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| | **UNIVERSITY OF EAST SARAJEVO**<br>Faculty of Technology Zvornik | |
| | ***Study programme:*** *Chemical Engineering and Technology* | |
| | Cycle I / Year II | |

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|---|---|
| **Course title** | Instrumental Methods |
| **Department** | Department for Chemistry– Faculty of Technology Zvornik |

| **Course code** | **Course status** | **Semester** | **ECTS** |
|---|---|---|---|
| 04-1-021-4 | Compulsory | IV | 5 |

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| **Teacher** | Zoran Obrenović, PhD, Associate Professor |
| **Teaching assistant** | Milomirka Obrenović, MSc, Senior Teaching Assitant |

| **Number of classes/ teaching workload (per week)** | | | **Individual student workload (in hours per semester)** | | | **Student workload coefficient $S_o$** |
|---|---|---|---|---|---|---|
| **Lectures** | **Auditory exercises** | **Laboratory exercises** | **Lectures** | **Auditory exercises** | **Laboratory exercises** | **$S_o$** |
| 2 | 0 | 2 | 45 | 45 | 0 | 1.50 |
| 2*15+0*15+2*15=60 hours | | | (2*15*1.50 + 0*15*1.50 + 2*15*1.50)=90 hours | | | |
| Total course workload 60 + 90 = 150 hours per semester | | | | | | |

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| **Learning outcomes** | After finishing the course, students will be able to:<br><br>1. demonstrate and utilize the knowledge of the principles and procedures of instrumental analysis<br>2. apply the appropriate instrumental analytical procedure and apparatus for the necessary analytical testing<br>3. conduct correct sampling, prepare the sample, and perform the instrumental analytical procedure<br>4. correctly display the results of the analysis in the prescribed units. |
| **Prerequisites** | None. |
| **Teaching methods** | Lectures, experimental exercises, calculations, mid-term tests (colloquia), consultations. |
| **Syllabus outline per week** | 1. Instrumental methods in modern analytical chemistry, Preparation of representative samples<br>2. Measurement, accuracy, precision, types and causes of errors, basic statistical processing of results<br>3. Ion exchange resins, ion exchange balance, application of ion exchangers in analytics;<br>4. Chromatography, theoretical basis, division of chromatographic methods<br>5. Application of chromatography in analysis, gas, liquid, and paper chromatography<br>6. Colorimetry and photometry, theoretical basis, typical colorimeters and photometers and application in determinations<br>7. Atomic absorption spectroscopy (AAS) , theoretical basis and Mid-term test 1<br>8. Apparatus for AAS, application in modern analytics, advantages and limitations<br>9. Polarimetry, polarized light, properties and regularities of the phenomenon of rotation of the plane of polarized light; polarimeters, construction and analytical application<br>10. Polarimetry, polarized light, properties and laws of occurrence of plane rotation of polarized light; polarimeters, construction and analytical application<br>11. Thermometry, differential thermal analysis, thermogravimetric analysis, thermometric titration<br>12. Electroanalytical methods, classification and application in determinations, Principles of conductometry<br>13. Direct conductometry, conductometric titration<br>14. Potentiometry, theoretical basis, indicator and reference electrodes<br>15. Measurement of rN-value, ion-selective electrode and rX-metry Mid-term test 2 |

**Obligatory reading**

| **Author** | **Title, publisher** | **Year** | **Pages** |
|---|---|---|---|
| Станојевић, Д. | Аналитичка хемија, "Српска књига", Рума-Београд | 2004 | 173-261 |
| Мишовић, Ј., Аст, Т. | Инструменталне методе хемијске анализе, ТМФ, Београд | 2000 | 9-205 |
| | | | |

| Additional reading | | | |
|---|---|---|---|
| **Author** | **Title, publisher** | **Year** | **Pages** |
| Фотић, Љ. | Инструменталне методе хемијске анализе, Практикум за вежбе, ТМФ, Београд | 1990 | - |
| Gunzler, H., Williams, A. | Handbook of analytical technics, Wiley VCH | 2001 | 173-323 |
| Harvey, D. | Modern Analytical chemistry, The McGraw Hill Co, New York | 2000 | 461-615 |

| | **Type of student evaluation** | **Grade points** | **Percentage** |
|---|---|---|---|
| **Obligations, assessment methods and grading system** | Pre-exam obligations | | |
| | Attendance | 6 | 6 % |
| | Laboratory exercises | 36 | 36 % |
| | Two mid-term tests - theory | 14+14 | 28 % |
| | Final examination | | |
| | Final examination (oral/written) | 30 | 30 % |
| | Total | 100 | 100 % |
| **Web page** | www.tfzv.ues.rs.ba | | |
| **Date** | 2023 | | |