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| **UNIVERSITY OF NIŠ** |
| **Course Unit Descriptor** | **Faculty** | Faculty of Mechanical Engineering |
| **GENERAL INFORMATION** |
| Study Program | **Mechanical Engineering** |
| Study Module (if applicable) | - |
| Course Title | Theory of composite structures |
| Level of Study | ☐Bachelor | ☐ Master’s | ☒ Doctoral |
| Type of Course | ☐ Obligatory | ☒ Elective |
| Semester | ☐ Autumn | ☒ Spring |
| Year of Study | I |
| Number of ECTS Allocated | 10 |
| Name of Lecturer/Lecturers | Ratko Pavlovic |
| Teaching Mode | ☒ Lectures | ☐ Group tutorials | ☒ Individual tutorials |
| ☐ Laboratory work | ☒ Project work | ☒ Seminar |
| ☐ Distance learning | ☐ Blended learning | ☐ Other |
| **Purpose and Overview (max. 5 sentences)** |
| Introduce students to the stress and strain of composite beams. The acquisition of knowledge in the field of composite beams.  |
| **Syllabus (brief outline and summary of topics, max. 10 sentences)** |
| *Theory classes:* Introduction to composite materials. Fibre, laminate and granular composites. Mechanical behaviour of composite materials. Fundamentals of fibre reinforced composite laminate. Lamella. Laminate. Macro mechanical behaviour of lamella. The relations between stress and strain for anisotropic materials. Technical constants and their limitations. Isotropic and orthotropic materials. The relations between stress and strain in an orthotropic material. The relations between stress and strain for the clutch arbitrary fibre orientation. Mechanical testing of lamella. Macro mechanical behaviour of laminate. The classical theory of laminate. Stress and strain state of the laminate. Changes in stress and strain. Forces and moments of arbitrary cross-section laminates. Special cases of laminates: a single, symmetric, antisymmetric and asymmetric laminates. Interlaminar stresses. Bending, buckling and vibrations composite plates. Differential equations of bending, buckling and vibrations. Limitations and assumptions. Differential equations of equilibrium composite plate. Differential equations of buckling of composite plates. Differential equations vibrations composite plate. Bending, buckling and vibrations specially orthotropic, symmetric angle, transverse and antisymmetric simply supported antisymmetric angle-ply laminated plates.*Guided independent research:*Prepare students for research in their doctoral dissertation. |
| **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** | **0** | **Written Examination** | **0** |
| **Practical Teaching** | **40** | **Oral Examination** | **Max. 60**  |
| **Teaching Colloquia** | **0** | **Overall Sum** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |