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|  **UNIVERSITY OF NIŠ** |
| **Course Unit Descriptor** | **Faculty**  | Faculty of Science and Mathematics |
| **GENERAL INFORMATION** |
| Study program  | **Chemistry**  |
| Study Module (if applicable) |  |
| Course title | Bases of materials technology |
| Level of study | [x] Bachelor [ ]  Master’s [ ]  Doctoral |
| Type of course | [ ]  Obligatory [x]  Elective |
| Semester  |  [x]  Autumn [ ] Spring |
| Year of study  |  |
| Number of ECTS allocated | 5 |
| Name of lecturer/lecturers | Aleksandra R. Zarubica |
| Teaching mode |  [x] Lectures [ ] Group tutorials [ ]  Individual tutorials [x] Laboratory work [x]  Project work [ ]  Seminar [ ] Distance learning [ ]  Blended learning [ ]  Other |
| **PURPOSE AND OVERVIEW (max. 5 sentences)** |
| *Earning basic knowledge of designing and synthesis of traditional and modern materials, and basic chemical reactions that take place during synthesis. Adopting of basic knowledge, earning ability and experiences in physico-chemical characterization of materials, and their application in selected processes – heterogeneous catalysis and/or adsorption.**Student should be able to:** *set basic elements and parameters of material synthesis of given chemical composition;*
* *list basic chemical and physical-chemical reactions that take place during synthesis;*
* *list and compare basic physical-chemical methods for materials characterization;*
* *predict and explain influence of selected fundamental physical-chemical characteristics of materials in manner of their efficiency during application;*
* *draw basic graphic dependences of selected characteristics of materials with demonstrated activities in simple/particular application processes;*
* *Adequately present fundamental and empirical data in oral and/or written form.*
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| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** |
| LecturesBasics of ceramic materials processing (2 cl); Relationship of processing, structure and characteristics of materials (2 cl); Synthesis of ceramic powders: Creating/formation of solid phase particles (2 cl); Traditional methods of ceramic powders synthesis: Methods of synthesis from solid phase (2 cl); Modern methods of ceramic powders synthesis: Liquid phase synthesis (2 cl); Ceramic powders synthesis by spraying (2 cl); Steam/gas phase synthesis of ceramic powders (4 cl); Preparation of polycrystalline monolithic ceramics – stages in process obtaining, shaping as a phase in processing of ceramic materials (2 cl); Drying as a phase in ceramic materials processing (2 cl); Sintering as a phase in ceramic materials processing (2 cl); Application of ceramic powders and polycrystalline monolithic ceramics (2 cl); Glass – basic characteristics of process obtaining, preparation of glasses by merging method (2 cl); Sintering processing in glasses production (2 cl).Practices Synthesis of MO2 by solid phase reactions (M=Zr, Ti, Sn); Synthesis of MO2 by inorganic compounds hydrolysis; Synthesis of MO2 by sol-gel method; Synthesis MO2 by hydrothermal method; Physical-chemical characterization of ceramic materials; Textural characteristics of ceramic materials; Calculation of material specific surface area and porosity analysis; Structural characteristics of material (XRD application); Examination of ceramic material crystallinity; Morphological properties of ceramic materials (electronic microscopy); Scanning electronic microscope imaging (SEM) and images analysis; Examination of acid-base centres of ceramics materials; Visit/practice to/in glass industry, Visit/practice to/in porcelain and ceramics industry. |
| **LANGUAGE OF INSTRUCTION** |
| [x] Serbian (complete course) [ ]  English (complete course) [ ]  Other \_\_\_\_\_\_\_\_\_\_\_\_\_ (complete course)[ ] Serbian with English mentoring [ ] Serbian with other mentoring \_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **ASSESSMENT METHODS AND CRITERIA** |
| **Pre exam duties** | **Points** | **Final exam** | **points** |
| **Activity during lectures** | **15** | **Written examination** | **40** |
| **Practical teaching** | **15** | **Oral examination** |  |
| **Teaching colloquia** | **30** | **OVERALL SUM** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |