

**DOCTORAL SCHOOL OF WROCLAW UNIVERSITY OF SCIENCE AND
TECHNOLOGY**

SUPERVISOR DECLARING/CONDUCTING COURSE: Izabela Polowczyk
DEPARTMENT: Chemical Department
SCIENTIFIC DISCIPLINE: Chemical Engineering

COURSE CARD

Course name in Polish: Procesy adsorpcyjne i agregacyjne
Course name in English: Adsorption and aggregation processes

Course language Polish

University-wide general course type*:

The course is intended for all PhD students: YES / NO

- 1) ~~BASIC COURSE~~
- 2) **SPECIALIST COURSE**
- 3) ~~SEMINAR~~
- 4) ~~HUMANISTIC COURSE~~
- 5) ~~LANGUAGE~~

Subject code: CIQ100103W

* delete as applicable

	Lecture	Foreign language course	Seminar	Mixed forms
Number of hours of organized classes in university (ZZU)	30			
Grading	Exam	Exam	Oral presentation	Exam, inspection, evaluation classes
Number of ECTS points	0			

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Lack of requirements

COURSE OBJECTIVES

C1 To familiarise the student with adsorption and aggregation phenomena occurring in dispersed systems

PROGRAM CONTENTS

**DOCTORAL SCHOOL OF WROCLAW UNIVERSITY OF SCIENCE AND
TECHNOLOGY**

Form of classes – lecture (Lec)		Number of hours
Lec1	Introduction to colloids	2
Lec2	Surfactant adsorption and aggregation at interfaces	2
Lec3	Surfactant structures at nanoparticles	2
Lec4	Emulsions, microemulsions and nanoemulsions	2
Lec5	Pickering emulsions	2
Lec6	Janus particles	2
Lec7	Giant surfactants	2
Lec8	Self-assembly in Nature	2
Lec9	Self-assembly of classical and nonclassical amphiphiles	2
Lec10	Self-assembly into branches and networks	2
Lec11	Primitive membrane formation	2
Lec12	Programming micelles with biomolecules	2
Lec13	Self-assembled monolayers	2
Lec14	Assembly of inorganic nanoparticles	2
Lec15	Self-assembly of organic nanoparticles	2
Total hours:		30

Form of classes – foreign language course (Lng)		Number of hours
Lng1		
Lng2		
Lng3		
..		
Total hours:		

Form of classes – seminar (Sem)		Number of hours
Sem1		
Sem2		
Sem3		
...		
Total hours:		

Form of classes – mixed forms (mix)		Number of hours
Mix1		
Mix2		
Mix3		
...		
Total hours		

TEACHING TOOLS USED
N1. Lectures with multimedia presentation

**DOCTORAL SCHOOL OF WROCLAW UNIVERSITY OF SCIENCE AND
TECHNOLOGY**

ACHIEVED SUBJECT LEARNING OUTCOMES		
Type of learning outcome	Code of learning outcome	Assessment of learning outcome
Knowledge	P8S_WG	has advanced level knowledge of major subjects in a given discipline or interdisciplinary subjects
Knowledge	P8S_W	has knowledge at an advanced level in relation to the discipline and subjects related to the area of scientific research, including the latest research results and scientific achievements
...		
Skills		
Skills		
...		
Social competence		
Social competence		
...		

PRIMARY AND SECONDARY LITERATURE
<p><u>PRIMARY LITERATURE:</u></p> <p>[1] T.Cosgrove „, Colloid Science: Principle, methods and applications”, 2010 John Wiley & Sons Ltd.</p> <p>[2] R.Nagarajan “Self-assembly: from surfactants to nanoparticles”, 2019 John Wiley & Sons inc.</p> <p>[3] D.L.Andrews, G.D.Scholes and G.P.Wiederrecht “Comprehensive Nanoscience and Technology”, 2011 Academic Press.</p> <p>[4] H.B.Bohidar and K.Rawat “Design of Nanostructures Self-Assembly of Nanomaterials”, 2017 Wiley-VCH Verlag GmbH & Co.</p>
<p><u>SECONDARY LITERATURE:</u></p> <p>[5] B.Bharti „,Adsorption, Aggregation and Structure Formation in Systems of Charged Particles From Colloidal to Supracolloidal Assembly”, 2014 Springer International Publishing Switzerland.</p> <p>[6] B.P.Binks and T.S.Horozov “Colloidal Particles at Interfaces”, 2006 Cambridge University Press.</p> <p>[7] S.Jiang, S.Granick “Janus Particle Synthesis, Self-assembly and Applications”, 2013 RSC Publishing.</p>
<p>SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)</p> <p>dr hab. inż. Izabela Polowczyk, izabela.polowczyk@pwr.edu.pl</p>