

**UČNI NAČRT PREDMETA / COURSE SYLLABUS**

**Predmet:** POŽARNOVARNOSTNA ANALIZA OBJEKTOV  
**Course Title:** FIRE SAFETY ANALYSIS OF BUILDINGS

Študijski program in stopnja Study Programme and Level	Študijska smer Study Field	Letnik Academic Year	Semester Semester
MAG Tehniška varnost, 2. stopnja	/	2.	3., 4.
USP Technical Safety, 2 <sup>nd</sup> Cycle	/	2 <sup>nd</sup>	3 <sup>rd</sup> , 4 <sup>th</sup>

**Vrsta predmeta / Course Type:**

izbirni / Elective

**Univerzitetna koda predmeta / University Course Code:**

TV2B9

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje Work	Druge oblike študija	Samost. delo Individual Work	ECTS
60	/	15 SV	/	/	75	5

**Nosilec predmeta / Lecturer:**

Izr. prof. dr. Simon Schnabl / Dr. Simon Schnabl, Associate Professor

**Jeziki / Languages:**

**Predavanja / Lectures:** slovenski / Slovenian  
**Vaje / Tutorial:** slovenski / Slovenian

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

Študent oz. kandidat mora imeti predmet opredeljen kot študijsko obveznost.

**Prerequisites:**

The course has to be assigned to the student.

**Vsebina:**

Splošno o požarnem inženirstvu. Pregled osnovnih pojmov. Evropski standardi in predpisi.  
Ukrepi aktivne in pasivne požarne zaščite za preprečevanje širjenja požara po objektu glede na namembnost objekta.  
Požarna obtežba. Modeli standardnih in realnih požarov.  
Evakuacijske poti, sistemi za javljanje in gašenje.  
Vpliv visoke temperature na lastnosti materialov.  
Temperaturno polje konstrukcije.  
Računsko ugotavljanje požarne odpornosti lesenih, armiranobetonskih in jeklenih nosilnih

**Content (Syllabus outline):**

General information about fire engineering. Overview of basic concepts. European standards and regulations.  
The measures of active and passive fire protection to prevent the spread of fire by the building depending on the intended use of the building.  
Fire load. Models of standard and natural fires. Evacuation routes, fire detection and fire fighting.  
Influence of high temperatures on material behavior.  
Temperature field of a structure.  
Computing determination of the fire resistance of timber, reinforced concrete and steel

konstrukcij po poenostavljenih postopkih skladno s Standardi Evrokod.  
Analiza konstrukcije po požaru, ocena poškodovanosti objekta.

Vaje:  
Računsko reševanje osnovnih nalog, z uporabo naprednejših računalniških programov.  
Obisk požarnega laboratorija .  
Izdelava požarnega elaborata za enostavnejše objekte.

structures.  
Analysis of the structure after the fire, the assessment of damage to the building.

Tutorial:  
Solving of basic tasks using advanced computer programs.,  
Visit of the fire laboratory  
Design of fire study for simple buildings.

### Temeljna literatura in viri / Readings:

- A. H. Buchanan, Structural Design for Fire Safety, John Wiley & Sons Ltd, 2005;
- An Introduction to Fire Dynamics, D. Drysdale, Wiley, 2. izdaja (1998)
- Wang, Y., Burgess, I., Wald, F., Gillie, M. Performance-Based Fire Engineering of Structures. Boca Raton, CRC Press: 369 str. (2013)

### Dodatna Literatura:

- Eurokod EN 1991-1-2 in požarni deli Eurokodov za lesene, armiranobetonske in jeklene konstrukcije
- IZS MST 01/2010. Smernica za izdelavo zasnove požarne varnosti. Inženirska zbornica Slovenije, Matična sekcija inženirjev tehnologov in drugih inženirjev: 8 str.
- Tehnična smernica TSG - 1 - 001: 2010. Požarna varnost v stavbah. Ministrstvo za okolje in prostor: 60 str.
- The SFPE Handbook - Fire Protection Engineering, 2nd Edition, Boston, Massachusetts, 1995;
- Rein, G., Empis, A. C., Carvel, R (ur.). 2007. The Dalmarnock Fire Test: Experiments and Modelling. Edinburgh, University of Edinburgh, School of Engineering and Electronics: p. 193-210.
- Fire Engineering Design Guide, Centre for Advanced Engineering, University of Canterbury, New Zealand, 1994;
- Fire Design in Europe. 2010. [http://people.fsv.cvut.cz/~wald/COST\\_C26\\_Prague/pdf/5-1\\_Fire%20design%20in%20Europe\\_sm.pdf](http://people.fsv.cvut.cz/~wald/COST_C26_Prague/pdf/5-1_Fire%20design%20in%20Europe_sm.pdf)
- Glavnik, A., Jug, A. 2010. Priročnik o načrtovanju požarne varnosti. Ljubljana, Inženirska zbornica Slovenije: 289 str.
- Direktiva o gradbenih proizvodih, CPD 89/106, Bistvena zahteva št.2 "Požarna varnost".
- McGrattan, K., Hostikka, S., Floyd, J., idr. 2010. Fire Dynamics Simulator (Version 5). Technical Reference Guide. NIST Special Publication 1018-5.
- Validation of Fire Dynamics Simulator (FDS) for forced and natural convection flows. 2006. [http://www.cfd.cad.pl/Thesis\\_P\\_Smardz\\_Rev\\_B.pdf](http://www.cfd.cad.pl/Thesis_P_Smardz_Rev_B.pdf).

### Cilji in kompetence:

Cilji:  
Podati osnovne ugotovitve o nastanku, razvoju in poteku požarov v zgradbah in

### Objectives and Competences:

Objectives:  
To provide the basic findings on the growth, development and the progress of fires in

naravnem okolju.

Seznantiti študente z modeli požarne obtežbe skladno z Evrokodom EN 1991-1-2 in z ukrepi aktivne in pasivne požarne zaščite.

Privzgojiti občutek za pomen ukrepov požarne zaščite v luči socioloških, naselitvenih, ekonomskih in drugih faktorjev.

Povezati znanja iz drugih predmetov s požarnimi problemi, varnost sistemov.

Vpeljati osnovna načela požarno varnega projektiranja lesenih, armiranobetonskih in jeklenih konstrukcij.

Spoznavanje vpliva izvedenih požarnovarnostnih ukrepov na objekte.

Analiza izvedenih požarnih ukrepov in pomenu le teh na varnost uporabnikov objekta in objekt v celoti.

Pridobljene kompetence:

- Sposobnost ocene požarne ogroženosti objekta ter načrtovanja ukrepov požarne zaščite.
- Sposobnost izbire primerne modela požarne obtežbe. Sposobnost uporabe poenostavljenih računskih metod za oceno požarne odpornosti enostavnih nosilnih konstrukcij.
- Sposobnost izdelave požarnega elaborata za preproste objekte

buildings and natural environment.

To familiarize students with models of fire load in accordance with EN 1991-1-2 standard and measures of active and passive fire protection.

To impart a sense of the importance of fire safety measures in the light of sociological, urban, economic and other factors.

Relate knowledge from other courses with fire problems and safety of the systems.

To introduce the basic principles of fire safety design of timber, reinforced concrete and steel structures.

Understanding of the impacts of fire-safety measures on structures.

Analysis of fire measures and their role in personal safety of the users as well as the buildings.

Acquired competences:

- Ability to determine fire safety assessment of the building and design of fire protection measures
- Ability of selecting an appropriate fire load model. Ability to use the simplified calculation methods for assessment of the fire resistance of simple load-bearing structures.
- Ability to design fire study for simple objects.

### **Predvideni študijski rezultati:**

#### Znanje in razumevanje

Razumevanje pomena požarnega inženirstva.

Razumevanje fizikalnih osnov nastanka in razvoja požara ter vpliva visokih temperatur na materiale in konstrukcije.

Znanje osnovnih metod in ukrepov aktivne in pasivne požarne zaščite.

#### Uporaba

Uporaba pridobljenega znanja pri pripravi magistrskega dela in pri samostojnem ali skupinskem reševanju požarnih problemov na delovnem mestu v praksi.

#### Refleksija

Povezava pridobljenega znanja z različnih področij naravoslovja in tehnike s problemi

### **Intended Learning Outcomes:**

#### Knowledge and Comprehension

Understanding the importance of fire safety engineering. Understanding the physical basis of the growth and evolution of fire and impact of high temperatures on materials and structures.

Knowledge of basic methods and measures of active and passive fire protection.

#### Application

Using the knowledge gained at this course in the preparation of the master's work and when solving practical fire issue problems individually or in a group in practice.

#### Analysis

Link acquired knowledge from different fields of science and technology with the problems of

požarnega inženirstva. Kritično ovrednotenje računskih modelov in poenostavitve v okviru standardov in predpisov.	fire engineering. Critical evaluation of computational models and simplification in the context of standards and regulations.
<b>Prenosljive spretnosti</b> Uporaba domače in tuje literature ter evropskih standardov in predpisov s področja požarnega inženirstva. Pridobivanje podatkov s svetovnega spleta, uporaba domačih in tujih baz podatkov. Izdelava in uporaba preprostih računalniških orodij za reševanje požarnih problemov. Uporaba razpoložljive programske opreme.	<b>Skill-transference Ability</b> Use of a domestic and foreign literature and European standards and regulations in the field of fire engineering. Obtaining information from the World Wide Web, the use of domestic and foreign databases. Development and use of simple computational tools for solving fire problems. Usage of the available software.

**Metode poučevanja in učenja:**

- predavanja
- seminarske vaje

**Learning and Teaching Methods:**

- Lectures
- Seminars

**Načini ocenjevanja:**

- Pisni izpit
  - Seminarska naloga
- Ocene: pozitivno 6-10; negativno 1-5.

Delež (v %) /  
Weight (in %)

**Assessment:**

- Written exam
  - Seminar work
- Grades: 6-10 pass, 1-5 fail.

**Reference nosilca / Lecturer's references:**

**SCHNABL, Simon**, SAJE, Miran, TURK, Goran, PLANINC, Igor. Fire analysis of wooden composite beams with interlayer slip. V: ATTARD, Thomas (ur.). Applied Mechanics in the Americas. Vol. 12 : Proceedings of the Tenth Pan American Congress of Applied Mechanics : PACAM X, Grand Oasis Resort, Cancun, Mexico, 7.-11. January 2008. Fresno: California State University, 2008, str. 41-44, ilustr. [COBISS.SI-ID 3866977]