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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 | Renewable energy sources |
| Level of study | ☐ Bachelor ☒ Master’s ☐ Doctoral |
| Type of course | ☐ Obligatory ☒ Elective |
| Semester  |  ☐ Autumn ☒ Spring |
| Year of study  | Third year |
| Number of ECTS allocated | 6 |
| Name of lecturer/lecturers | Ljiljana Živković, 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)** |
| *Merging of theory and practice in using renewable energy sources. Gaining practical experience in working with facilities that utilize renewable energy sources. Raised and maintained awareness of the necessity and importance of using renewable energy sources and environmental preservation.* |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** |
| Introduction to renewable energy sources. Demand for renewable energy sources. Major sources and types of energy. Characteristics of renewable energy sources. Greenhouse effect. Global warming. Extreme meteorological conditions. Share of renewable energy source use in the production of greenhouse gases. Share of renewable energy source use in the production of primary and secondary environmental pollutants. Regulation on renewable energy sources. EU Directive on Renewable Energy Sources. Renewable energy sources in Serbian legislation. Solar energy. The Sun as an energy source. Direct conversion of solar radiation into thermal and electric energy. Use of solar energy and environmental impact. Solar panel energy. Installation of solar panels. Active and passive systems. Geothermal energy. Basic terms. Geothermal energy sources. Extraction and transport equipment. Geothermal energy application. Direct application for heating and electricity production. Wind energy. Basic terms. Wind generators, aerodynamics, types, dimensions, and selection. Basic elements. Safety and control systems. Installation. Use of wind generators and environmental impact. Water energy. Available energy resources. Sea wave energy. Tidal energy. Biomass energy. Basic terms. Biomass sources. Energy potential. Biomass potential in Serbia. Biomass processing technology (manufacturing of briquettes, pellets, woodchips, etc.). Energy from waste wood, agricultural waste, and municipal waste. Biomass transport and storage. Environmental impact. Biomass form cattle industry. Application in biogas production. Application of cultivated biomass in biodiesel production. Advanced energy systems (fuel cells, hydrogen fuel). Waste recycling. Production of thermal and electric energy from renewable energy sources. Biomass-powered boilers. Combined production of thermal and electric energy. Social and economic indicators of the use of renewable energy sources. Market development. Pricing policy. Regulation. |
| **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** | **10** | **Written examination** | **20** |
| **Practical teaching** |  | **Oral examination** | **20** |
| **Teaching colloquia** | **50** | **OVERALL SUM** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |