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|  **UNIVERSITY OF NIŠ** |
| **Course Unit Descriptor** | **Faculty**  | Faculty of Occupational Safety in Niš |
| **GENERAL INFORMATION** |
| Study program  | Environmental Engineering |
| Study Module (if applicable) | / |
| Course title | Alternative Energy Sources |
| Level of study | ☐Bachelor ☐ Master’s ☒ Doctoral |
| Type of course | ☐ Obligatory ☒ Elective |
| Semester  | ☒ Autumn ☐Spring |
| Year of study  | Second year |
| Number of ECTS allocated | 10 |
| Name of lecturer/lecturers | Ljiljana Živković, Emina Mihajlović, Miomir Raos |
| Teaching mode |  ☒Lectures ☐Group tutorials ☒ Individual tutorials ☐Laboratory work ☐ Project work ☒ Seminar ☐Distance learning ☐ Blended learning ☒ Other |
| **PURPOSE AND OVERVIEW (max. 5 sentences)** |
| *Acquiring knowledge about energy systems based on alternative energy sources. Energy balance. Calculation of losses and the degree of efficiency of the systems with alternative energy sources. Feasibility studies, design, selection and installation of systems with alternative energy sources. The ability to use already acquired knowledge. Knowledge, understanding and implementation of energy, economic and environmental analysis of the justification for installing alternative energy systems. Preparation of documentation for obtaining the status of preferential electricity producer for plants that are using renewable energy sources.* |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** |
| Solar radiation at the Earth's surface. The conversion of solar radiation into heat. Conversion of sunlight into electricity. Elements for the use of solar energy. Material properties ‐ absorption, emission, reflection. Selective surfaces. Flat‐plate solar collectors. Concentric solar collectors. Photovoltaic cells. Accumulation of heat. Solar‐technical systems. The use of solar energy for technical purpose: sanitary water heating, heating and cooling premises, obtaining hydrogen, desalination and distillation. Passive heating. Geothermal energy. Ways of using. Biomass; types, sources, ways of use. Heat pumps. Analysis and determination of operating cost based on modeling. Environmental energy, elements for its use. |
| **LANGUAGE OF INSTRUCTION** |
| ☐ 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** |  | **Written examination** | **30** |
| **Practical teaching** | **40** | **Oral examination** | **30** |
| **Teaching colloquia** |  | **OVERALL SUM** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |