

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	STROJNI IN GRADBENI ELEMENTI
Course Title:	MACHINE AND CONSTRUCTION ELEMENTS

Študijski program in stopnja Study Programme and Level	Študijska smer Study Field	Letnik Academic Year	Semester Semester
UŠP Tehniška varnost, 1. stopnja	/	2.	3.
USP Technical Safety, 1 st Cycle	/	2 nd	3 rd

Vrsta predmeta / Course Type obvezni / Mandatory

Univerzitetna koda predmeta / University Course Code: TV109

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
45	/	30 SV	/	/	75	5

Nosilec predmeta / Lecturer: doc. dr. Boris Jerman / Dr. Boris Jerman, Assistant Professor

Jeziki / Languages: **Predavanja / Lectures:** Slovenski / Slovenian
Vaje / Tutorial: Slovenski / Slovenian

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti: **Prerequisites:**
Študent oz. kandidat mora imeti predmet opredeljen kot študijsko obveznost. The course has to be assigned to the student.

Vsebina:

Osnove tehniškega risanja. Predstavitev osnovnih mednarodnih in domačih standardov ter tehniške prakse, ki obravnavajo varnostne zahteve za strojne in gradbene elemente. S stališča varstva pri delu so predstavljeni materiali, ki se za te elemente uporabljajo. Vključene so ustrezne teoretične osnove, na katerih posamezne zahteve temeljijo. Vključene so naslednje teme:

- varjenje: postopki varjenja, kakovost in kontrola zvarov, materiali;
- vezni elementi: žičnik, vijaki in matice, vrste navojev, drugi vezni elementi;
- elementi gonil: osi in gredi, ležaji, sklopke, zobniki, verižna gonila, torna gonila;
- gradiva in polizdelki v gradbeništvu (beton, jeklo, keramika, les)

Content (Syllabus Outline):

Fundamentals of technical drawing. Presentation of basic international and domestic standards and technical practices that address the safety requirements for mechanical and structural elements. From the standpoint of safety at work materials used for these elements are presented. The relevant theoretical bases are included on which separate requirements are based. The following topics are included:

- Welding: welding processes, weld quality control, materials;
- Fasteners: nails, bolts and nuts, thread types, other fasteners;
- transmission elements: axles and shafts, bearings, couplings, gears, chain drives, friction drives;

- stavbarstvo: temelji, stebri, zidovi, nosilci, plošče, ostrešja, kritine, stopnice, okna, vrata.

- materials and semi-finished products for construction (concrete, steel, ceramics, wood)
- building parts: foundations, columns, walls, beams and columns, slabs, roofing, stairs, windows, doors.

Temeljni literatura in viri / Readings:

- I. Prebil, Tehnična dokumentacija, Tehniška založba Slovenije, Ljubljana, 1995, 435 str., (25%)
 - J. Kropce, Strojni elementi, Tehniška fakulteta v Mariboru, VTO Kemijska tehnologija, 1986, 225 str., (60%)
 - A. Berdajs, Gradbeniški priročnik, 3., predelana in razširjena izd., Tehniška založba Slovenije, Ljubljana, 2004, 2006, 560 str. (10%)
- Dopolnilna literatura / Additional literature:**
- B. Kraut, Krautov strojniški priročnik 10. slovenska izd., predelana in izpopolnjena, Tehniška založba Slovenije, Ljubljana, 1993, 694 str.,

Cilji in kompetence:

Cilj predmeta je predstavitev osnov strojne in gradbene stroke. Slušatelji se seznanijo s principi uporabe strojnih in gradbenih elementov ter z uporabo koncepta vgrajene varnosti. Slušatelji se seznanijo s posameznimi strojnimi in gradbenimi elementi in njihovo uporabo.

Objectives and Competences:

The objective of the course is to introduce the basics of mechanical and civil engineering field. The principles of the use of mechanical and structural elements are introduced to students, as well as the concept of inherent safety. Students get familiar with the various machine and structural elements and their use.

Predvideni študijski rezultati:

- Znanje in razumevanje
Pri predmetu bo slušatelj pridobil osnovna teoretska in praktična znanja za oceno varnosti posameznih obravnavanih strojnih in gradbenih elementov. Slušatelj bo po opravljenem izpitu:
- seznajen z osnovnimi principi delovanja obravnavanih strojnih in gradbenih elementov;
 - seznajen z osnovnimi principi vgrajene varnosti;
 - seznajen z osnovnimi postopki dimenzioniranja obravnavanih elementov.
- Uporaba
Predmet je usmerjen k reševanju varnostnih problemov, s katerimi se varnostni inženir srečuje v praksi. Slušatelj bo po opravljenem izpitu:
- usposobljen oceniti raven vgrajene

Intended Learning Outcomes:

- Knowledge and Comprehension
In this course students will acquire basic theoretical and practical knowledge to assess the inherent safety of the individual mechanical and structural elements. Students will be after the final exam:
- familiar with the basic principles of operation of the present mechanical and structural elements;
 - familiar with the basic principles of the inherent safety;
 - familiar with the basic procedures for the design of the elements.
- Application
The course is oriented to solve machine inherent safety problems which the safety engineers experience in practice. Students will be after the final exam:
- qualified to assess the level of inherent

<p>varnosti;</p> <p>ii. usposobljen oceniti morebitno odstopanje od normalnega delovanja posameznih elementov;</p> <p>iii. usposobljen oceniti ustreznost postopkov dimenzioniranja;</p> <p>iv. usposobljen oceniti ustreznost zamenjave, popravila oz. rekonstrukcije.</p>	<p>safety;</p> <p>ii. qualified to assess any deviation from the normal operation of individual element;</p> <p>iii. qualified to evaluate the adequacy of design procedures;</p> <p>iv. qualified to assess the adequacy of replacement, repair or reconstruction.</p>
<p>Refleksija</p> <p>Spoznanja o principih dimenzioniranja predstavljajo trdni temelj za preverjanje odločitve, povezanih z varnostjo strojev in naprav ter stavb, v praksi.</p>	<p>Reflection</p> <p>Knowledge of the design principles represent a solid basis for practical verification of the decisions related to the safety of machinery and buildings.</p>
<p>Prenosljive spretnosti</p> <p>V okviru predmeta si bo slušatelj pridobil oz. utrdil sledeča znanja oz. spretnosti: razbiranje tehniških risb, ki so osnova tehniškega sporazumevanja, razumevanje zahtevnejših strokovnih tekstov, kot so tehniški standardi, uporaba standardov v tujih jezikih, razvoj analitičnega načina mišljenja.</p>	<p>Skill-transference Ability</p> <p>During the course students will acquire the following knowledge or skills: interpretation of engineering drawings, which are the basis of technical communication, understanding of complex texts such as technical standards, the use of standards in foreign languages, development of analytical thinking.</p>

Metode poučevanja in učenja:

Predavanja, teoretske vaje, laboratorijske vaje, domače delo – izdelava seminarske naloge (seminarska naloga je praktičen primer ocenjevanja vgrajene varnosti – primer konkretnega sklopa v neki proizvodnji – obisk p, pridobitev podatkov in rešitev).

Learning and Teaching Methods:

Lectures, exercises, lab work, domestic work - seminars (seminar is a practical example of assessment of inherent safety - case study of parts of an existing machine in real world company - visit of the company, gaining the information, solution).

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Izpit (pisno in/ali ustno) iz teorije in vaj. Možnost opravljanja pisnega dela izpita s kolokviji.	70%	Examination (written and/or oral) of theory and exercises. Optionally the written examination can be replaced by colloquiums. Seminar work and effectiveness of cooperation in exercises presents a part (1/3) of the exercise grade. The grades rate from 1 to 10. Grades 1 to 5 are negative, grades 6 to 10 are positive as follows: 6-sufficient, 7-good, 8 and 9-very good, 10-excellent.
Del ocene iz vaj predstavlja ocena seminarske naloge in uspešnost sodelovanja pri vajah (1/3). Lestvica ocen od 1 do 10. Ocene 1 do 5 so negativne, ocene 6 do 10 pa pozitivne in sicer: 6-zadostno, 7-dobro, 8 in 9-prav dobro, 10-odlično.	30%	

Reference nosilca / Lecturer's References:

1. HLADNIK, Jurij, RESMAN, Franc, **JERMAN, Boris**. Torsion stiffness of a racing cross-country ski boot. *Proc. Inst. Mech. Eng., Part P, sports eng. technol. (Print)*, 2013, doi: [10.1177/1754337113485349](https://doi.org/10.1177/1754337113485349). [COBISS.SI-ID [12936475](https://www.cobiss.si/id/12936475)]

2. VUJIČIĆ, Andrija, ZRNIĆ, Nenad Đ., **JERMAN, Boris**. Ports sustainability : a life cycle assessment of zero emission cargo handling equipment. *Stroj. vestn.*, Sep. 2013, vol. 59, no. 9, str. 547-555, ilustr., doi: [10.5545/sv-ime.2012.933](https://doi.org/10.5545/sv-ime.2012.933). [COBISS.SI-ID [13112859](#)]

3. **JERMAN, Boris**, HRIBAR, Anton. Dynamics of the mathematical pendulum suspended from a moving mass. *Teh. vjesn. - Stroj. fak.*, 2013, vol. 20, no. 1, str. 59-64, ilustr. http://hrcak.srce.hr/index.php?show=clanak&id_clanak_jezik=143490. [COBISS.SI-ID [12724251](#)]

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