

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	OSNOVE INŽENIRSTVA
Course Title:	ENGINEERING FUNDAMENTALS

Študijski program in stopnja Study Programme and Level	Študijska smer Study Field	Letnik Academic Year	Semester Semester
UŠP Kemijsko inženirstvo, 1. stopnja	/	1.	1.
USP Chemical Engineering, 1 st Cycle	/	1 st	1 st

Vrsta predmeta / Course Type:

obvezni / Mandatory

Univerzitetna koda predmeta / University Course Code:

IN105

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

Nosilec predmeta / Lecturer:

prof. dr. Matevž Dular / Dr. Matevž Dular, Full Professor

Jeziki / Languages:

Predavanja / Lectures: slovenski / Slovenian

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:

Uvod: pomen tehnike v svetu in znanosti
Elektrotehnika: lastnosti električnega toka, elektromagnetno polje in elektromotorji, uporaba elektromotorjev, različne vrste elektromotorjev, mehansko in elektronsko krmiljeni elektromotorji, asinhroni in sinhroni elektromotorji, transformatorji, krmiljenje in regulacija, vodenje energetskega sistema
Strojništvo: materiali (preizkušanje, jekla in litine, aluminij, baker, keramika, kompozitni materiali, polimeri) hrup, prenos toplote (prevajanje, prestop, sevanje), prenosniki toplote, energetske stroje (volumenski in turbinski)
Gradbeništvo: hidravlične meritve
Seminarji: Proizvodnja steklene in kamene

Content (Syllabus outline):

Introduction: the importance of technology in the world and science
Electrotechnics: electrical current properties, electromagnetic field and electric motors, use of electric motors, various types of electric motors, mechanically and electronically commutated electric motors, asynchronous and synchronous electric motors, transformers, control and regulation, regulation of power systems
Mechanical engineering: materials (testing, steels and alloys, aluminum, copper, ceramics, composite materials, polymers) noise, heat transfer (conduction, convection, radiation), heat exchangers, energy machines (volumetric and turbine)

volne, komunalne čistilne naprave, delovanje gospodinskega sušilnega stroja, merjenje sestave plinov in delcev v izpušnih plinih vozil, z notranjim zgorevanjem, sistemi za posnemanje podatkov

Civil engineering: hydraulic measurements
Seminars: Production of glass and stone wool, municipal wastewater treatment plants, operation of a household tumble dryer, measurement of the composition of gases and particles in exhaust of internal combustion engines, data acquisition systems

Temeljna literatura in viri / Readings:

Marko Hočvar, Matevž Dular, Osnove inženirstva, študijsko gradivo, 233 strani, FKKT, 2017

Cilji in kompetence:

Cilj predmeta je študente seznaniti z značilnostmi in koncepti kemijsko inženirske stroke in njeno vlogo v svetu tehnike.

Predmetno specifične kompetence:

- študent spozna kemijsko proizvodno linijo in prepletanje posameznih tehniških strok na poti od surovine do produkta
- študent spozna značilnosti kemijsko tehnološkega procesa ter koncept osnovnih operacij in reakcij v njem
- razume procesno shemo in pomen posameznih naprav za določen kemijsko tehnološki proces.

Objectives and Competences:

The objective is to acquaint the student with characteristics and concepts of chemical engineering and its role in the technical world.

Specific competences are:

- student recognizes chemical production line and interaction of particular technical disciplines on the way from raw materials to a product,
- student recognizes characteristics of chemical process technology together with the concept of unit operations and chemical reaction,
- understands the process scheme and the role of individual equipment for a particular chemical process technology.

Predvideni študijski rezultati:

Znanje in razumevanje

Študent je po osvojitvi osnovnih pojmov in principov tehnike, ki jih podaja ta predmet, sposoben razumeti specifičnosti kemijsko inženirske stroke ter pomena osnovnih operacij v tehnološkem procesu v kemijski industriji.

Uporaba

Pridobljeno osnovno in splošno tehnično izobrazbo bo koristno uporabil v nadaljevanju študija za nadgradnjo s specifičnimi in poglobljenimi kemijsko inženirskimi znanji, kar bo omogočalo reševanje posameznih praktičnih primerov in problemov v industrijskih kemijsko tehnoloških procesih.

Intended Learning Outcomes:

Knowledge and Comprehension

After mastering basic technical concepts and principles given by the present course, student is able to understand specifics of chemical engineering discipline and the role of unit operations in chemical process technology on industrial scale.

Application

Acquired basic and general technical knowledge will be usefully served during the future study for the upgrade with specific and profound chemical engineering knowledge. This will enable solving practical cases and problems in chemical process technology on industrial scale.

<u>Refleksija</u> Uporaba splošnih tehničnih znanj in osnovnih principov kemijskega inženirstva, analiza in kritično ovrednotenje kemijsko tehnološkega procesa oziroma posameznega postopka in naprave.	<u>Analysis</u> Use of general technical knowledge and basic principles of chemical engineering, analysis and critical evaluation of chemical process technology as whole or only its particular operation or equipment.
<u>Prenosljive spretnosti</u> Razvita sposobnost identifikacije in reševanja tehničnih problemov, kritičnega razmišljanja in logičnega sklepanja. Sposobnost uporabe literature, zbiranja in interpretacije podatkov in njihove kritične evalvacije.	<u>Skill-transference Ability</u> Developed skill to identify and solve technical problem, critical thinking and making logical conclusions. Ability of literature data using, data collection and interpretation as well as their critical evaluation.

Metode poučevanja in učenja:

Predavanja in seminarji.

Learning and Teaching Methods:

Lectures and seminars.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
pisni in ustni izpit	100%	

Reference nosilca / Lecturer's references:

STEPIŠNIK PERDIH, Tadej, ZUPANC, Mojca, DULAR, Matevž. Revision of the mechanisms behind oil-water (O/W) emulsion preparation by ultrasound and cavitation. *Ultrasonics Sonochemistry*, ISSN 1350-4177, Mar. 2019, vol. 51, str. 298-304

STEPIŠNIK PERDIH, Tadej, ŠIROK, Brane, DULAR, Matevž. On the bubble-surfactant interaction. *Chemical engineering and processing*, ISSN 0255-2701. [Print ed.], Nov. 2017, vol. 121, str. 198-204

ŽNIDARČIČ, Anton, METTIN, Robert, DULAR, Matevž. Modeling cavitation in a rapidly changing pressure field - application to a small ultrasonic horn. *Ultrasonics Sonochemistry*, ISSN 1350-4177, Jan. 2015, vol. 22, str. 482-492