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| **Study program** Applied chemistry with the management basics |
| **Course title** Water and wastewater technology (H263C) |
| **Name of lecturer/lecturers** Jelena Z. Mitrović |
| **Type of course** Elective |
| **Number of ECTS allocated** 7 |
| **Course objectives**Acquisition of theoretical and practical knowledge about the characteristics of natural and waste water. Training student for the application of knowledge and skills in drinking water preparation technology, as well as introducing the student to mechanical, chemical and biological processes of wastewater treatment. |
| **Course outcomes**After successful completion of this course, the student is able to:- analyze the physical, chemical and microbiological characteristics of natural and waste water,- explain and apply classic procedures in the treatment of drinking water,- describe the mechanical, chemical and biological processes of wastewater treatment,- apply different procedures for processing and disposal of sludge from the wastewater treatment process,- predict the rational use of water in a specific production process and the possibility of water recycling. |
| **SYLLABUS***Lectures*Chemical and microbiological aspects of drinking water; drinking water quality control. Water clarification by coagulation/flocculation and filtration. Removal of mineral substances from water: thermal and chemical water softening procedures, ion exchange water softening. Deferrization and demanganization of water. Removal of dissolved gases from water; Water deodorization. Disinfection of water with chlorine. Ozonation of water. Origin and characterization of wastewater. Mechanical treatment of wastewater. Chemical wastewater treatment. Biological treatment of wastewater. Final treatment of wastewater. Recycling and discharge of wastewater. Waste sludge from the wastewater treatment process., their processing and disposal.*Laboratory work*Thermal decarbonization of water; Water softening with lime and ion exchange. Deferrization and demanganization of water. Water clarification by coagulation/flocculation. Decomposition of organic pollutants in water by the UV/H2O2 process. Purification of wastewater by the process of electrooxidation. Removal of heavy metals from water by biosorption - optimization of the process. Removal of heavy metals from water by biosorption - kinetic and equilibrium testing. |
| **References**1. Gaćeša S., Klašnja M., Tehnologija vode i otpadnih voda, Jugoslovensko udruženje pivara, Beograd, 1994.
2. Ljubisavljević D., Prečišćavanje otpadnih voda, Građevinski fakultet, Beograd, 2004.
3. Crittenden J., Trusell R., Hand D. Howe K., Tchobanoglous G., Water treatment: Principle and design, 3rd ed. John Willey and sons, New Jersey, 2012.
4. A series of electronic teaching materials developed in the framework of ERASMUS+ NETCHEM project (http://mdl.netchem.ac.rs/course/view.php?id=7).
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| **Active teaching classes** | **Lectures** 45 | **Laboratory work** 30 |
| **Teaching mode**lectures, laboratory exercises and consultations |
| **ASSESSMENT METHODS AND CRITERIA (Max 100 points)** |
| **Pre exam duties** | **Points** | **Final exam**  | **Points** |
| Activity during lectures | 5 | Written examination | 40 |
| Practical teaching | 10 | Oral examination | 20 |
| Teaching colloquia | 10 |  |  |
| Seminar | 20 |  |  |