

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	NUMERIČNE METODE V VARNOSTI II
Course Title:	NUMERICAL METHODS IN SAFETY

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

Vrsta predmeta / Course Type: obvezni/ Mandatory

Univerzitetna koda predmeta / University Course Code: TV201

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje Work	Druge oblike študija	Samost. delo Individual Work	ECTS
45	30	/	/	/	75	5

Nosilec predmeta / Lecturer: izr. prof. dr. Jurij Rešičič/ Dr. Jurij Rešičič, Associate Professor
doc. dr. Jože Šrekl/ Dr. Jože Šrekl, Assistant Professor

Jeziki / Languages: slovenski / Slovenian
Predavanja / Lectures: /
Vaje / Tutorial: /

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:

Numerične metode v raziskovalnem delu:

- Reševanje navadnih diferencialnih enačb z aplikacijami v varnosti in požarni varnosti (Eulerjeva metoda, Metoda Runge-Kutta)
- Fourierova vrsta
- Transportna enačba (metoda končnih diferenc), reševanje problema prenosa toplote pri požarih
- Metode s slučajnim izborom podatkov. Monte Carlo metode.

Statistične metode v raziskovalnem delu:

Content (Syllabus outline):

Numerical methods in research work:

- Solving ordinary differential equations with applications in safety and fire safety (Euler's method, Runge-Kutta method)
- Fourier series
- The transport equation (finite difference method), solving the problem of heat transfer in fires
- Methods for a randomized data. Monte Carlo methods.

Statistical methods in research work:

- Regression
- Techniques for one-sided analysis of variance (ANOVA)

- Regresije
- Tehnike za enostranska analiza variance (ANOVA)
- ANOVA za modele in različne zasnove
- Analiza kovariance
- Multipla regresija in korelacije
- Strukturni modeli enačb

- ANOVA models for various design
- Analysis of covariance
- Multiple regression and correlation
- Structural Equation Models

Temeljna literatura in viri / Readings:

Glavna literatura:

- S. Dowdy, S. Wearden, D. Chilko: Statistics for Research, Third edition, Wiley, New Jersey, 2004, str. 211-511
- K. Atkinson, W. Han: Elementary Numerical Analysis, Third edition, Wiley, New York, 2004 str. 368-491

Dopolnilna literatura:

- P. I. Good, J. W. Hardin, Common Errors in Statistics, Wiley, 2003, str. 127-217
- K. W. Morton, D. F. Mayers, Numerical Solution of Partial Differential Equations, Cambridge UP, 2005, 273 str.

Cilji in kompetence:

Študentje bodo spoznali matematične in statistične metode, ki jih je mogoče uporabiti pri strokovnem in raziskovalnem delu na področju varnosti in pridobivali sposobnosti za uporabo teh metod.

Objectives and Competences:

Students will learn mathematical and statistical methods that can be used in professional and research work in the field of safety and acquire the ability to use these methods.

Predvideni študijski rezultati:

Znanje in razumevanje

Študentje bodo pridobili specialna znanja iz področja numeričnih metod in statistike, ki so potrebna za razvoj in reševanje modelov iz področja varnosti.

Uporaba

Študentje bodo pridobili specialna znanja iz področja numeričnih metod in statistike, ki so potrebna za razvoj in reševanje modelov iz področja varnosti.

Refleksija

Vsebine navajajo študenta k razmišljanju o pomenu računanja o nedosegljivosti eksaktnih rezultatov in o natančnosti rešitev v tehniki.

Prenosljive spretnosti

Logično razmišljanje in logično povezovanje informacij iz prakse s teoretičnimi modeli in prenos teoretičnih rešitev v prakso.

Intended Learning Outcomes:

Knowledge and Comprehension

Students should gain special knowledge in the field of numerical methods and statistics that are needed to develop and solve models in the field of safety.

Application

The methods used by the students will learn the tools for research and verification of real situations in the safety and technical practice.

Analysis

Contents indicate the student to think about the importance of calculating the unavailability of exact results and the accuracy of the solution in engineering.

Skill-transference Ability

Logical thinking and logical linking of information from practice with theoretical models and theoretical transfer the solution

into practice.

Metode poučevanja in učenja:

Predavanja.
Seminarske vaje v računalniški učilnici.

Learning and Teaching Methods:

Lectures
Seminar

Delež (v %) /

Načini ocenjevanja:

Weight (in %) **Assessment:**

Pisni izpit. Ocene: 6-10 pozitivno

100%

Written exam

Reference nosilca / Lecturer's references:

izr. prof. dr. Jurij Reščič

1. Soavtor računalniškega programa MOLSIM za simulacijo molekularnih sistemov (avtor je prof. Per Linse, Univerza v Lundu, Švedska)
2. **REŠČIČ, Jurij**, VLACHY, Vojko, HAYMET, A. D. J. Highly asymmetric electrolytes: beyond the hypernetted chain integral equation. Journal of the American Chemical Society, ISSN 0002-7863, 1990, vol. 112, no. 9, str. 3398-3401. [COBISS.SI-ID 23495173]
3. **REŠČIČ, Jurij**, LINSE, Per. Potential of mean force between charged colloids : effect of dielectric discontinuities. The Journal of chemical physics, ISSN 0021-9606, 2008, vol. 129, no. 11, art. no. 114505 (9 str.), graf. prikazi. [COBISS.SI-ID 29795333]

doc. dr. Jože Šrekl

1. **ŠREKL, Jože**. Computational model of successful mobilization of voluntary firefighters. Open journal of safety science and technology, ISSN 2162-5999, 2014, vol. 4, no. 1, str. 42-48, ilustr. <http://www.scirp.org/journal/PaperInformation.aspx?PaperID=43635>, doi: 10.4236/ojsst.2014.41006. [COBISS.SI-ID 1697583]
2. **ŠREKL, Jože**, GOLOB, Janvit. New approach to calculate the probability of ignition. Journal of loss prevention in the process industries, ISSN 0950-4230, 2011, vol. 24, no. 3, str. 288-291, doi: 10.1016/j.jlp.2010.09.006. [COBISS.SI-ID 34976773]
3. **ŠREKL, Jože**, GOLOB, Janvit. Impact of the buildings areas on the fire incidence. Acta chimica slovenica, ISSN 1318-0207. [Tiskana izd.], 2010, vol. 57, no. 1, str. 118-122. <http://acta.chem-soc.si/57/57-1-118.pdf>. [COBISS.SI-ID 33808645]