



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Nitrogen-based organic compounds [S1TCh2E>ZOA]

### Course

Field of study

Chemical Technology

Year/Semester

2/4

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

English

Form of study

full-time

Requirements

elective

### Number of hours

Lecture

0

Laboratory classes

30

Other

0

Tutorials

0

Projects/seminars

0

### Number of credit points

2,00

### Coordinators

prof. dr hab. inż. Łukasz Chrzanowski  
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### Lecturers

### Prerequisites

At the beginning of the course, the student should have a basic knowledge of general chemistry. The student should know the symbols of the elements and the principles of chemical bonds cration, and should comprehend and discuss selected issues of inorganic chemistry at ease - catalytic properties of metals, complexes formation. The student should have the ability to associate facts and to obtain information from indicated sources. Based on the knowledge gained in the previous semester the student should also be aware of the dangers associated with working with organic compounds. Moreover the student should have knowledge and practical skills in assembling sets and apparatus used in the laboratory of organic chemistry. The student should know the names of the equipment and be able to assemble appropriate sets.

### Course objective

The aim of the course is to become familiar with the basic techniques used in the synthesis of organic compounds, and methods of their isolation from the post-reaction medium on the example of organic nitrogen compounds.

### Course-related learning outcomes

Knowledge:

K\_W03 has the knowledge of chemistry necessary to understand chemical phenomena and processes  
P6S\_WG

K\_W08 has a structured, theoretically underpinned general knowledge of general and inorganic, organic, physical and analytical chemistry P6S\_WG

K\_W09 has the necessary knowledge of both natural and synthetic raw materials, products and processes used in chemical technology, and the directions in chemical industry development (in the country and worldwide) P6S\_WG P6SI\_WG

#### Skills:

K\_U01 is able to obtain the necessary information from literature, databases and other sources related to chemical sciences, to properly interpret them, draw conclusions, formulate and justify opinions  
P6S\_UW

K\_U24 predicts the reactivity of chemical compounds based on their structure, estimates the thermodynamic and kinetic effects of chemical processes P6S\_UW

K\_U20 uses basic laboratory techniques for the synthesis, secretion and purification of chemicals  
P6S\_UW P6SI\_UW

#### Social competences:

K\_K06 can think and act in an entrepreneurial way P6S\_KO

K\_K01 understands the need for further education and improvement of professional, personal and social competences P6S\_KKK

K\_K04 is able to properly define priorities for the implementation of the designated task P6S\_KR

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Tests of the theoretical knowledge (reaction mechanism) necessary for the safe performance of the laboratory exercise. Execution of planned experiments with further description of observations and correct execution of necessary preparative calculations. Crediting on the basis of the performance of the planned experiments and passing all tests from the theoretical knowledge.

### Programme content

Issue related to nitrogen-based organic compounds.

### Course topics

Within the course, the student performs the synthesis of selected organic compounds containing nitrogen: oxides, derivatives with nitro group, aniline derivatives, products of diazonium salts coupling (azo dyes).

### Teaching methods

Oral questioning on preparation for synthesis and understanding of the reaction mechanisms. Individually performed by student synthesis with further separation of the product from the post-reaction medium. In addition, the student makes notes of changes occurring during the synthesis. The student makes reaction calculations and summarizes the whole work with appropriate conclusions.

### Bibliography

#### Basic:

1. Robert Morrison, Robert Boyd, Organic Chemistry, Prentice Hall
2. John McMurry, Organic Chemistry, Cengage Learning

#### Additional:

1. Arthur Vogel, Practical Organic Chemistry, Longmans
2. Susan McMurry, Organic Chemistry, Brooks

### Breakdown of average student's workload

|                                                                                                                                            | Hours | ECTS |
|--------------------------------------------------------------------------------------------------------------------------------------------|-------|------|
| Total workload                                                                                                                             | 50    | 2,00 |
| Classes requiring direct contact with the teacher                                                                                          | 30    | 1,00 |
| Student's own work (literature studies, preparation for laboratory classes/<br>tutorials, preparation for tests/exam, project preparation) | 20    | 1,00 |