

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Kemijska tehnologija
Course title:	Chemistry and Processes

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Tehnologije in sistemi – prva stopnja	/	prvi	prvi
Technologies and Systems – 1st cycle	/	first	first

Vrsta predmeta / Course type obvezni/obligatory

Univerzitetna koda predmeta / University course code: TS 1 UN 4

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
45		30			93	6

Nosilec predmeta / Lecturer: doc. dr. Ivan Jerman

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

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

- vpis v prvi letnik študija,
- znanje vsaj enega tujega jezika (angleščina),
- študent(-ka) naj pripravi vsaj eno seminarsko nalogo, jo uspešno predstavi pred zahtevnim (študenti, profesorji) občinstvom.

Prerequisites:

- enrollment in the first year of study,
- knowledge of at least one foreign language (English),
- student should prepare at least one seminar assignment and successfully present it in front of a demanding (students, professors) audience.

Vsebina:

- *Kemijska tehnologija*. Definicija. Pomen. Razdelitev.
- *Izbrana poglavja iz organske kemijske tehnologije*.
- Procesi in proizvodi pri predelavi premoga in zemeljskega olja (karbokemija, petrokemija, kemikalije, bencini, plinska olja).
- Izbrane tehnologije pri kemijskih sintezah zdravil.
- Rastlinska zaščitna sredstva.
- Pomen biotehnologije.
- Osnove proizvodnje nekaterih izbranih funkcionalnih proizvodov.
- Nekatero značilne kemijske tehnologije v anorganski industriji.

Content (Syllabus outline):

- *Chemical technology*. Definition. Meaning. Division.
- *Selected chapters of organic chemical technology*.
- Processes and products in the processing of coal and petroleum (carbochemistry, petrochemistry, chemicals, gasoline, gasoil).
- Selected technologies in chemical synthesis of pharmaceuticals.
- Plant protection products.
- Importance of biotechnology.
- Basics of production of some selected functional products.
- Some typical chemical technologies in the inorganic industry.

Temeljni literatura in viri / Readings:

Austin, G. T. (1998) *Shreve's chemical process industries*. New York: McGraw-Hill.

Green, M. M., Witcoff, H. A. (2003) *Organic chemistry principles and industrial practice*. Weinheim: Wiley-VCH. ISBN 3-527-30289-1.

Japelj, M. (1992) *Rastlinska zaščitna sredstva, skripta*. Ljubljana: Univerza v Ljubljani.

Rennenberg, R. (2008) *Biotechnology for Beginners*. Elsevier. ISBN-10: 0123735815 | ISBN-13: 978-0123735812.

Petre, M. (2012) *Advances in Applied Biotechnology*. InTech.

Kirk-Othmer (2006) *Kirk-Othmer Encyclopedia of chemical technology*. Weinheim: Wiley-VCH.

Ullmann's Encyclopedia of Industrial Chemistry: Electronic Release (2006) Weinheim: Wiley-VCH.

Cilji in kompetence:

Učna enota prispeva predvsem k razvoju naslednjih splošnih in specifičnih kompetenc:

- sposobnost obvladovanja standardnih razvojnih metod, postopkov in procesov,
- sposobnost uporabe pridobljenega teoretičnega znanja v praksi,
- sposobnost obvladovanja razvoja in napredka,
- kooperativnost, usposobljenost za timsko delo,
- sposobnost razumevanja in uporabe sodobnih teorij s področja tehniških, tehnoloških in naravoslovnih ved,

Objectives and competences:

The learning unit mainly contributes to the development of the following general and specific competences:

- the ability to master standard development methods, procedures and processes,
- the ability to use acquired theoretical knowledge in practice,
- the ability to manage development and progress,
- willingness to cooperate and work in a team;
- the ability to understand and apply modern theories in the fields of technical, technological and natural sciences,

- sposobnost interdisciplinarnega povezovanja znanja,
- sposobnost reševanja konkretnih delovnih problemov na področju tehnologij in sistemov z uporabo standardnih strokovnih metod in postopkov,
- poznavanje mehanskih in kemičnih lastnosti materialov, njihovo uporabo in metode predelave,
- razvoj strokovnih veščin in spretnosti na področju tehnologij in sistemov,
- poznavanje, uporabljanje in spremljanje metode celovite kakovosti tehnologij, proizvodnje in logistike.

- the ability to integrate knowledge in an interdisciplinary manner,
- the ability to solve specific work problems in the field of technologies and systems using standard professional methods and procedures,
- knowledge of the mechanical and chemical properties of materials, their use and processing methods,
- development of professional skills and abilities in the field of technologies and systems,
- knowledge, application and monitoring of the comprehensive quality method for technologies, production and logistics.

Predvideni študijski rezultati:

Znanje in razumevanje:

Študent/študentka:

- spozna in doume pomen kemijske tehnologije in predvsem pomen kompleksnih dosežkov s širokega področja kemije za uspešno gospodarstvo in za uspešno družbo nasploh,
- doume izredni pomen kemije in kemijske tehnologije v vsakodnevem življenju posameznika in v neposredni poklicni dejavnosti na različnih področjih,
- seznaneni se z nekaterimi bistvenimi tehnologijami in tehnološkimi procesi v široko razviti (svetovni in predvsem naši) kemijski industriji,
- delno se seznaneni s široko izbiro in raznovrstnostjo številnih proizvodov kemijske industrije in z njihovo vsestransko uporabo,
- pozna in razume pomen svetovne kemijske industrije in predvsem sodobne slovenske kemijske in farmacevtske industrije,
- ustvarja si in tudi spreminja svojo življenjsko filozofijo, ki poleg sicer zelo pomembnih družbenih in humanistični ved in kulture visoko ceni in na novo in drugače spoštuje dosežke in spoznanja s področij naravoslovnih ved, tehnike, inženirstva, tehnologije...

Intended learning outcomes:

Knowledge and understanding:

Student:

- learns and understands the importance of chemical technology and especially the importance of complex achievements in the broad field of chemistry to a successful economy and to a successful society in general,
- understands the extraordinary importance of chemistry and chemical technology in the daily life individuals and in direct professional activities in various fields,
- learns about some essential technologies and technological processes in the widely developed (global and especially our) chemical industry,
- partially learns about the wide range and variety of many products of the chemical industry and their many uses,
- knows and understands the importance of the global chemical industry and especially the modern Slovenian chemical and pharmaceutical industry,
- also creates and changes his/her philosophy of life, which, in addition to the otherwise important social and humanistic sciences and culture, also values and respects the achievements and knowledge from the

- spoznava in doumeva odnose med osnovnimi in aplikativnimi raziskavami, njihovo medsebojno prepletenost in povezanost znanosti s sodobno tehniko in visokimi tehnologijami,
- širše znanje iz tehnologij nasploh daje študentom nove izzive in možnosti za osebno zadovoljstvo na novih službenih dolžnostih, velike možnosti napredovanja in realne danosti za mednarodno sodelovanje.

- fields. of natural sciences, engineering, technology... in a new and different way,
- learn about and understand the relationships between basic and applied research, their interconnectedness and the relationship between science and modern engineering and high technologies,
 - a broader knowledge of technologies in general gives students new challenges and opportunities for personal satisfaction in new professional roles, great opportunities for advancement and realistic possibilities for international collaboration

Metode poučevanja in učenja:

- *predavanja* z aktivno udeležbo študentov (razlaga, diskusija, problematika, razvijanje ustvarjalnosti),
- *seminarske naloge in vaje*, vezane na problematiko različnih vrst kemijske tehnologije,
- uvajanje samostojnosti razmišljanja in osebnega ukrepanja pri širokem izboru ustvarjalnega in inovativnega dela,
- *priprava možnostnih študij* (Feasibility Studies) za posamezne tehnologije in proizvode,
- pomen prenosov eksperimentalnih dosežkov iz laboratorijskih raziskav v polindustrijska in industrijska merila,
- *razumevanje izbranih tehnologij in tehnoloških shem* (Flow-Sheet),
- *seznanjanje z nekatero tehnološko opremo, stroji, aparati, merilnimi instrumenti* (reaktorji, centrifuge, sušilniki, filtri, spektrometri, laboratorijska oprema...),
- seznanjanje s široko strokovno in patentno literaturo in praktična uporaba dosegljive dokumentacije iz knjig, revij, interneta, arhivov ...,
- pomen in prenosi dosežkov iz laboratorijskih raziskav v polindustrijska in industrijska merila,
- *strokovne ekskurzije* in ogledi izbranih in pomembnih kemijskih in farmacevtskih industrijskih obratov.

Learning and teaching methods:

- *lectures* with active participation of students (explanation, discussion, problems, development of creativity),
- *seminar papers and tutorials* related to the problems of different types of chemical technology,
- introduction to independent thinking and personal action in a wide range of creative and innovative work,
- *preparation of feasibility studies* for individual technologies and products,
- the importance of transferring experimental results from laboratory research to semi-industrial and industrial standards,
- *understanding of selected technologies and technological schemes* (Flow-Sheet),
- *familiarization with some technological equipment, machines, devices, measuring instruments* (reactors, centrifuges, dryers, filters, spectrometers, laboratory equipment...),
- familiarization with a wide range of professional and patent literature and practical use of available documentation from books, magazines, Internet, archives...,
- the importance and transfer of achievements from laboratory research to semi-industrial and industrial standards,
- *professional excursions* and visits to of selected and important chemical and pharmaceutical industrial plants.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Način (pisni izpit, ustno izpraševanje, naloge, projekt): <ul style="list-style-type: none"> • pisni izpit • ustni izpit • projektno in seminarsko delo Ocenjevalna lestvica:ECTS.	30% ocene 40% ocene 30% ocene	Type (examination, oral, coursework, project): <ul style="list-style-type: none"> • written exam • verbal exam • project and seminar work Grading scale: ECTS.