

(faculty stamp)

## COURSE DESCRIPTION

Z1-PU7

WYDANIE N1

Strona 1 z 2

1. Course title: GREEN CHEMISTRY, WASTES AND SAFETY		2. Course code		
3. Validity of course description: 2015/2016				
4. Level of studies: 1 <sup>st</sup> cycle of higher education				
5. Mode of studies: intramural studies				
6. Field of study: INDUSTRIAL AND ENGINEERING CHEMISTRY		RCH		
7. Profile of studies: -				
8. Programme: general				
9. Semester: 7				
10. Faculty teaching the course: Department of Chemical Organic Technology and Petrochemistry RCh-5				
11. Course instructor: Dymitr Czechowicz, PhD				
12. Course classification: common				
13. Course status: compulsory				
14. Language of instruction: English				
15. Pre-requisite qualifications: knowledge provided in: Fundamentals of Chemical Technology, Chemical Technology				
16. Course objectives: An objective of the course is providing the students with the basic concept of Process Safety and with the issues from the area of Green Chemistry and Waste Management				
17. Description of learning outcomes:				
No	Learning outcomes description	Method of assessment	Teaching methods	Learning outcomes reference code
1.	Student has basic knowledge about hazards associated with chemical processes and knows principles of risk assessment. Student is familiar with international (including EU) conventions and directives relates to chemical process safety	Exam, presentation	Lecture, seminar	K_W17+, K_W18++, K_U03++, K_U08+
2.	Student understands the importance of non-technical aspects and effects of engineering activities, their impact on the environment and responsibility for decisions	Exam, presentation, discussion	Lecture, seminar	K_K02+, K_U03+++, K_U04+
3.	Student has awareness of the importance of behavior in a professional manner with respecting the rules of professional ethics	Discussion	Lecture, seminar	K_K03+, K_U03+++,
4.	Student is able to assess the risks associated with the use of chemical products and processes	Exam, presentation	Lecture, seminar	K_U03+++, K_U18+
5.	Student can design basic waste management system	Exam, discussion	Lecture, seminar	K_U03+++, K_U20+, K_U07+
6.	Student understands necessity to inform the public about favorable and unfavorable aspects of the activities related to the production and use of chemicals. Student is able to provide such information in a commonly understood manner	Exam, discussion, presentation	Lecture, seminar	K_U03+++, K_K06+, K_W18++
18. Teaching modes and hours				
Lecture / BA /MA Seminar / Class / Project / Laboratory				
Lecture - 30 h /Seminar – 15 h				

**19. Syllabus description:**

Lecture: After an introduction to the problems of Green Chemistry, Process Safety and Waste Management, there are detailed consideration of the next topics: legislation EU, USA, Poland; hazard incident and loss; Major hazard control, economics and insurance, management and management systems, hazard identification, reactive chemicals, hazard assessment, plant siting & layout, process design, pressure system design, control system design, human factor & human error, fire & explosions, toxic release, plant commissioning and inspection, plant operation, accident research, waste management.

Seminar: Case history accident studies

**20. Examination: yes****21. Primary sources:**

C. Ray Asfahl, David W. Rieske Industrial Safety and Health Management, Prentice Hall, 2010;

J. P. Seiler, Good laboratory Practice, Springer, 2001;

R. E. Sanders, Chemical Process Safety, Learning from Case histories, B.H., 1999

**22. Secondary sources:**

V. Marshall, S. Ruhemann, Fundamentals of Process Safety, IChemE, 2002;

S. Mannan, Lee's Loss Prevention in the Process Industries, Elsevier, 2005

**23. Total workload required to achieve learning outcomes**

No.	Teaching mode :	Contact hours / Student workload hours
1	Lecture	30/30
2	Classes	-/-
3	Laboratory	-/-
4	Project	-/-
5	BA/ MA Seminar	15/15
6	Other	15/15
	Total number of hours	60/60

**24. Total hours: 120****25. Number of ECTS credits: 4****26. Number of ECTS credits allocated for contact hours: 1,5****27. Number of ECTS credits allocated for in-practice hours (laboratory, classes, projects): 0****26. Comments:**

Approved:

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(date, Instructor's signature)

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(date, the Director of the Faculty Unit signature)