

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	INŠTRUMENTALNA ANALIZA IN MONITORING
Course Title:	INSTRUMENTAL ANALYSIS AND MONITORING

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

Vrsta predmeta / Course Type:

izbirni / Elective

Univerzitetna koda predmeta / University Course Code:

TV2B7

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

Nosilec predmeta / Lecturer:

izr. prof. dr. Matevž Pompe /
Dr. Matevž Pompe, 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:

Pri predmetu "Inštrumentalna analiza, monitoring, sistemi" bomo obravnavali naslednje teme:

- Pregled instrumentalnih tehnik za analitiko nevarnih in toksičnih snovi
- Pregled škodljivih snovi v delovnem okolju ali pri gorenju (posamezne organske snovi, kovine, prašni delci,...)
- Pregled različnih načinov jemanja vzorcev za prašne delce ter onesnaževala v plinski fazi
- pasivni vzorčevalniki (osebni dozimetri)
- off-line jemanje vzorcev (filtri, izpiralke, kartuše, adsorpcijska sredstva,...).
- on-line jemanje vzorcev
- Osnove monitoring sistemov

Content (Syllabus outline):

In this course "Instrumental analysis and monitoring", the following topics be discussed:

- Overview of instrumental techniques for analysis of hazardous and toxic substances
- Review of harmful substances in the workplace or during combustion (individual organic materials, metals, dust, ...)
- Review of sampling procedures for determination of the dust particles and the gas phase pollutants.
- Passive sampling (personal dosimeters)
- off-line sampling (filters, impingers, cartridge, adsorption tubes ...).
- on-line sampling
- Basic monitoring systems

- Načrtovanje meritev ter eksperimentov
- Vrednotenje dobljenih rezultatov in priprava poročil
- Pregled metod določevanja pomembnejših onesnaževal (EU, OSHA standardi)

VSEBINA VAJ (individualne vaje):
Vaje bi obsegale praktične primere enostavnejših metod določevanja pomembnejših onesnaževal. Poudarek bi bil predvsem na rokovanju z osebnimi dozimetri.

- Planning of measurements and experiments design
- Evaluation of the results and the preparation of the reports
- Review standard methods for determination of major pollutants (EU-OSHA standards)

CONTENTS OF PRACTICALS (individual exercises):
Practical should encompass practical examples of simple methods for determination of major pollutants. The focus would be primarily on the handling of personal dosimeters.

Temeljna literatura in viri / Readings:

- S.A. Ness, Air monitoring for Toxic Exposures, Van Nostrand Reinhold, New York.
- J.P. Lodge, ed. Methods of Air Sampling and Analysis, Lewis Publishers, Chelsea, Michigan.
- D.A. Skoog, D.M. West, Holler, Analytical Chemistry an Introduction, Holt-Saunders Int. Ed. New York
- D. C. Harris Quantitative Chemical Analysis, (5th edition) W. H. Freeman N.Y

Cilji in kompetence:

Pri predmetu "Inštrumentalna analiza, monitoring, sistemi" naj bi študentje univerzitetnega programa varstva pri delu in požarne varnosti dobil znanje o osnovah jemanja vzorcev zraka v delovnem okolju, določevanju posameznih komponent v vzorcih zraka (monitoring sistemi) ter vrednotenju dobljenih rezultatov s povezavo z ustreznimi standardi in priporočili

Objectives and Competences:

In this course, "Instrumental analysis and monitoring", the students should gain knowledge about the basics of sampling of air in the work environment, determining the individual components in samples of air (monitoring systems), and the evaluation of the obtained results taking into account the relevant standards and recommendations.

Predvideni študijski rezultati:

Znanje in razumevanje
Študentje naj bi pridobil osnovna teoretska in praktična znanja, ki so potrebna za načrtovanje ter izvedbo meritev onesnaževal v delovnem okolju. Obenem bodo sposobni kritično presoditi primernost posameznih tehnik ter interpretirati dobljene rezultate.

Uporaba
Znanje, ki ga bo pridobil študent pri predmetu "Inštrumentalna analiza, monitoring, sistemi" je namenjeno reševanje praktičnih problemov tako pri načrtovanju in izvedbi monitoring sistemov kot tudi za oceno učinkovitosti

Intended Learning Outcomes:

Knowledge and Comprehension
Students should acquire basic theoretical knowledge and practical skills necessary for planning and execution of the measurements of pollutants in the work environment. At the same time they will be able to critically assess the suitability of particular techniques and evaluate the results.

Application
The obtained knowledge during this course Instrumental analysis and monitoring can be used for solving practical problems in both the design and implementation of monitoring systems, as well as to assess the effectiveness

<p>ukrepov pri sanacija stanj. Pri predmetu naj bi študentje pridobili znanja, ki jim omogočajo izvedbo preprostejših analiznih postopkov kot so enostavni osebni dozimetri. Poleg fizikalno-kemijskih osnov, ki so osnova razumevanje analiznih postopkov bodo pridobili tudi praktična znanja, ki so potrebna pri zasnovi in izvedbi meritev ter interpretaciji podatkov in dobljenih rezultatov. Pomemben vidik predmeta je predstaviti študentu kritičen pogled na podajanje rezultatov in zmogljivosti različnih analiznih postopkov</p>	<p>of measures for solving problems in working environment. In this course, students should acquire skills that enable them to perform simple analytical procedures such as simple personal dosimeters. In addition to the theoretical physico-chemical knowledge about analytical procedures, the students will acquire practical skills that are needed in the design and implementation of the measurement and interpretation of the obtained data and results. An important aspect of this course is to provide students with a critical view the performance of different analytical procedures.</p>
<p><u>Refleksija</u> Teoretska in praktična znanja bo lahko študent uporabil pri reševanju praktičnih in teoretskih problemov (študij in praksa). Spoznanja o zmogljivostih in omejitvah posameznih metod v praksi pomenijo osnovo za mnoge pomembne odločitve.</p>	<p><u>Analysis</u> Theoretical and practical knowledge will be used by the student in solving practical and theoretical problems (study and practice). Knowledge of the capabilities and limitations of each method is necessary for taking key decisions in practice.</p>
<p><u>Prenosljive spretnosti</u> Pri predmetu bo študent pridobil laboratorijske spretnosti, znal bo uporabljati literaturne podatke, izvajati kemijske in nekatere fizikalne meritve, eksperimentalne podatke bo znal ustrezno obdelati ter primerno interpretirati.</p>	<p><u>Skill-transference Ability</u> In this course the student will acquire laboratory skills, they know how to use literature data, perform some chemical and physical measurements. They get knowledge how to process experimental and perform appropriate interpretation.</p>

Metode poučevanja in učenja:

Predavanja, laboratorijske vaje.

Learning and Teaching Methods:

Lectures, laboratory work.

Načini ocenjevanja:

Izpit pisni in ustni. Ocene: 6-10 pozitivno

Delež (v %) /

Weight (in %)

Assessment:

Written and oral exam. Grade 6-10 positive.

Reference nosilca / Lecturer's references:

1. S. Kose, S. Koral, B. Tufan, **M. Pompe**, A. Ščavničar, D. Kočar. Biogenic amine contents of commercially processed traditional fish products originating from European countries and Turkey. European Food Research and Technology. A, Zeitschrift für Lebensmittel-Untersuchung und -Forschung. 2012, 235, 669-683.
2. G. Arh, L. Klasinc, M. Veber, **M. Pompe**. Calibration of mass selective detector in non-target analysis of volatile organic compounds in the air. J. chromatogr. A 2011, 1218, 1538-1543.
3. J. Cerar, **M. Pompe**, M. Guček, J. Cerkovnik, J. Škerjanc. Analysis of sample of highly water-soluble T_{sub}-symmetric fullerenehexamalononic acid C_{sub}(66)(COOH)_{sub}(12) by ion-chromatography and capillary electrophoresis. J. chromatogr. A 2007, 1169, 86-94.