

| FACULTY OF CHEMISTRY | | | | | |
|--|--|---------|----------------------|---------|------------------------|
| SUBJECT CARD | | | | | |
| Name of subject in Polish | Wieloletnia Synteza Organiczna | | | | |
| Name of subject in English | Multistep Organic Synthesis | | | | |
| Main field of study (if applicable): | Chemia | | | | |
| Specialization (if applicable): | Medicinal Chemistry | | | | |
| Profile: - | academic | | | | |
| Level and form of studies: | 2nd level, full-time | | | | |
| Kind of subject: | obligatory | | | | |
| Subject code | CHC024063 | | | | |
| Group of courses | NO | | | | |
| | Lecture | Classes | Laboratory | Project | Seminar |
| Number of hours of organized classes in University (ZZU) | | | 60 | | |
| Number of hours of total student workload (CNPS) | | | 90 | | |
| Form of crediting | | | Crediting with grade | | |
| For group of courses mark (X) final course | | | | | |
| Number of ECTS points | | | 3 | | |
| including number of ECTS points for practical (P) classes | | | 3 | | |
| including number of ECTS points for direct teacher-student contact (BK) classes | | | 2 | | |
| PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES | | | | | |
| 1. Knowledge and skills at the level of completion of "Fundamentals of Organic Chemistry - laboratory" course, or equivalent. | | | | | |
| 2. Basic knowledge of English | | | | | |
| \SUBJECT OBJECTIVES | | | | | |
| C1 Gathering proficiency in the laboratory work using advanced experimental techniques of organic synthesis. | | | | | |
| C2 Abilities to employ various transformation methods in a multi-step synthesis. | | | | | |
| C3 Planning and execution of a complex synthetic sequence based on the literature data | | | | | |
| SUBJECT EDUCATIONAL EFFECTS | | | | | |
| relating to skills: | | | | | |
| PEK_U01 - is able to perform multistep synthesis of an organic compound, select and assemble the appropriate equipment, identify and characterize the products obtained, | | | | | |
| PEK_U02 - can use professional scientific literature and databases to plan the strategy and tactics of the synthesis, | | | | | |
| PEK_U03 - can choose reaction conditions of various transformations, plan the methods of products isolation and purification, | | | | | |
| PEK_U04 - is able to interpret the results, to evaluate the purity of the product by defining basic physicochemical properties, to interpret spectra of organic compounds and to write laboratory notebook in English. | | | | | |
| PROGRAMME CONTENT | | | | | |
| Laboratory | | | | | Number of hours |
| Lab 1 | Conducting the laboratory and completion rules. Laboratory notebook. Basic equipment (glass and metal), and laboratory operations. Safety issues: hazardous substances, flammable, etc. Planning the synthesis - the use of the literature and | | | | 4 |

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|--|---|---|
| | databases. | |
| Lab 2 | Carrying out two or three-step synthesis of two obligatory compounds (2,4-dinitrophenylhydrazine, nicotinic acid, (R)-(-)-carvone or other of choice) | 4 |
| Lab 3 | | 4 |
| Lab 4 | | 4 |
| Lab 5 | | 4 |
| Lab 6 | Planning and carrying out the synthesis of two organic compounds (2-4 step sequential processes) using different types of organic reactions: alkylation, acylation, elimination, nucleophilic substitution, electrophilic substitution, oxidation and reduction, cycloaddition. Conversion of alcohols, carbonyl compounds, carboxylic acids and their derivatives, amines, expansion of the carbon scaffold. | 4 |
| Lab 7 | | 4 |
| Lab 8 | | 4 |
| Lab 9 | | 4 |
| Lab 10 | | 4 |
| Lab 11 | | 4 |
| Lab 12 | | 4 |
| Lab 13 | | 4 |
| Lab 14 | Purification, identification and characterization of the products. Interpretation of the results, writing the reports. | 4 |
| Lab 15 | Revision of the laboratory equipment and reports. | 4 |
| | Total hours | 60 |
| TEACHING TOOLS USED | | |
| N1. planning and execution the experiments N2. writing reports (in English) | | |
| EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT | | |
| Evaluation (F – forming (during semester), P – concluding (at semester end)) | Educational effect number | Way of evaluating educational effect achievement |
| C | PEK_U01 –PEK_U04 | Planning and preparation of two organic compounds (2-4 synthetic steps), characterization of the products, writing the reports. |
| PRIMARY AND SECONDARY LITERATURE | | |
| <u>PRIMARY LITERATURE:</u> | | |
| [1] A. Mucha, R. Siedlecka, Multistep organic synthesis. practical course, Wrocław, 2010; [2] A. I. Vogel, Preparatyka organiczna, WNT, Warszawa, 2006; Databases: Beilstein, Chemical Abstracts, Current Contents | | |
| <u>SECONDARY LITERATURE:</u> | | |
| [1] J. Gawroński, K. Gawrońska, K. Kacprzak, M. Kwit, Współczesna synteza organiczna, PWN, Warszawa, 2004 | | |
| SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS) | | |
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