**Study program: IndustrialEngineering**

**Course title: Strengthof Materials(Mechanicsof Materials)**

**Professor/assistant: PhD. Miloš S. Ristić**

**Type of course:** compulsory

**ECTS credits: 5**

**Pre-requisites: -**

**Aims of the course:i**s to enable a student to analyze each machine part so that, according to its role and function, the student recognizes the loads and calculates the strains.

Throughtheteachingprocessitisachievedthatthestudent:

- differentiates between rigid and solid bodies;
- identifies internal and external forces and their effects on the body;
- recognizes basic and complex strains, and calculates stresses and deformations;

defines independently a practical problem, recognizes the method and solves the problem using literature.

**Learning outcomes:**

Upon the successful completion of the course, a student successfully:

- defines strain, stress and deformation and describes difference between elastic and plastic deformation;
- identifies five basic types of strains, equations for their dimensioning and applies them;
- calculates deformation during axial strain, dilatation and maximum force allowed;
- explains moments of inertia, what they are used for, and how they are calculated;
- recognizes torsion and designs shaft (bar) that transmits torque (twisting moment);
- describes deformation due to flexural bracing, deflection and neutral line. dimensions a flexural loading beam determining the shape of cross-section and distant fibers from a neutral line. draws loading diagrams;
- shows the difference at four characteristic cases of screwing, recognizes them and accordingly suggests the problem-solving procedure (Oiler, Tietmeyer);

differentiates complex strains.

**Syllabus**

*Theoreticalpart*-Strength ofmaterial- terms and definitions.External andinternal forces.Strains.Stressesand deformations.Moments ofinertiaofleveled crosssections.Axialstrain.Strainintwodirections.Flatstrain.Shearing.Torsionstrain.Flexural.Idealshapeofaplainbeam andconsole.Elasticlines.Flexuralofstaticallyundeterminedtrusses.Buckling.Complexstrains.

*Practicalpart*-

Applicationoftheoreticalknowledgeinsolvingspecificpracticalexampleswiththeemphasisondimensioningandonnecessaryinstructionforsolvingspecifictypesoftasks. The use of literature.

**Literature**


1. StamenkovićS.,StefanovićS.,CvetanovićB, Otpornost materijala, Visoka tehnička škola strukovnih studija u Nišu, Niš, 2009.
2. StamenkovićS.,SpasićD.,*Otpornost materijala- Zbirka rešenih zadataka, VTŠ Niš, 1991.*
3. Riley W., Sturges L., Morris D., *Mechanics of Materials*, John Wiley & Sons, 2007.


| **Number of active classes** | | | Other forms of teaching: |
|---|---|---|---|
| Lectures: 2 | Practical classes: 2 | Research work: | |

**Teaching methods** Theoreticalteachingis frontal,usingaudio-visualpresentationswherestudentscanpractically recognizeloadings,deformationsandshapesoftheelementthatisbeingcalculated.Projecttasks are completed and defendedindividually.Knowledgeassessmentisperformedthroughcolloquiumsandwrittenassignmentattheendofthesemester.

**Grading system** (maximum 100 points), **grading scale**from 5 to 10: below 51 points grade 5, grade 6 from 51-60 points, grade7 from 61-70 points, grade8 from 71-80 points, grade 9 from 81-90 points, grade 10 from 91-100 points.

| **Pre-exam obligations** | **points** | **Final exam** | **points** |
|---|---|---|---|
| activity during theoretical lectures | **10** | written exam | **40** |
| practical training | **5** | oral exam | |
| colloquium(s)/seminar papers | **15+30** | | |
| **Sum** | **60** | **Sum** | **40** |