

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

SUPERVISOR/TEAM/ DECLARING/CONDUCTING COURSE: **dr hab., inż. Rafał Kowalczyk**
DEPARTMENT Chemistry

COURSE CARD

Course name in Polish: Fizyczna Chemia Organiczna

Course name in English: Physical Organic Chemistry

Course language Polish / English*

University-wide general course type*:

1) basic science course (mathematics, physics, chemistry, computer science or other) :

Chemistry.....

Subject code: CIQ100164W * 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

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Acquired knowledge: advanced organic chemistry
2. Knowledge: various types of organic reactions and their mechanism
3. Basic knowledge of physical chemistry

COURSE OBJECTIVES

- C1 To familiarize students with various approaches to shed more light on the course of the reaction
- C2 Presentation of methods leading to modification of the reactivity of organic compounds including: changes in reaction medium, reaction conditions (temperature, concentration) and the application of various types of catalysis
- C3. Acidity, basicity, nucleophilicity and electrophilicity as factors determining the structure of the organic compound and its reactivity
- C4. The role of catalytic processes and main types of catalysis applied in the organic synthesis
- C5. Reaction mechanisms and factors influencing the course of reactions important for modern organic synthesis

PROGRAM CONTENTS

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Form of classes – lecture (Lec)		Number of hours
Lec1	Bonds in Organic Chemistry	4
Lec2	Structure of the compound vs. its stability and reactivity	2
Lec3	Weak bonds and interaction with solvent	2
Lec4	Organic compounds as acid-base and nucleophile-electrophile	2
Lec5	Take a look at the reaction-mechanism analysis, transient state theory	4
Lec6	Catalysis in Organic Chemistry	6
Lec7	Mechanisms of the most important reactions in synthetic organic chemistry	10
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. Lecture with a multimedia presentation
 N2. Examples of problem-solving methods, derived from the original literature
 N3. Discussions on the problem solutions the students have received to prepare

ACHIEVED SUBJECT LEARNING OUTCOMES

Type of learning outcome	Code of learning outcome	Assessment of learning outcome
Knowledge	P8U_W	student competently quotes other authors in articles published and prepared for publication in peer-reviewed scientific journals, peer-reviewed materials from international scientific conferences, and in book editions preceding the preparation of a doctoral dissertation

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Knowledge	P8S_WG	Student has an advanced knowledge fundamental to a field relevant to his/her research, including the most advanced methods of research and verification of results achieved has knowledge at an advanced level of discipline and subject matter relevant to the field of research carried out, including the most recent research findings and scientific achievements
Skills	P8U_U	Student is able to classify scientific publishers, including scientific journals, and scientific achievements according to accepted rules for: - journals included in international databases Scopus and Web of Science - impact factor (if), - quoting, - Hirsch index, - i10-indicator - have knowledge of current specification of active scientific journals in Scopus and Web of Science databases and their associated disciplines, as defined in the new classification of fields and disciplines
Skills	P8S_UW	Student is able to creatively interpret the results obtained and to search for their application is prepared to intensify research with commercial potential
Skills	P8S_UW	student has scientific and technological skills relevant to methods and methodology of conducting scientific research and critical evaluation of the results obtained student is able to create and conduct independent research, including outside the educational institution
Social competence		
Social competence		
...		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

- [1] J. Clayden, N. Greeves, S. Warren, P. Wothers, *Organic Chemistry*, Oxford University Press, 2001
- [2] E. V. Anslyn, D. A. Dougherty, *Modern Physical Organic Chemistry*, University Science Books, 2006
- [3] F. A. Carey, R. J. Sundberg, *Advanced Organic Chemistry*, Springer, 2007
- [4] R. A. Y. Jones, *Fizyczna Chemia Organiczna. Mechanizmy reakcji organicznych*, PWN, 1988

SECONDARY LITERATURE:

- [1] M. B. Smith, *March's Advanced Organic Chemistry: Reactions, Mechanisms, and Structure, 7th Edition*, Wiley, 2013

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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