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| **Study program** Master Studies |
| **Course title** Advanced course in industrial chemistry (H207C) |
| **Name of lecturer/lecturers** Aleksandra R. Zarubica, Marjan S. Ranđelović |
| **Type of course** Obligatory |
| **Number of ECTS allocated** 5 |
| **Course objectives**The student should learn about different chemical principles and physico-chemical laws on which the work of chemical reactors is based, the fundamental principles of heterogeneous processes, and the principles of mass and energy exchange; the principles by which numerous interactions of reactants take place, which is the basis of various technological processes in the modern chemical industry. |
| **Course outcomes**Having finished this course successfully, a student will be able to apply the acquired theoretical and practical knowledge, the student acquires the ability to independently or in a group (teamwork) solve problems in the production processes of inorganic and organic compounds, in the production of various products modern food industry, and to contribute to the development of new, unconventional technologies in the function of sustainable development, as well as to improve existing technologies, especially green technologies, to the development and implementation of new ones. |
| **SYLLABUS***Lectures*Principles of mass transfer in heterogeneous processes - higher course; Principles of energy exchange in heterogeneous processes - higher course; Principles of solid phase interaction with reactants in liquid and/or gas phase (catalytic and/or adsorption processes) – general approach; Disorder in solid phases - crystals and the influence on the properties of solid bodies/crystals; Principles of catalytic processes - general approach; Principles of crystallization processes - general approach; Principles of photochemical and plasmachemical processes – general approach; Principles and interconnection of redox processes and corrosion processes, and oxidation, burning and detonation processes; Chemical technologies of artificial fertilizers; Chemical technology of pulp and paper - higher course; Chemical technology of ceramics production - higher course; Chemical technology of plastics; Chemical technology of beer production - higher course; Chemical technology of production of drinks with a high alcohol content - brandy, vodka, whiskey, etc.; Chemical technology of fruit processing and productionof fruit products; Chemical technology of vegetable processing and production of vegetable products; Chemical technology of wine production; Environmental problems of the modern chemical industry, modern technologies to overcome.*Laboratory work* Fertilizer; Production of phenol-formaldehyde resin; Obtaining ceramic materials; Testing the resistance of organiccoatings to chemical agents; Water content in final industrial products - distillation according to Dean-Stark;Hydrotreating process of aromatic compounds from modern industry; Obtaining reformulated fuels; Removal of pollutants from water with selected catalytic materials; Removal of cationic pollutants from water with selected adsorption materials; Content of carbon(IV)-oxide in beer; Content of carbon(IV)-oxide in carbonated juices; Wine quality parameters; Quality of selected fruit products; Quality of selected vegetable products; Field teaching - visit to the beer industry; Field teaching – visit fruit juice industry; Field teaching - visit to the industry of selected ceramic products; Field teaching - visit to the industry that regulates environmental problems of modern industry - waste water treatment. |
| **References**1. M. Purenović, A. Bojić, Osnovni principii procesi u industrijskoj hemiji, Faculty of Science, Niš, 2005.2. M. Purenović, Reakcije u čvrstim telima i na njihovoj površini, Faculty of Philosophy, Niš, 1994.3. D. Vitorović, Hemijska tehnologija, Faculty of Science, Belgrade, 1973.4. M. Purenović, M. Miljković, Odabrana poglavlja neorganske i organske hemijske tehnologije, Faculty of Science, Niš, 2005.5. O. Levenspiel, Chemical Reaction Engineering, John Wiley & Sons, New York, 1979 (and later editions).6. V. Srdić, Procesiranje novih keramičkih materijala, Faculty of Technology, Novi Sad, 2004.7. A. Bojić, A. Zarubica, Praktikum za vežbe iz industrijske hemije, Faculty of Science, Niš, 2007. |
| **Active teaching classes** | **Lectures**  45 | **Laboratory work**  30 |
| **Teaching mode**Lectures, interactive teaching, field teaching, laboratory exercises, consultations. |
| **ASSESSMENT METHODS AND CRITERIA (Max 100 points)** |
| **Pre exam duties** | **Points** | **Final exam**  | **Points** |
| Activity during lectures | 10 | Written examination | 20 |
| Practical teaching | 10 | Oral examination | 40 |
| Teaching colloquia | 20 |  |  |
| Seminar | - |  |  |