

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	ZAGOTAVLJANJE KAKOVOSTI V ANALIZNEM LABORATORIJU
Course Title:	QUALITY ASSURANCE IN ANALYTICAL LABORATORY

Študijski program in stopnja Study Programme and Level	Študijska smer Study Field	Letnik Academic Year	Semester Semester
VSŠP Kemijska tehnologija, 1. stopnja	/	3.	6.
PSP Chemical Technology, 1 st Cycle	/	3 rd	6 th

Vrsta predmeta / Course Type:

izbirni strokovni / Elective Professional

Univerzitetna koda predmeta / University Course Code:

KTSI31

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje Work	Druge oblike študija	Samost. delo Individual Work	ECTS
45	15	15 LV	/	/	75	5

Nosilec predmeta / Lecturer:

izr. prof. dr. Nataša Gros / Dr. Nataša Gros, 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:

- Potreba po zanesljivih rezultatih (utemeljitev, družbeno-ekonomski učinek, zahteve naročnika, namen analize)
- Temeljna načela zagotavljanja in nadzora kakovosti (QA/QC, različni standardi in njihove značilnosti, najboljše prakse)
- Odvzem vzorca (definicija vzorčenja, vrste vzorcev, načrt vzorčenja, število vzorcev in velikost vzorca, obravnava vzorca in shranjevanje)
- Priprava za analizo (izbira metode, viri metod, dejavniki presoje in izbire metod, vzroki za nepravilne analizne rezultate, validacija metode)
- Meritev (dobra laboratorijska praksa, kalibracija meritve, doseganje metrološke sledljivosti, nadzor kakovosti, okolje, oprema in pribor, kemikalije in potrošnji material, vzdrževanje in kalibracija)

Content (Syllabus outline):

- The need for reliable results (justification, social and economic impact, customers' requirements, purpose of analysis)
- General principles of quality assurance and quality control (QA/QC, different standards and their main features, best practices)
- Sampling (sampling defined, types of samples, sampling plan, numbers and sample size, sample handling and storage)
- Preparation for analysis (selecting the method, sources of methods, factors to consider when selecting a method, reasons for incorrect analytical results, method validation)
- Making measurement (good laboratory practice, calibration of measurement, achieving metrological traceability, quality control,

opreme)

- Vrednotenje rezultatov (uporabljena statistika, nadzorni grafi, merilna negotovost)
- Medlaboratorijske primerjave (sheme, organizacija, uporabljena statistika, pomen, sodelovalne študije)
- Dokumentacija in upravljanje z njo (dokumentacija, mnenja in interpretacije)
- Upravljanje s kakovostjo (sistem upravljanja, standardi za laboratorije, priročniki kakovosti in druga dokumentacija, nadzor, poročila upravljanja, odgovornost laboratorijskega osebja za kakovost)

environment, equipment and glassware, chemicals and consumables, maintenance and calibration of equipment)

- Data treatment (statistics, control charts, measurement uncertainty)
- Proficiency testing schemes (organisation, statistics, making the most of participation in proficiency testing schemes, collaborative studies)
- Documentation and its management (documentation, opinions and interpretations)
- Managing quality (managing system, standards available for laboratories, quality manuals and other documentation, audits, management reviews, responsibility of laboratory staff for quality)

Temeljna literatura in viri / Readings:

- E. Prichard, V. Barwick, Quality Assurance in Analytical Chemistry, Wiley, 2007, 316 pages.

Cilji in kompetence:

Cilj predmeta je, da se študent usposobi za delovanje v analiznem laboratoriju, ki je skladno z načeli zagotavljanja kakovosti in vodi do veljavnih analiznih rezultatov.

PREDMETNO SPECIFIČNE KOMPETENCE

-Študent razume celovitost sistema zagotavljanja kakovosti, ki temelji na pravilnem izvajanju, nadzoru in dokumentiranju vseh stopenj analiznega procesa.

-Študent razume strategije delovanja, ki vodijo do veljavnih analiznih rezultatov in zna prenesti te strategije na manj kompleksne realne primere.

Objectives and Competences:

Student develops skills for quality assurance in analytical laboratory leading to valid analytical results.

COURSE SPECIFIC COMPETENCES

Student understands the quality assurance system which depends on accurate procedures, control measures and documentation in all steps of analytical process.

Student understands strategies which produce valid analytical results and is able to apply these strategies in practice.

Predvideni študijski rezultati:

Znanje in razumevanje

Študent pridobi znanja pomembna za zagotavljanje kakovosti v analiznem laboratoriju. Študent razume sistem in mehanizme zagotavljanja kakovosti.

Uporaba

Študent se usposobi za delovanje znotraj sistema zagotavljanja kakovosti v analiznem laboratoriju.

Refleksija

Študent se zaveda pomena zanesljivih analiznih rezultatov in spoštovanja načel dobre laboratorijske

Intended Learning Outcomes:

Knowledge and Comprehension

Student fosters knowledge which is essential for quality assurance in analytical laboratory. Student understands the quality assurance system and measures.

Application

Student develops skills for operation in the accordance with the system of quality assurance in analytical laboratory.

Analysis

Student fosters the awareness of the importance of the valid analytical results and

prakse.	performance in the accordance with the principles of a good laboratory practice.
Prenosljive spretnosti Študent razvija odgovornost za zanesljivo delovanje in spoštovanje postavljenih zahtev.	Skill-transference Ability Student develops personal responsibility for reliable performance and following the prescribed procedures.

Metode poučevanja in učenja:

Predavanja, vodeni razgovor, sodelovalno učenje, študij primerov, reševanje problemov.
Laboratorijsko projektno delo: ovrednotenje prispevkov k merilni negotovosti končnega rezultata dobljenega z analizno metodo.

Learning and Teaching Methods:

Lectures, guided discussions, cooperative learning, case studies, problem solving.
Laboratory project: Evaluation of the uncertainty contributions to the final result obtained by an analytical method.

Načini ocenjevanja:

Pisno preverjanje znanja.

Delež (v %) /

Weight (in %) **Assessment:**

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Reference nosilca / Lecturer's references:

- **GROS, Nataša.** Evacuated blood-collection tubes for haematological tests : a quality evaluation prior to their intended use for specimen collection. Clinical chemistry and laboratory medicine, ISSN 1434-6621, 2013, vol. 51, no. 5, str. 1043-1051.
- **GROS, Nataša, CAMÕES, Maria Filomena, SILVA, Ricardo J. N. Bettencourt da.** Detailed uncertainty budget for major and minor ions in stock combined calibration standards : influence of impurities in chemicals. Analytica chimica acta, ISSN 0003-2670.
- **GROS, Nataša, CAMÕES, Maria Filomena, SILVA, Ricardo J. N. Bettencourt da.** Uncertainty budget for simultaneous determination of minor and major ions in seawater with ion chromatography confronted with uncertainties in concentrations of calibration standards. Analytical letters, ISSN 0003-2719, 2010, vol. 43, no. 7/8, str. 1317-1329.