td>Basic reference materials</td><td>M. Bollen, F. Hassan, Integration of Distributed Generation in the Power System, John Wiley &Sons, 2011
Daniel S. Kirschen, Goran Strbac, Fundamentals of Power System Economics 2nd Edition, John Wiley & Sons, 2018
Microgrid. Advanced Control Methods and Renewable Energy System Integration, edited by Magdi S. Mahmoud, Elsevier 2017</td></tr>
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	S. Chowdhury, S.P. Chowdhury and P. Crossley, Microgrids and Active Distribution Networks, The IET, 2009
Other reference materials	Arthur R. Bergen, Vijay Vittal - Power Systems Analysis, 2nd Edition, Prentice Hall, 1999 William H Kersting, Distribution System Modeling and Analysis, Fourth Edition, CRC Press, 2018. Qing-Chan Zhong, T. Hornik, Control of power inverters in renewable energy and smart grid integration, John Wiley &Sons, 2013
Average student workload outside classroom	30h
Comments	
Last update	26.01.2022