

POŽARNOVARNOSTNA ANALIZA OBJEKTOV

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Požarnovarnostna analiza objektov
Course title:	FIRE SAFETY ANALYSIS OF BUILDINGS
Članica nosilka/UL	UL FKKT
Member:	

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Tehniška varnost, druga stopnja, magistrski	Ni členitve (študijski program)	1. letnik, 2. letnik		izbirni

Univerzitetna koda predmeta/University course code:	0100770
Koda učne enote na članici/UL Member course code:	TV2B9

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
60		15 SV			75	5

Nosilec predmeta/Lecturer:	prof. dr. Simon Schnabl
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Vrsta predmeta/Course type:	izbirni strokovni/Elective Professional
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Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

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

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

<p>Vaje:</p> <p>Računsko reševanje osnovnih nalog, z uporabo naprednejših računalniških programov.</p> <p>Obisk požarnega laboratorija .</p> <p>Izdelava požarnega elaborata za enostavnejše objekte.</p>	<p>Tutorial:</p> <p>Solving of basic tasks using advanced computer programs.,</p> <p>Visit of the fire laboratory</p> <p>Design of fire study for simple buildings.</p>
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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
- 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.

Cilji in kompetence:

Cilji:

Podati osnovne ugotovitve o nastanku, razvoju in poteku požarov v zgradbah in naravnem okolju. Seznaniti študente z modeli požarne obtežbe skladno z Eurokodom 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:

- Spособnost ocene požarne ogroženosti objekta ter načrtovanja ukrepov požarne zaščite.

Objectives and competences:

Objectives:

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

- Sposobnost izbire primernega modela požarne obtežbe. Sposobnost uporabe poenostavljenih računskih metod za oceno požarne odpornosti enostavnih nosilnih konstrukcij. - Sposobnost izdelave	- 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.
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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 požarnega inženirstva. Kritično ovrednotenje računskih modelov in poenostavitev v okviru standardov in predpisov. Prenosljive spretnosti 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.	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 fire engineering. Critical evaluation of computational models and simplification in the context of standards and regulations. Skill-transference Ability 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.
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Metode poučevanja in učenja: - predavanja - seminarske vaje	Learning and teaching methods: - Lectures - Seminars
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Načini ocenjevanja:	Delež/Weight	Assessment:
- Pisni izpit	50,00 %	- Written exam
- Seminarska naloga Ocene: pozitivno 6-10; negativno 1-5.	50,00 %	- 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]
