



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Sodobne gradnje
Course title:	Modern buildings

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Enovit magistrski študijski program Predmetni učitelj 2. stopnje	Izobraževalna tehnika	3	6
Five-year master's degree program Subject teacher	Technical education	3	6

Vrsta predmeta / Course type

Izbirni / elective

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
30		15			45	3

Nosilec predmeta / Lecturer:

Branko Nečemer

Jeziki /

Languages:

Predavanja / Lectures:

Vaje / Tutorial:

slovenski / slovene

slovenski / slovene

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

Ni pogojev.

Prerequisites:

No requirements.

Vsebina:

Predmet Sodobne gradnje predstavlja celovit pregled sodobnih pristopov, tehnologij in trendov v strojništvu in gradbeništvu. Sodobna gradnja se odlikuje po nenehnem iskanju in uvajanju inovativnih pristopov, tehnologij ter materialov, ki omogočajo bolj učinkovito, trajnostno in funkcionalno gradnjo. Sodobna gradnja odraža tudi družbene, ekonomske in okoljske vrednote. Med najpomembnejšimi vidiki sodobne gradnje so uporaba naprednih materialov, uvajanje novih tehnologij, poudarek na trajnosti ter prilagajanje potrebam družbe. Splošna vsebina predmeta:

- sodobna gradiva v strojni industriji,
- gradnja bivalnih objektov,
- gradnja industrijskih objektov,
- konstruiranje strojev in aparatov,
- metodično konstruiranje,
- gradnja transportnih naprav,
- konstruiranje vozil,
- osnove gradbenih materialov.

Content (Syllabus outline):

The subject Modern buildings represents a complete outline of modern approaches, technologies and trends in mechanical engineering and civil engineering. Modern building excels by constant search for and introduction of innovative approaches, technologies and materials that enable more effective, sustainable, and functional building. Modern building reflects also social, economic, and environmental values. The use of advanced materials, introduction of new technologies, focus on sustainability and adjustment to the needs of the society are among most important aspects of modern building. General content of the subject:

- modern materials in mechanical engineering,
- building residential facilities,
- industrial construction
- designing machines and devices,
- methodical designing,
- building transport devices,
- designing vehicles,
- fundamentals of building materials.

Temeljni literatura in viri / Readings:

Pehan, S., Glodež, S. in Kramberger, J. (2021). Osnove konstruiranja: Učbenik. Maribor: Univerzitetna založba

Kramberger, J., Pehan, S., Glodež, S. (2023). Konstruiranje strojev in naprav: učbenik. Univerza v Mariboru, Univerzitetna založba <https://press.um.si/index.php/ump/catalog/book/795>

Dodatna literatura:

Steinman, F., Gosar, L. (2009). Osnove gradbeništva: Učbenik. Ljubljana, fakultete za gradbeništvo in geodezijo

Cilji in kompetence:

Cilji:

- Razumevanje sodobnih pristopov, tehnologij in trendov v strojništvu in gradbeništvu.
- Razumevanje uporabe naprednih materialov.
- Sposobnost prilagajanja trajnostnim pristopom.
- Razvijanje veščin konstrukcije in oblikovanja.

Objectives and competences:

Objectives:

- Understanding modern approaches, technologies and trends in mechanical engineering and civil engineering.
- Understanding the use of advanced materials.
- Ability to adjust to sustainable approaches.
- Developing skills of designing and constructing.

Kompetence:

- Sposobnost analize in kritičnega razmišljanja npr. kritično analizirati različne pristope, tehnologije in materiale ter ocenjevati njihovo ustreznost v različnih gradbenih in strojnih aplikacijah.
- Veščine načrtovanja in analize različnih objektov, strojev, naprav in vozil, pri čemer se upošteva funkcionalne zahteve, trajnostne vidike in estetske preference.
- Sposobnost analize uporabe naprednih tehnologij in orodij, ki se uporabljajo v sodobnem gradbeništvu in strojništvu, kot so računalniško podprto načrtovanje in simulacijski programi.
- Sposobnost timskega dela.

Competences:

- Ability to analyse and critically evaluate, e.g. critically analyse different approaches, technologies, and materials and to assess their suitability in various building and mechanical applications.
- Skills of planning and analysing various facilities, machines, devices, and vehicles, considering functional requirements, sustainable aspect, and aesthetic preferences.
- Ability to analyse the use of advanced technologies and tools used in modern civil engineering and mechanical engineering, e.g. computer supported planning and simulation programs.
- Ability for teamwork.

Predvideni študijski rezultati:**Znanje in razumevanje:**

- Prepoznati sodobna gradiva in konstrukcijske materiale.
- Uporabiti sodobne pristope, tehnologije in trende v sodobni gradnji.
- Obvladati osnovne korake načrtovanja in konstruiranja.
- Oceniti vplive sodobne gradnje na varstvo okolja.
- Povezovati pridobljeno znanje z različnimi tehničnimi področji.

Intended learning outcomes:**Knowledge and understanding:**

- Recognize modern materials and construction materials.
- Use of modern approaches, technologies, and trends in modern buildings.
- To master the basic steps of planning and design.
- Assess the impacts of modern buildings on environmental protection.
- Connect acquired knowledge with various technical fields.

Metode poučevanja in učenja:

- frontalna predavanja,
- praktično delo pri avditornih vajah,
- izdelava seminarske naloge.

- frontal lectures,
- practical work at tutorials works,
- seminar (project) work.

Načini ocenjevanja:Delež (v %) /
Weight (in %)**Assessment:**

Način (pisni izpit, ustno izpraševanje, naloge, projekt)		Type (examination, oral, coursework, project):
• Teoretični izpit	40%	• Theoretical exam
• Praktični izpit	20%	• Practical exam
• Seminarska naloga	40%	• Seminar paper

Reference nosilca / Lecturer's references:

NEČEMER, Branko, ZUPANIČ, Franc, VUHERER, Tomaž, GLODEŽ, Srečko. High-cycle fatigue behaviour of the aluminium alloy 5083-H111. Materials. Mar. 2023, vol. 16, iss. 7, [article no.] 2674, 15 str. ISSN 1996-1944. <https://dk.um.si/IzpisGradiva.php?id=87977>, DOI: 10.3390/ma16072674. [COBISS.SI-ID 147262467]

NEČEMER, Branko, KLEMENC, Jernej, ZUPANIČ, Franc, GLODEŽ, Srečko. Modelling and predicting of the LCF-behaviour of aluminium auxetic structures. International journal of fatigue. Mar. 2022, vol. 156 (106673), str. 1-15. ISSN 0142-1123. <https://www.sciencedirect.com/science/article/pii/S0142112321005156>, <https://repozitorij.uni-lj.si/IzpisGradiva.php?id=134236>, DOI: 10.1016/j.ijfatigue.2021.106673. [COBISS.SI-ID 88045827]

NEČEMER, Branko, GLODEŽ, Srečko, NOVAK, Nejc, KRAMBERGER, Janez. Numerical modelling of a chiral auxetic cellular structure under multiaxial loading conditions. Theoretical and Applied Fracture Mechanics. [Print ed.]. June 2020, vol. 107 (102514), str. 1-7. ISSN 0167-8442. DOI: 10.1016/j.tafmec.2020.102514. [COBISS.SI-ID 22996246]

FAJDIGA, Gorazd, RAJH, Denis, NEČEMER, Branko, GLODEŽ, Srečko, ŠRAML, Matjaž. Experimental and numerical determination of the mechanical properties of spruce wood. Forests. [Online ed.]. 2019, vol. 10, iss. 12, 1-12 str., ilustr. ISSN 1999-4907. <https://www.mdpi.com/1999-4907/10/12/1140>, <https://repozitorij.uni-lj.si/IzpisGradiva.php?id=133066>, DOI: 10.3390/f10121140. [COBISS.SI-ID 3150985]

NEČEMER, Branko, VESENJAK, Matej, GLODEŽ, Srečko. Fatigue of cellular structures - a review. Strojniški vestnik. Sep. 2019, vol. 65, no. 9, str. 525-536, si 64, ilustr. ISSN 0039-2480. <http://www.dlib.si/details/URN:NBN:SI:DOC-95KMSZ2Z>, DOI: 10.5545/sv-jme.2019.6070. [COBISS.SI-ID 22599190]