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| Course ID: HAH478 | Course name: ANALYTICAL QUALITY CONTROL SYSTEMS | | |
| Cycle: FIRST | Year: FOURTH | Semester: VII | ECTS credits: 5 |
| Course status: MANDATORY | | Total course hours: 60 Lectures: 30 Laboratory: 30 | |
| Teaching participants: | Teachers and associates with expertise in the field to which the subject belongs | | |
| Prerequisite for enrollment: | - | | |
| Course aims: | Acquisition of basic knowledge in the field of certification, accreditation and introduction of quality systems in the chemical testing laboratory of the environment and assessment of water, air and soil quality in relation to relevant specifications | | |
| Thematic course units: | <ol style="list-style-type: none">1. Quality, concept and definitions, various aspects of quality in the environment2. Development of the quality management system for environment3. International standards for a quality management system4. Management system documentation5. Quality management6. Quality assurance, quality control (QA/QC)7. Quality system certification8. Midterm9. Accreditation of environmental testing laboratories according to ISO 1702510. Quality system management requirements11. Technical requirements ISO 1702512. Accreditation process for environmental testing laboratories13. Compliance of water quality with relevant specifications14. Compliance of air quality with relevant specifications15. Compliance of soil quality with relevant specifications | | |
| Learning outcomes: | After completing the course, the student will be able to: - define the elements of the quality system in the environmental testing laboratory - distinguish between quality control and quality assurance in the environmental testing laboratory | | |

| | <ul style="list-style-type: none"> - assess the quality of environmental samples - prepare an environmental testing laboratory for certification and accreditation according to ISO methods - recognize the importance and requirements for laboratory accreditation - find and interpret information on compliance of water, air and soil quality with relevant specifications, national and international documents | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|------------------|--|--|----------|---------------|----------------|---------------------|---|---|----------------------|----|---|-------------|----|----|---------------|----|----|-------|-----|----|---|--|--|--------------------|--|--|-------|-------------|--------------|------|---|-------|-------|---|---|-------|---|---|-------|---|---|-------|---|---|--------|----|---|
| Teaching methodology: | <p>Lectures Laboratory exercises</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Assessment methods and grading system¹: | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3" style="text-align: center;">Grading criteria</th> </tr> <tr> <th style="width: 60%;">Criteria</th> <th style="width: 20%;">Maximal score</th> <th style="width: 20%;">Required score</th> </tr> </thead> <tbody> <tr> <td>1. Class attendance</td> <td style="text-align: center;">5</td> <td style="text-align: center;">3</td> </tr> <tr> <td>2. Class activities*</td> <td style="text-align: center;">15</td> <td style="text-align: center;">8</td> </tr> <tr> <td>3. Midterms</td> <td style="text-align: center;">40</td> <td style="text-align: center;">22</td> </tr> <tr> <td>4. Final exam</td> <td style="text-align: center;">40</td> <td style="text-align: center;">22</td> </tr> <tr> <td style="text-align: center;">Total</td> <td style="text-align: center;">100</td> <td style="text-align: center;">55</td> </tr> <tr> <td colspan="3" style="text-align: center;">* Class activity is scored through the engagement of students in laboratory exercises</td> </tr> <tr> <th colspan="3" style="text-align: center;">Scores and grading</th> </tr> <tr> <th style="width: 40%;">Score</th> <th style="width: 30%;">Grade (BiH)</th> <th style="width: 30%;">Grade (ECTS)</th> </tr> <tr> <td style="text-align: center;">< 55</td> <td style="text-align: center;">5</td> <td style="text-align: center;">F, FX</td> </tr> <tr> <td style="text-align: center;">55–64</td> <td style="text-align: center;">6</td> <td style="text-align: center;">E</td> </tr> <tr> <td style="text-align: center;">65–74</td> <td style="text-align: center;">7</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;">75–84</td> <td style="text-align: center;">8</td> <td style="text-align: center;">C</td> </tr> <tr> <td style="text-align: center;">85–94</td> <td style="text-align: center;">9</td> <td style="text-align: center;">B</td> </tr> <tr> <td style="text-align: center;">95–100</td> <td style="text-align: center;">10</td> <td style="text-align: center;">A</td> </tr> </tbody> </table> | Grading criteria | | | Criteria | Maximal score | Required score | 1. Class attendance | 5 | 3 | 2. Class activities* | 15 | 8 | 3. Midterms | 40 | 22 | 4. Final exam | 40 | 22 | Total | 100 | 55 | * Class activity is scored through the engagement of students in laboratory exercises | | | Scores and grading | | | Score | Grade (BiH) | Grade (ECTS) | < 55 | 5 | F, FX | 55–64 | 6 | E | 65–74 | 7 | D | 75–84 | 8 | C | 85–94 | 9 | B | 95–100 | 10 | A |
| Grading criteria | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 1. Class attendance | 5 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. Class activities* | 15 | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. Midterms | 40 | 22 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4. Final exam | 40 | 22 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | 100 | 55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| * Class activity is scored through the engagement of students in laboratory exercises | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scores and grading | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 55–64 | 6 | E | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 65–74 | 7 | D | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 75–84 | 8 | C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 85–94 | 9 | B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 95–100 | 10 | A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Literature²: | <p>Mandatory literature:</p> <ol style="list-style-type: none"> 1. V. V. Velagić, Analitička kontrola kvaliteta, Studentska štamparija Univerziteta, Sarajevo 1997. 2. M. Kaštelan-Macan, Kemijska analiza u sustavu kvalitete, Školska knjiga, Zagreb 2003. 3. B. Magnusson and U. Örnemark (eds.) Eurachem Guide: The fitness for purpose of analytical methods – A laboratory guide to method validation and related topics (2nd ed. 2014). ISBN 978-91-87461-59-0. 4. V. Barwick (Ed), Eurachem/CITAC Guide: Guide to Quality in Analytical Chemistry: An Aid to | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

¹ The grading structure for each subject is determined by the Council of the organizational unit before the beginning of the academic year in which the subject is taught as per Article 64, paragraph 6 of the Law on Higher Education of Sarajevo Canton

² The Senate of the higher education institution, as an institution, or the Council of the organizational unit of the higher education institution, as a public institution, determines by a special decision, which is published on its website before the beginning of the academic year obligatory, mandatory and recommended textbooks and manuals, as well as other recommended literature based on which exams are prepared and taken as per Article 56, paragraph 3 of the Law on Higher Education of the Sarajevo Canton

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Supplementary literature:

1. BAS EN ISO/IEC 17025
2. BAS EN ISO/IEC 14001
3. BAS EN ISO 9001