

Nazwa w jęz. angielskim: Process system engineering

**Dane dotyczące zajęć:
Information on course:**

Jednostka oferująca: Wydział Chemiczny // dr hab. inż. Janusz Wójcik
Course offered by: Faculty of Chemistry // dr hab. inż. Janusz Wójcik

Język wykładowy:
angielski
Language:
English
Strona WWW: Course homepage:
Skrócony opis:
Short description:
<p>An objective of the course is providing the students with theoretical and practical background of process plants design, as well as rules of rational selection and matching unit operations into technological process line.</p> <p>The design process – its objectives, basic steps in designing and retrofitting of the chemical processes, new process concept. Environmental protection problems – environmental factors in process design. Safety considerations, safe chemical plants. Application of computers, computational guidelines, principles of flowsheet simulation. Detailed process creation. Heuristics for process synthesis. Process control.</p>
Opis:
Description:
Detailed programme's content: Lectures:
<ol style="list-style-type: none">1. The design process – its objectives, basic steps in designing and retrofitting of the chemical processes.2. Creation of the new process concept.3. Development of base case.4. Detailed process synthesis using algorithmic methods.5. Detailed design, equipment sizing, cost estimation, profitability analysis, optimization.6. Plantwide controllability assessment. Environmental protection problems – environmental factors in process design.7. Safety considerations.8. Design approaches towards safe chemical plants.10. Application of computers – basic spreadsheets, mathematical packages, process simulators (ASPEN PLUS, HYSYS, PRO/II, CHEMCAD), computational guidelines.11. Principles of flowsheet simulation.12. Detailed process creation – database preparation, thermophysical property data, role of experiments.13. Preliminary process synthesis – continuous/batch processing, chemical state of the substance, synthesis steps – unit operations, synthesis tree.14. Heuristics for process synthesis.15. Detailed process flowsheet, process integration, process simulation and pilot plant testing. <p>Interaction of process design and automatic process control. Profitability analysis.</p> <p>Tutorials, laboratory and design are directly connected with the lectures</p>
Contact hours:
<ul style="list-style-type: none">• full-time studies: 45L, 15T, 30 Lab, 30 Design• part-time studies: 45L, 15T, 30 Lab, 30 Design

Number of ECTS credits: 8
Literatura:
Bibliography:
<ol style="list-style-type: none"> 1. Douglas J.M., Conceptual Design of Chemical Processes, McGraw–Hill, New York (1988). 2. Ulrich G.D., A Guide to Chemical Engineering Process Design and Economics, Wiley, New York (1984). 3. Myers A.L., Seider W.D., Introduction to Chemical Engineering and Computer Calculations, Prentice–Hall, Englewood Cliffs, NJ (1976). 4. Coulson & Richardson's, CHEMICAL ENGINEERING, VOLUME 6 5. G. TOWLER, R. SINNOTT, CHEMICAL ENGINEERING DESIGN, Principles, Practice and Economics of Plant and Process Design
Efekty uczenia się:
Learning outcomes:
<p>1. Student possesses theoretical and practical background of process plants design K_W02+++, K_W03+++, K_W04+++, K_W06++, K_W07+++, K_W09+++</p> <p>2. Student can use in practice concept of multilevel design approach – from chemical concept of the process up till full documentation of the process project K_U03+++, K_U04++, K_U07+++, K_U09+++, K_U10+++,</p> <p>3. Student can use in practical situation heuristic rules concerning selection of optimal process plant configuration K_U03+++, K_U09+++, K_U10+++, K_U13+++, K_U19+++,</p> <p>4. Student uses literature data, data processing/communication techniques and specialized calculation/simulation programs in design works K_U03+++, K_U07+++</p> <p>5. Student understands the necessity of further professional training and the development of his/her engineering and personal competence K_K01+++</p>
Metody i kryteria oceniania:
Assessment methods and assessment criteria:
Method of assessment credit test, discussion, project work

**Przynależność do grup przedmiotów w cyklach:
Element of course groups in various terms:**

Opis grupy przedmiotów Course group description	Cykl pocz. First term	Cykl kon. Last term
<p>przedmioty obieralne studia stacjonarne i niestacjonarne stopień studiów – dowolny kierunek studiów – dowolny, semestr dowolny</p> <p>elective courses full-time and part-time studies degree - any field of study - any</p>	2023/2024	

semester - any		
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