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| Универзитет у Крагујевцу  **ПРИРОДНО-МАТЕМАТИЧКИ**  **ФАКУЛТЕТ** | PMF LOGO VER8 CIRILICA | University оf Kragujevac  **FACULTY OF**  **SCIENCE** |
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DEPARTMENT OF CHEMISTRY

**UNDERGRADUATE ACADEMIC STUDIES**

**CHEMISTRY**

for obtaining the first higher education degree and professional title

**Bachelor of Chemistry – Research and Development Chemist**

**Bachelor of Chemistry – Professor of Chemistry**

**Bachelor of Chemistry – Environmental Chemist**

Kragujevac, 2017

**THE STRUCTURE OF THE STUDY PROGRAM**

**TITLE AND AIMS OF THE STUDY PROGRAM**

Undergraduate academic studies of Chemistry last four years (8 semesters, 240 ECTS). The aim of the study program is structured for education and training experts for vocational and scientific work in different fields of chemistry. Upon completion of this Undergraduate academic studies of Chemistry student acquires the professional title:

***Bachelor of Chemistry (Bachelor with Honours)***

Upon completion of Undergraduate academic studies of Chemistry, the experts are formed, capable to work as associates in areas where the knowledge from the field of chemistry is applicable.

**ADMISSION REQUIREMENTS FOR the STUDY program**

Application for studies can submit persons with completed secondary education in four year duration. Persons who apply for admission to the first year of the undergraduate academic studies take an entrance exam in Chemistry course.

**PURPOSE OF THE STUDY PROGRAM**

The purpose of Undergraduate academic studies of Chemistry is to educate experts for a variety of jobs that require knowledge of chemistry and the ability to apply current knowledge in this field, as well as preparing students for further education. Respecting the importance of chemistry and its representation in all spheres of life and work, experts of this profile have socially justified and useful skills.

Study program has clearly defined and identifiable purposes and social roles (studying outcomes)**:**

• education of expert, graduate chemist, capable to perform and manage a variety of jobs and policy-making in areas where the knowledge in chemistry is applicable: in scientific research laboratories, accredited laboratories for quality control, biotechnological and development laboratories, institutes for monitoring and protecting the environment, as well as in the various fields of industry, agriculture, medicine, pharmacy, etc.,

• preparation for further education, whether it is the knowledge in the field of education or research area of chemical disciplines.

**APPENDIX**

A list of obligatory and elective courses per semester, weekly number of classes of lectures, exercises and individual work, ECTS for each subject at the Undergraduate academic studies of Chemistry (240 ECTS).

**Labels used:**

**C** - course code which is set at the level of institutions,

**S** - semester of the course.

Type of the course: **AG** – Academic general educational,

**TM** - Theoretical and methodological

**SP** – Scientific professional

**PA** - Professional applicative

Status of the course: **O** – obligatory,

**EB** – elective block.

Classes of active teaching: **L** – lectures,

**E** – exercises,

**SR** – Study and Research,

**OFT** – other forms of teaching (seminars, etc.,

depending on the specifics of the study program).

**A distribution of the study program courses into semesters and academic years**

UNDERGRADUATE ACADEMIC STUDIES **CHEMISTRY - Research and Development Chemist**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **C** | **Course Title** | **S** | **Course Type** | **Course Status** | | | **Active teaching** | | | | | **Other classes** | **ECTS** |
| **L** | **E** | | **OFT** | |
| **FIRST YEAR** | | | | | | | | | | | | | | |
| 1. | C101 | General Chemistry | 1 | TM | O | | | 4 | 4 | | 0 | |  | 9 |
| 2. | P198 | Physics 1 | 1 | AG | O | | | 4 | 3 | | 0 | |  | 7 |
| 3. | M136 | Mathematics 1 | 1 | AG | O | | | 4 | 3 | | 0 | |  | 7 |
| 4. | K101 | English language 1 | 1 | AG | O | | | 2 | 1 | | 0 | |  | 5 |
| 5. |  | Courses of elective block 1  (one course) | 1 | PA | EB | | | 1 | 1 | | 0 | |  | 3 |
| 6. | K105 | English language 2 | 2 | AG | O | | | 2 | 1 | | 0 | |  | 5 |
| 7. | C102 | Inorganic Chemistry 1 | 2 | TM | O | | | 4 | 4 | | 0 | |  | 9 |
| 8. | C103 | Analytical Chemistry 1 | 2 | TM | O | | | 2 | 5 | | 0 | |  | 6 |
| 9. | P197 | Physics 2 | 2 | AG | O | | | 2 | 0 | | 0 | |  | 3 |
| 10. |  | Courses of elective block 2  (one course) | 2 | AG | EB | | | 2 | 2 | | 0 | |  | 6 |
| **Total classes (L/E +OFT/other classes) and credits in year** | | | | | | | | **27** | **24** | | **0** | |  | **60** |
| **Total classes of active teaching in year** | | | | | | | | **765** | | | | |  |  |
|  | | | | | | | |  | | | | |  |  |
| **SECOND YEAR** | | | | | | | | | | | | | | |
| 11. | C106 | Organic Chemistry 1 | 3 | TM | O | | | 4 | 4 | | 0 | |  | 9 |
| 12. | C107 | Physical Chemistry 1 | 3 | TM | O | | | 4 | 4 | | 0 | |  | 8 |
| 13. | C108 | Analytical Chemistry 2 | 3 | SP | O | | | 2 | 4 | | 0 | |  | 8 |
| 14. |  | Courses of elective block 3  (one course) | 3 | PA | EB | | | 2 | 4 | | 0 | |  | 7 |
| 15. | C109 | Organic Chemistry 2 | 4 | SP | O | | | 4 | 4 | | 0 | |  | 9 |
| 16. | C110 | Physical Chemistry 2 | 4 | SP | O | | | 4 | 3 | | 0 | |  | 9 |
| 17. | C111 | Analytical Chemistry 3 | 4 | SP | O | | | 2 | 4 | | 0 | |  | 7 |
| 18. |  | Courses of elective block 4  (one course) | 4 | PA | EB | | | 2(1)\* | 0(2)\* | | 0 | |  | 3 |
| **Total classes (L/E +OFT/other classes) and credits in year** | | | | | | | | **24(23)\*** | **27(29)\*** | | **0** | |  | **60** |
| **Total classes of active teaching in year** | | | | | | | | **765(780)\*** | | | | |  |  |
|  | | | | | | | |  | | | | |  |  |
| **THIRD YEAR** | | | | | | | | | | | | | | |
| 19. | C116 | Instrumental Analytical Chemistry 1 | 5 | SP | | O | | 3 | 4 | | 0 | |  | 8 |
| 20. | C117 | Advanced Inorganic Chemistry | 5 | SP | | O | | 4 | 4 | | 0 | |  | 9 |
| 21. | C118 | Industrial Chemistry 1 | 5 | SP | | O | | 3 | 3 | | 0 | |  | 6 |
| 22. | C119 | Advanced Organic Chemistry | 5 | SP | | O | | 4 | 0 | | 0 | |  | 6 |
| 23. |  | Courses of elective block 5 (one course) | 5 | PA | | EB | | 2 | 2 | | 0 | |  | 6 |
| 24. | C120 | Natural Product Chemistry | 6 | TM | | O | | 3 | 3 | | 0 | |  | 7 |
| 25. | C121 | Industrial Chemistry 2 | 6 | SP | | O | | 3 | 3 | | 0 | |  | 6 |
| 26. | C122 | Organic Synthesis 1 | 6 | SP | | O | | 2 | 6 | | 0 | |  | 9 |
| 27. |  | Courses of elective block 6 (one course) | 6 | PA | | EB | | 2 | 2 | | 0 | |  | 3 |
| **Total classes (L/E +OFT/other classes) and credits in year** | | | | | | | | **26** | **27** | | **0** | |  | **60** |
| **Total classes of active teaching in year** | | | | | | | | **795** | | | | |  |  |
|  | | | | | | | |  | | | | |  |  |
| **FOURTH YEAR** | | | | | | | | | | | | | | |
| 28. | C127 | Basics of Organic and Biochemical Spectroscopy 1 | 7 | SP | | | O | 3 | | 3 | | 0 |  | 5 |
| 29. | C128 | Biochemistry | 7 | TM | | | O | 3 | | 3 | | 0 |  | 6 |
| 30. | C129 | Mechanisms of Inorganic Reactions | 7 | SP | | | O | 3 | | 3 | | 0 |  | 6 |
| 31. | C130 | Organic Synthesis 2 | 7 | SP | | | O | 2 | | 5 | | 0 |  | 7 |
| 32. |  | Courses of elective block 7 (one course) | 7 | PA | | | EB | 2 | | 2 | | 0 |  | 6 |
| 33. | C131 | Basics of Organic and Biochemical Spectroscopy 2 | 8 | SP | | | O | 3 | | 2 | | 0 |  | 5 |
| 34. | C132 | Analitycal Environmental Chemistry | 8 | SP | | | O | 1 | | 2 | | 0 |  | 3 |
| 35. | C158 | Organic Environmental Chemistry | 8 | SP | | | O | 1 | | 2 | | 0 |  | 3 |
| 36. |  | Courses of elective block 8 (one course) | 8 | PA | | | EB | 2 | | 2 | | 0 |  | 6 |
| 37. |  | Courses of elective block 9 (one course) | 8 | PA | | | EB | 2 | | 2 | | 0 |  | 5 |
| 38. |  | Courses of elective block 10 (one course) | 8 | PA | | | EB | 2 | | 0 | | 0 |  | 2 |
| 39. | C100 | Final Exam | 8 | PA | | | O | 0 | | 0 | | 0 |  | 6 |
| **Total classes (L/E +OFT/other classes) and credits in year** | | | | | | | | **24** | | **26** | | **0** |  | **60** |
| **Total classes of active teaching in year** | | | | | | | | **750** | | | | |  |  |
| **Total classes of active teaching, other classes and credits for all study years** | | | | | | | | **3075(3090)\***  **240 ECTS** | | | | |  |  |

\*Number of classes of active teachingdepending on the electivity

**The list of elective courses in the study program**

UNDERGRADUATE ACADEMIC STUDIES **CHEMISTRY - Research and Development Chemist**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **C** | **Course Title** | **Course Type** | **Course Status** | **Active teaching** | | | | **ECTS** |
| **L** | **E** | **OFT** | **SR** |
| Courses of elective block 1 | | | | | | | | | |
| 1. | C104 | Measurements and Calculations | PA | EB | 1 | 1 | 0 |  | 3 |
| 2. | C105 | Chemical Theory of Graphs | PA | EB | 1 | 1 | 0 |  | 3 |
| Courses of elective block 2 | | | | | | | | | |
| 1. | M137 | Mathematics 2 | AG | EB | 2 | 2 | 0 |  | 6 |
| 2. | B140 | Basics of Ecology | AG | EB | 2 | 2 | 0 |  | 6 |
| Courses of elective block 3 | | | | | | | | | |
| 1. | C112 | Computers in Chemistry 1 | PA | EB | 2 | 4 | 0 |  | 7 |
| 2. | C113 | Computers in Chemistry 2 | PA | EB | 2 | 4 | 0 |  | 7 |
| Courses of elective block 4 | | | | | | | | | |
| 1. | C114 | Semi-micro and Micro Methods of Analysis | PA | EB | 1 | 2 | 0 |  | 3 |
| 2. | C115 | Computer Programming in Chemistry | PA | EB | 2 | 0 | 0 |  | 3 |
| Courses of elective block 5 | | | | | | | | | |
| 1. | C125 | Mechanisms of Organic Reactions | PA | EB | 2 | 2 | 0 |  | 6 |
| 2. | C126 | Selected Chapters of Organic Chemistry | PA | EB | 2 | 2 | 0 |  | 6 |
| Courses of elective block 6 | | | | | | | | | |
| 1. | C123 | Selected Chapters of Inorganic Chemistry | PA | EB | 2 | 2 | 0 |  | 3 |
| 2. | C124 | Instrumental Analitycal Chemistry 2 | PA | EB | 2 | 2 | 0 |  | 3 |
| Courses of elective block 7 | | | | | | | | | |
| 1. | C133 | Chemistry of Atmosphere | PA | EB | 2 | 2 | 0 |  | 6 |
| 2. | C134 | Free Radical Reactions | PA | EB | 2 | 2 | 0 |  | 6 |
| 3. | B163 | Cell Biochemistry | PA | EB | 2 | 2 | 0 |  | 6 |
| Courses of elective block 8 | | | | | | | | | |
| 1. | C136 | Analytics of Natural and Waste Waters | PA | EB | 2 | 2 | 0 |  | 6 |
| 2. | C137 | International Standardization and Acreditation Regulations | PA | EB | 2 | 2 | 0 |  | 6 |
| 3. | C138 | Molecular Modelling 1 | PA | EB | 2 | 2 | 0 |  | 6 |
| Courses of elective block 9 | | | | | | | | | |
| 1. | C139 | Structural Inorganic Chemistry | PA | EB | 2 | 2 | 0 |  | 5 |
| 2. | C140 | Solution Chemistry | PA | EB | 2 | 2 | 0 |  | 5 |
| Courses of elective block 10 | | | | | | | | | |
| 1. | C141 | Philosophy and History of Chemistry | PA | EB | 2 | 0 | 0 |  | 2 |
| 2. | C142 | Mathematical Methods in Chemistry | PA | EB | 2 | 0 | 0 |  | 2 |

**A distribution of the study program courses into semesters and academic years**

UNDERGRADUATE ACADEMIC STUDIES **CHEMISTRY – Professor of Chemistry**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **C** | **Course Title** | **S** | **Course Type** | **Course Status** | | | **Active teaching** | | | | | **Other classes** | **ECTS** |
| **L** | **E** | | **OFT** | |
| **FIRST YEAR** | | | | | | | | | | | | | | |
| 1. | C101 | General Chemistry | 1 | TM | O | | | 4 | 4 | | 0 | |  | 9 |
| 2. | P198 | Physics 1 | 1 | AG | O | | | 4 | 3 | | 0 | |  | 7 |
| 3. | M136 | Mathematics 1 | 1 | AG | O | | | 4 | 3 | | 0 | |  | 7 |
| 4. | K101 | English language 1 | 1 | AG | O | | | 2 | 1 | | 0 | |  | 5 |
| 5. |  | Courses of elective block 1  (one course) | 1 | PA | EB | | | 1 | 1 | | 0 | |  | 3 |
| 6. | K105 | English language 2 | 2 | AG | O | | | 2 | 1 | | 0 | |  | 5 |
| 7. | C102 | Inorganic Chemistry 1 | 2 | TM | O | | | 4 | 4 | | 0 | |  | 9 |
| 8. | C103 | Analytical Chemistry 1 | 2 | TM | O | | | 2 | 5 | | 0 | |  | 6 |
| 9. | P197 | Physics 2 | 2 | AG | O | | | 2 | 0 | | 0 | |  | 3 |
| 10. |  | Courses of elective block 2  (one course) | 2 | AG | EB | | | 2 | 2 | | 0 | |  | 6 |
| **Total classes (L/E +OFT/other classes) and credits in year** | | | | | | | | **27** | **24** | | **0** | |  | **60** |
| **Total classes of active teaching in year** | | | | | | | | **765** | | | | |  |  |
|  | | | | | | | |  | | | | |  |  |
| **SECOND YEAR** | | | | | | | | | | | | | | |
| 11. | C106 | Organic Chemistry 1 | 3 | TM | O | | | 4 | 4 | | 0 | |  | 9 |
| 12. | C107 | Physical Chemistry 1 | 3 | TM | O | | | 4 | 4 | | 0 | |  | 8 |
| 13. | C108 | Analytical Chemistry 2 | 3 | SP | O | | | 2 | 4 | | 0 | |  | 8 |
| 14. |  | Courses of elective block 3  (one course) | 3 | PA | EB | | | 2 | 4 | | 0 | |  | 7 |
| 15. | C109 | Organic Chemistry 2 | 4 | SP | O | | | 4 | 4 | | 0 | |  | 9 |
| 16. | C110 | Physical Chemistry 2 | 4 | SP | O | | | 4 | 3 | | 0 | |  | 9 |
| 17. | C111 | Analytical Chemistry 3 | 4 | SP | O | | | 2 | 4 | | 0 | |  | 7 |
| 18. |  | Courses of elective block 4  (one course) | 4 | PA | EB | | | 2(1)\* | 0(2)\* | | 0 | |  | 3 |
| **Total classes (L/E +OFT/other classes) and credits in year** | | | | | | | | **24(23)\*** | **27(29)\*** | | **0** | |  | **60** |
| **Total classes of active teaching in year** | | | | | | | | **765(780)\*** | | | | |  |  |
|  | | | | | | | |  | | | | |  |  |
| **THIRD YEAR** | | | | | | | | | | | | | | |
| 19. | C116 | Instrumental Analytical Chemistry 1 | 5 | SP | | O | | 3 | 4 | | 0 | |  | 8 |
| 20. | C143 | Inorganic Chemistry 2 | 5 | SP | | O | | 4 | 4 | | 0 | |  | 8 |
| 21. | K109 | Psychology | 5 | AG | | O | | 2 | 0 | | 0 | |  | 4 |
| 22. | C144 | Methods in Chemistry Teaching 1 | 5 | TM | | O | | 2 | 1 | | 0 | |  | 3 |
| 23. |  | Courses of elective block 5 (one course) | 5 | SP | | EB | | 3 | 3 | | 0 | |  | 6 |
| 24. | C120 | Natural Product Chemistry | 6 | TM | | O | | 3 | 3 | | 0 | |  | 7 |
| 25. | C145 | Methods in Chemistry Teaching 2 | 6 | TM | | O | | 2 | 2 | | 0 | |  | 4 |
| 26. | C146 | Organic Chemistry 3 | 6 | SP | | O | | 4 | 3 | | 0 | |  | 7 |
| 27. | K110 | Pedagogy | 6 | PA | | O | | 2 | 0 | | 0 | |  | 4 |
| 28. |  | Courses of elective block 6 (one course) | 6 | SP | | EB | | 2 | 2 | | 0 | |  | 3 |
| 29. |  | Courses of elective block 7 (one course) | 6 | SP | | EB | | 3 | 3 | | 0 | |  | 6 |
| **Total classes (L/E +OFT/other classes) and credits in year** | | | | | | | | **30** | **25** | | **0** | |  | **60** |
| **Total classes of active teaching in year** | | | | | | | | **825** | | | | |  |  |
|  | | | | | | | |  | | | | |  |  |
| **FOURTH YEAR** | | | | | | | | | | | | | | |
| 30. | C127 | Basics of Organic and Biochemical Spectroscopy 1 | 7 | SP | | | O | 2 | | 3 | | 0 |  | 5 |
| 31. | C128 | Biochemistry | 7 | TM | | | O | 3 | | 3 | | 0 |  | 6 |
| 32. | C149 | Methods in Chemistry Teaching 3 | 7 | TM | | | O | 2 | | 3 | | 0 |  | 7 |
| 33. | C150 | Experiments in Chemistry Teaching | 7 | PA | | | O | 1 | | 3 | | 0 |  | 4 |
| 34. | K111 | Andragogy | 7 | PA | | | O | 2 | | 0 | | 0 |  | 3 |
| 35. | K112 | Developmental Psychology | 7 | PA | | | O | 2 | | 0 | | 0 |  | 3 |
| 36. | C131 | Basics of Organic and Biochemical Spectroscopy 2 | 8 | SP | | | O | 2 | | 2 | | 0 |  | 5 |
| 37. | C132 | Analitycal Environmental Chemistry | 8 | SP | | | O | 1 | | 2 | | 0 |  | 3 |
| 38. | C158 | Organic Environmental Chemistry | 8 | SP | | | O | 1 | | 2 | | 0 |  | 3 |
| 39. | C151 | Scholar Practice | 8 | PA | | | O | 1 | | 3 | | 0 |  | 8 |
| 40. |  | Courses of elective block 8 (one course) | 8 | SP | | | EB | 2 | | 2 | | 0 |  | 5 |
| 41. |  | Courses of elective block 9 (one course) | 8 | AG | | | EB | 2 | | 0 | | 0 |  | 2 |
| 42. | C100 | Final Exam | 8 | PA | | | O | 0 | | 0 | | 0 |  | 6 |
| **Total classes (L/E +OFT/other classes) and credits in year** | | | | | | | | **21** | | **23** | | **0** |  | **60** |
| **Total classes of active teaching in year** | | | | | | | | **660** | | | | |  |  |
| **Total classes of active teaching, other classes and credits for all study years** | | | | | | | | **3015(3030)\***  **240 ECTS** | | | | |  |  |

\*Number of classes of active teachingdepending on the electivity

**The list of elective courses in the study program**

UNDERGRADUATE ACADEMIC STUDIES **CHEMISTRY - Professor of Chemistry**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **C** | **Course Title** | **Course Type** | **Course Status** | **Active teaching** | | | | **ECTS** |
| **L** | **E** | **OFT** | **SR** |
| Courses of elective block 1 | | | | | | | | | |
| 1. | C104 | Measurements and Calculations | PA | EB | 1 | 1 | 0 |  | 3 |
| 2. | C105 | Chemical Theory of Graphs | PA | EB | 1 | 1 | 0 |  | 3 |
| Courses of elective block 2 | | | | | | | | | |
| 1. | M137 | Mathematics 2 | AG | EB | 2 | 2 | 0 |  | 6 |
| 2. | B140 | Basics of Ecology | AG | EB | 2 | 2 | 0 |  | 6 |
| Courses of elective block 3 | | | | | | | | | |
| 1. | C112 | Computers in Chemistry 1 | PA | EB | 2 | 4 | 0 |  | 7 |
| 2. | C113 | Computers in Chemistry 2 | PA | EB | 2 | 4 | 0 |  | 7 |
| Courses of elective block 4 | | | | | | | | | |
| 1. | C114 | Semi-micro and Micro Methods of Analysis | PA | EB | 1 | 2 | 0 |  | 3 |
| 2. | C115 | Computer Programming in Chemistry | PA | EB | 2 | 0 | 0 |  | 3 |
| Courses of elective block 5 | | | | | | | | | |
| 1. | C118 | Industrial Chemistry 1 | SP | EB | 3 | 3 | 0 |  | 6 |
| 2. | C147 | Inorganic Industrial Pollutants | SP | EB | 3 | 3 | 0 |  | 6 |
| Courses of elective block 6 | | | | | | | | | |
| 1. | C123 | Selected Chapters of Inorganic Chemistry | SP | EB | 2 | 2 | 0 |  | 3 |
| 2. | C124 | Instrumental Analitycal Chemistry 2 | SP | EB | 2 | 2 | 0 |  | 3 |
| Courses of elective block 7 | | | | | | | | | |
| 1. | C121 | Industrial Chemistry 2 | SP | EB | 3 | 3 | 0 |  | 6 |
| 2. | C148 | Organic Industrial Pollutants | SP | EB | 3 | 3 | 0 |  | 6 |
| Courses of elective block 8 | | | | | | | | | |
| 1. | C139 | Structural Inorganic Chemistry | SP | EB | 2 | 2 | 0 |  | 5 |
| 2. | C140 | Solution Chemistry | SP | EB | 2 | 2 | 0 |  | 5 |
| 3. | C157 | Molecular Modelling in Chemistry Teaching | SP | EB | 2 | 2 | 0 |  | 5 |
| Courses of elective block 9 | | | | | | | | | |
| 1. | C141 | Philosophy and History of Chemistry | AG | EB | 2 | 0 | 0 |  | 2 |
| 2. | C142 | Mathematical Methods in Chemistry | AG | EB | 2 | 0 | 0 |  | 2 |

**A distribution of the study program courses into semesters and academic years**

UNDERGRADUATE ACADEMIC STUDIES **CHEMISTRY – Environmental Chemist**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **C** | **Course Title** | **S** | **Course Type** | **Course Status** | | | **Active teaching** | | | | | **Other classes** | **ECTS** |
| **L** | **E** | | **OFT** | |
| **FIRST YEAR** | | | | | | | | | | | | | | |
| 1. | C101 | General Chemistry | 1 | TM | O | | | 4 | 4 | | 0 | |  | 9 |
| 2. | P198 | Physics 1 | 1 | AG | O | | | 4 | 3 | | 0 | |  | 7 |
| 3. | M136 | Mathematics 1 | 1 | AG | O | | | 4 | 3 | | 0 | |  | 7 |
| 4. | K101 | English language 1 | 1 | AG | O | | | 2 | 1 | | 0 | |  | 5 |
| 5. |  | Courses of elective block 1  (one course) | 1 | PA | EB | | | 1 | 1 | | 0 | |  | 3 |
| 6. | K105 | English language 2 | 2 | AG | O | | | 2 | 1 | | 0 | |  | 5 |
| 7. | C102 | Inorganic Chemistry 1 | 2 | TM | O | | | 4 | 4 | | 0 | |  | 9 |
| 8. | C103 | Analytical Chemistry 1 | 2 | TM | O | | | 2 | 5 | | 0 | |  | 6 |
| 9. | P197 | Physics 2 | 2 | AG | O | | | 2 | 0 | | 0 | |  | 3 |
| 10. |  | Courses of elective block 2  (one course) | 2 | AG | EB | | | 2 | 2 | | 0 | |  | 6 |
| **Total classes (L/E +OFT/other classes) and credits in year** | | | | | | | | **27** | **24** | | **0** | |  | **60** |
| **Total classes of active teaching in year** | | | | | | | | **765** | | | | |  |  |
|  | | | | | | | |  | | | | |  |  |
| **SECOND YEAR** | | | | | | | | | | | | | | |
| 11. | C106 | Organic Chemistry 1 | 3 | TM | O | | | 4 | 4 | | 0 | |  | 9 |
| 12. | C107 | Physical Chemistry 1 | 3 | TM | O | | | 4 | 4 | | 0 | |  | 8 |
| 13. | C108 | Analytical Chemistry 2 | 3 | SP | O | | | 2 | 4 | | 0 | |  | 8 |
| 14. |  | Courses of elective block 3  (one course) | 3 | PA | EB | | | 2 | 4 | | 0 | |  | 7 |
| 15. | C109 | Organic Chemistry 2 | 4 | SP | O | | | 4 | 4 | | 0 | |  | 9 |
| 16. | C110 | Physical Chemistry 2 | 4 | SP | O | | | 4 | 3 | | 0 | |  | 9 |
| 17. | C111 | Analytical Chemistry 3 | 4 | SP | O | | | 2 | 4 | | 0 | |  | 7 |
| 18. |  | Courses of elective block 4  (one course) | 4 | PA | EB | | | 2(1)\* | 0(2)\* | | 0 | |  | 3 |
| **Total classes (L/E +OFT/other classes) and credits in year** | | | | | | | | **24(23)\*** | **27(29)\*** | | **0** | |  | **60** |
| **Total classes of active teaching in year** | | | | | | | | **765(780)\*** | | | | |  |  |
|  | | | | | | | |  | | | | |  |  |
| **THIRD YEAR** | | | | | | | | | | | | | | |
| 19. | C116 | Instrumental Analytical Chemistry 1 | 5 | SP | | O | | 3 | 4 | | 0 | |  | 8 |
| 20. | C143 | Inorganic Chemistry 2 | 5 | SP | | O | | 4 | 4 | | 0 | |  | 8 |
| 21. | C147 | Inorganic Industrial Pollutants | 5 | SP | | O | | 3 | 3 | | 0 | |  | 6 |
| 22. | C133 | Chemistry of Atmosphere | 5 | SP | | O | | 2 | 2 | | 0 | |  | 6 |
| 23. | C152 | Quality System | 6 | AG | | O | | 3 | 2 | | 0 | |  | 9 |
| 24. | C146 | Organic Chemistry 3 | 6 | SP | | O | | 4 | 3 | | 0 | |  | 7 |
| 25. | C159 | Biochemistry of Primary Biomolecules | 6 | SP | | O | | 3 | 3 | | 0 | |  | 7 |
| 26. | C148 | Organic Industrial Pollutants | 6 | SP | | O | | 3 | 3 | | 0 | |  | 6 |
| 27. |  | Courses of elective block 5 (one course) | 6 | SP | | EB | | 2 | 2 | | 0 | |  | 3 |
| **Total classes (L/E +OFT/other classes) and credits in year** | | | | | | | | **27** | **26** | | **0** | |  | **60** |
| **Total classes of active teaching in year** | | | | | | | | **795** | | | | |  |  |
|  | | | | | | | |  | | | | |  |  |
| **FOURTH YEAR** | | | | | | | | | | | | | | |
| 28. | C160 | Basics of Toxicological Analysis 1 | 7 | SP | | | O | 4 | | 4 | | 0 |  | 9 |
| 29. | C161 | Biochemistry of Secondary Biomolecules | 7 | TM | | | O | 3 | | 3 | | 0 |  | 6 |
| 30. | C153 | Methods of Toxic Substances Analysis | 7 | PA | | | O | 2 | | 3 | | 0 |  | 5 |
| 31. |  | Courses of elective block 6 (one course) | 7 | SP | | | EB | 2 | | 2 | | 0 |  | 6 |
| 32. | C154 | Regulations in Environmental Protection | 8 | PA | | | O | 2 | | 2 | | 0 |  | 5 |
| 33. |  | Courses of elective block 7 (one course) | 8 | PA | | | EB | 2 | | 2 | | 0 |  | 5 |
| 34. |  | Courses of elective block 8 (three courses) | 8 | PA | | | EB | 2 | | 2 | | 0 |  | 6 |
| 35. | C100 | Final Exam | 8 | PA | | | O | 0 | | 0 | | 0 |  | 6 |
| **Total classes (L/E +OFT/other classes) and credits in year** | | | | | | | | **21** | | **22** | | **0** |  | **60** |
| **Total classes of active teaching in year** | | | | | | | | **645** | | | | |  |  |
| **Total classes of active teaching, other classes and credits for all study years** | | | | | | | | **2970(2985)**  **240 ECTS** | | | | |  |  |

\*Number of classes of active teachingdepending on the electivity

**The list of elective courses in the study program**

UNDERGRADUATE ACADEMIC STUDIES **CHEMISTRY - Environmental Chemist**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **C** | **Course Title** | **Course Type** | **Course Status** | **Active teaching** | | | | **ECTS** |
| **L** | **E** | **OFT** | **SR** |
| Courses of elective block 1 | | | | | | | | | |
| 1. | C104 | Measurements and Calculations | PA | EB | 1 | 1 | 0 |  | 3 |
| 2. | C105 | Chemical Theory of Graphs | PA | EB | 1 | 1 | 0 |  | 3 |
| Courses of elective block 2 | | | | | | | | | |
| 1. | M137 | Mathematics 2 | AG | EB | 2 | 2 | 0 |  | 6 |
| 2. | B140 | Basics of Ecology | AG | EB | 2 | 2 | 0 |  | 6 |
| Courses of elective block 3 | | | | | | | | | |
| 1. | C112 | Computers in Chemistry 1 | PA | EB | 2 | 4 | 0 |  | 7 |
| 2. | C113 | Computers in Chemistry 2 | PA | EB | 2 | 4 | 0 |  | 7 |
| Courses of elective block 4 | | | | | | | | | |
| 1. | C114 | Semi-micro and Micro Methods of Analysis | PA | EB | 1 | 2 | 0 |  | 3 |
| 2. | C115 | Computer Programming in Chemistry | PA | EB | 2 | 0 | 0 |  | 3 |
| Courses of elective block 5 | | | | | | | | | |
| 1. | C123 | Selected Chapters of Inorganic Chemistry | SP | EB | 2 | 2 | 0 |  | 3 |
| 2. | C124 | Instrumental Analitycal Chemistry 2 | SP | EB | 2 | 2 | 0 |  | 3 |
| Courses of elective block 6 | | | | | | | | | |
| 1. | C155 | Chemistry of Natural and Waste Waters | SP | EB | 2 | 2 | 0 |  | 6 |
| 2. | P134 | Radiation Physics | SP | EB | 2 | 2 | 0 |  | 6 |
| 3. | B163 | Cell Biochemistry | SP | EB | 2 | 2 | 0 |  | 6 |
| Courses of elective block 7 | | | | | | | | | |
| 1. | C163 | Basics of Toxicological Analysis 2 | PA | EB | 2 | 2 | 0 |  | 5 |
| 2. | C156 | Estimation of Environmental Impact | PA | EB | 2 | 2 | 0 |  | 5 |
| Courses of elective block 8 | | | | | | | | | |
| 1. | C137 | International Standardization and Acreditation Regulations | PA | EB | 2 | 2 | 0 |  | 6 |
| 2. | C126 | Selected Chapters of Organic Chemistry | PA | EB | 2 | 2 | 0 |  | 6 |
| 3. | C136 | Analytics of Natural and Waste Waters | PA | EB | 2 | 2 | 0 |  | 6 |
| 4. | C162 | Applied Microorganism Biochemistry | PA | EB | 2 | 2 | 0 |  | 6 |
| 5. | C138 | Molecular Modelling 1 | PA | EB | 2 | 2 | 0 |  | 6 |