

University
of Ljubljana
Faculty
*of Civil and Geodetic
Engineering*



Course Syllabi
1st cycle study programmes

Courses in English

2016/2017

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	Digitalno načrtovanje
Course title:	Digital design

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Gradbeništvo – prva stopnja UN		2, 3	3–6
Civil Engineering – first cycle academic		2, 3	3–6

Vrsta predmeta / Course type:

Izbirni strokovni / Elective professional

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
30		30			60	4

Nosilec predmeta / Lecturer:

doc. dr. Tomo Cerovšek

Jeziki /

Predavanja / Lectures: slovenski / English

Languages:

Vaje / Tutorial: slovenski / English

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

Prerequisites:

Vsebina:

Vloge računalnika pri načrtovanju in modeli BIM. Orodja za konceptualno in detajlno načrtovanje. Obvladovanja okolij za digitalno načrtovanje. Ravnina in prostor, koordinatni sistemi in mreže. Pogledi, transformacije k.s. in elementov. Modeliranje teles, platonična telesa in telesa CSG. Modeliranje elem. stavb, knjižnice predmetov GDL. Programiranje geometrije na osnovi API. Modeliranje terena, operacije in As-built modeli. Površine teles, teksture, senčenje in svetloba. Animacija, Sončne študije in 4D modeli. 5D simulacija časovnih sprememb geometrije. Standardi, interoperabilnost in BIM menedžment. Napredna uporaba pogledov projekcije, kosovnice. Metode priprave in izmenjave dokumentacije.

Content (Syllabus outline):

The role of computers in engineering design and the use of BIM models. Tools for conceptual and detailed design. Environments for digital design. Planar and space geometry, coordinate systems and grids. Views, transformations of coordinate systems and geometrical entities. Modelling of bodies, platonic solids and CSG. Modelling of building elements and libs GDL. Programming of geometrical entities via API. Modelling of terrain, operations and As-builts. Surfaces, textures, shading and daylight. Animations, sun studies and 4D models. 5D simulation of changes of geometry. Standards, interoperability and BIM mngt. Advanced use of views, projections, take-of. Methods of authoring and exchange of project documentation.

Temeljna literatura in viri / Readings:

MITCHELL and McCULLOUGH M. 1995. Digital design media . - 2nd ed. - New York [etc.] : Wiley, cop. 1995. - XVI, 494 str., ilustr. ; 26 cm.
 CEROVŠEK T (2013) Prosojnice za predmet Digitalno Načrtovanje, Univerza v Ljubljani.
 Učno gradivo v spletni učilnici UL FGG.

Cilji in kompetence:**Cilji**

- Spoznati vlogo digitalnega načrtovanja v procesu graditve
- Spoznati način delovanja programov za načrtovanje
- Spoznati uporabo modelov za različne potrebe

Kompetence

- Izbrati pravo orodje za digitalno načrtovanje glede na vrsto objekta, kompleksnost in fazo projekta
- Samostojno izdelati model gradbenega objekta s ključnimi informacijami
- Uporabiti avtomatizacijo procesa načrtovanja glede na zahtevnost in obseg problema
- Sposobnost uporabe geometrijskih podatkov v različne namene

Objectives and competences:**Objectives**

- Student shall understand the role of digital design throughout project stages
- Student shall understand the way tools for digital design work
- Student shall understand the use of models

Competences

- Use the right tool for digital design that matches types of building, complexity and project phase
- Independent authoring of a model of a building with essential geometrical and non- geometrical data
- Ability to automate the design process to match scale and complexity of the design problem
- Ability to use geometrical data for different purposes

Predvideni študijski rezultati:

- Poznavanje pomena digitalnega načrtovanja skozi življenjski cikel stavb.
- Razumevanje delovanja programov za digitalno načrtovanje.
- Znanje o uporabi računalniških programov.
- Poznavanje dela s programi za konceptualno načrtovanje.
- Izdelani modeli v različnih programskih paketih in glede na potrebe različnih faz gradbenega projekta.

Intended learning outcomes:

- Knowledge and understanding of the role of digital design throughout building project stages.
- Knowledge and understanding of tools for digital design from conceptual design to detailed design.
- Developed models in different authoring environments for digital design for different information needs in several project stages.

Metode poučevanja in učenja:

Problemsko zasnovano učenje. Študentu se podajo problemi iz prakse, ki so povezani z digitalnim načrtovanjem, pri reševanju pa se lahko posvetuje s predavateljem, bodisi na korekturah ali preko spletnih tehnologij za komunikacijo v dejanskem času, lahko si pomaga s primeri dobre prakse.

Learning and teaching methods:

Problem based learning. Students are faced with problems from the industry, which are related to digital design. Students get part of the knowledge just in time and one part just in case. Students have regular consultations with the lecturers either in person or live using real-time collaboration tools.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Sprotno delo pri vajah	50 %	Regular course work
Samostojne naloge	20 %	Final project

Reference nosilca / Lecturer's references:

CEROVŠEK, Tomo. A review and outlook for a 'Building Information Model' (BIM) : a multi-standpoint framework for technological development. Advanced engineering informatics, 2011, letn. 25, št. 2, str. 224-244, ilustr., doi: 10.1016/j.aei.2010.06.003.

CEROVŠEK, Tomo. Informacijsko modeliranje zgradb (BIM) : uvod. Gradb. vestn., mar. 2010, letn. 59, št. 3, str. 71-72, ilustr.

CEROVŠEK, Tomo. Process Reuse in Product Development with 5D Models : Concepts, Similarity Measures and Query Techniques. V: PUTNIK, Goran D. (ur.). VINORG 11 : July 6.-8., 2011, Ofir, Portugal, (Communications in Computer and Information Science). Ofir: 2100 Project Association, 2012, str. 1-10, ilustr.

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
---------------------------------------	--

Predmet:	Geotehnika
Course title:	Geotechnical engineering

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Gradbeništvo – prva stopnja UN		3	5
Civil Engineering – first cycle academic		3	5

Vrsta predmeta / Course type: Obvezni strokovni / Obligatory professional

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
45	10		30	5	90	6

Nosilec predmeta / Lecturer: izr. prof. dr. Janko Logar

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

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

Opravljeni izpiti iz predmetov Trdnost, Mehanika tal in inženirska geologija.

Prerequisites:

Passed exams in Soil mechanics and engineering geology, Strength of materials.

Vsebina:

Zemeljski pritiski; mejna napetostna stanja v tleh – nosilnost tal; terenske raziskave tal; plitvo temeljenje objektov (potrebne raziskave, načrtovanje, tehnologije); gradnja objektov v odprti gradbeni jami, oporne konstrukcije za zaščito gradbene jame; globoko temeljenje objektov (tehnologije, nosilnost in posedki pilotov); kdaj temeljimo objekte plitvo, kdaj globoko; težnostne podporne konstrukcije; priprava temeljnih tal; načrtovanje in gradnja nasipov; načrtovanje in gradnja vkopov; masna bilanca zemeljskih del; osnove uporabe geosintetikov.

Content (Syllabus outline):

Earth pressures; limit stress states in the ground – bearing capacity; shallow foundations (ground investigations, design and technologies); in-situ ground investigations; construction pit, retaining structures in deep cuts; deep foundations (technologies, bearing capacity, settlements); criteria for the choice of foundation type; retaining structures; ground treatment and fundamentals of soil improvement; design and construction of embankments; design and construction of cuts; balance of soil masses in earthworks; basic concepts of the use of geosynthetics.

Temeljni literatura in viri / Readings:

Majes, B., J. Logar. 2012. Skripta za predmet Geotehnika. Ljubljana.
 Šuklje, L. 1984. Mehanika tal. Ljubljana, Univerza v Ljubljani, Fakulteta za arhitekturo, gradbeništvo in geodezijo, str. 212-235 in 268-312.
 Nonveiller, E. 1990. Mehanika tla i temeljenje građevina. Zagreb, Školska knjiga, str. 309-400 in 495-768.
 SIST EN 1997-1, Geotehnično projektiranje – 1. del: Splošna pravila (2006)
 SIST EN 1997-2, Geotehnično projektiranje – 2. del: Geotehnično preiskovanje in preskušanje (2007)
 Tomlinson, M.J. 2001. Foundation design and construction. Prentice Hall, 569 str.
 Učno gradivo v spletni učilnici UL FGG.

Cilji in kompetence:

- Cilj predmeta je nadgraditi osnove mehanike tal in jih uporabiti za aplikacije pri načrtovanju in izvedbi temeljev, zemeljskih del ter geotehničnih gradenj.

Kompetence

- Zna izračunati nosilnost in posedek temelja v homogenih tleh pod preprostimi objekti
 - Zna geotehnično načrtovati manj zahtevne nasipe, vkope, podporne konstrukcije in rutinske temelje konstrukcij.

Objectives and competences:

- The theoretical knowledge on soil mechanics will be upgraded and used in engineering applications for the design of foundations of structures, earthworks and geotechnical works.

Competences

- Ability to assess bearing capacity and settlement in homogeneous ground under simple structures,
 - Ability to perform geotechnical design of embankments, cuts, retaining structures and routine foundations.

Predvideni študijski rezultati:

- Poznavanje načel projektiranja in gradnje nasipov, vkopov, odvodnje, priprave temeljnih tal in uporabe geosintetikov; tehnologije gradnje plitvih in globokih temeljev, tehnologije izvedbe gradbene jame, podpornih konstrukcij.

- Razumevanje pojmov nosilnost tal, zemeljski pritiski.

- Razumevanje procesa geotehničnega projektiranja od raziskav preko načrtovanja, izvedbe in opazovanja izvedenih del.

- Razumevanje varnosti pri različnih geotehničnih delih, razločevanje bistvenih pogojev, ko je mogoče plitvo temeljenje oziroma je potrebno globoko temeljenje objektov.

- Razumevanje principov varovanja gradbene jame in njenega zaledja.

- Sposobnost razumevanja geotehniške dokumentacije, uporaba enačb in postopkov za računske analize vkopov, nasipov, temeljenja, načrtovanja gradbene jame, podpornih konstrukcij, uporaba računalniških programov za analize posedkov in globalne stabilnosti tal.

Intended learning outcomes:

- Student is acquainted with the principles of the design and construction of embankments, cuts, drainage, ground treatment and use of geosynthetics; construction technology of shallow and deep foundations and retaining structures.

- Understanding of bearing capacity, earth pressures

- Understanding of the process of geotechnical design from ground investigation, design calculations, execution of geotechnical works and monitoring

- Understanding of safety concept in geotechnical design. Distinguishing the main reasons for the choice of deep or shallow foundations.

- Understanding the principles of design of deep cuts for construction pits.

- Ability to read and understand geotechnical reports, to use equations and procedures for the analyses of cuts, embankments, construction pits, foundations and retaining structures. Ability to use software for the calculation of settlements and slope stability.

Metode poučevanja in učenja:

Predavanja, seminar, terenski dan, računske vaje, domače delo preko spletne učilnice.

Learning and teaching methods:

Lectures, seminar, field work, tutorials, homework using e-classroom.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Domače naloge	10 %	Homework
in		and
dva kolokvija	90 %	two midterm tests
ali		or
računski izpit	45 %	written exam
teoretični (ustni) izpit	45 %	theoretical (oral) exam

Reference nosilca / Lecturer's references:

PULKO, Boštjan, MAJES, Bojan, LOGAR, Janko. Geosynthetic-encased stone columns - analytical calculation model. Geotext. geomembr.. [Print ed.], feb. 2011, letn. 29, št. 1, str. 29-39.

KUDER, Sebastjan, LOGAR, Janko. Numerični model za analizo obnašanja tlačno obremenjenih, vtisnjenih jeklenih pilotov v Luki Koper = Numerical model for the prediction of behaviour of driven steel piles under axial compression loading in the Port of Koper. Gradb. vestn., avgust 2008, letn. 57, št. 8, str. 207-214.

ŠTRUKELJ, Andrej, ŠKRABL, Stanislav, ŠTERN, Ksenija, LOGAR, Janko. The assesment of pile shaft resistance based on axial strain measurements during the loading test. Acta geotech. Slov., 2005, letn. 2, št. 2, str. 12-23.

LOGAR, Janko, FIFER BIZJAK, Karmen, KOČEVAR, Marko, MIKOŠ, Matjaž, RIBIČIČ, Mihael, MAJES, Bojan. History and present state of the Slano Blato landslide. Nat. hazards earth syst. sci. (Print), 2005, 5, str. [447]-457.

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Naravne nesreče in njihov vpliv na okolje, prostor in družbo
Course title:	Natural disasters and their impact on environment and society

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Vodarstvo in okoljsko inženirstvo – prva stopnja UN		1–3	1–6
Water Science and Environmental Engineering – first cycle academic		1–3	1–6

Vrsta predmeta / Course type: Izbirni strokovni / Elective professional

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
60	30				90	6

Nosilec predmeta / Lecturer: doc. dr. Andrej Kryžanowski, doc. dr. Primož Banovec

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

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

Predmet je namenjen študentom drugih študijskih programov, predvsem s področja družboslovja, zanje ni pogojev pristopa, ne more pa ga izbrati študent študijskih programov s področja gradbeništva ali vodarstva in okoljskega inženirstva.

Prerequisites:

The course is intended to students of other study programs, mainly those from social sciences; no prerequisites are foreseen, but it cannot be selected by students of civil engineering or water science and environmental engineering..

Vsebina:

Predavanja
Opredelitev tipov naravnih nesreč. Organizacijski okvir izvajanja nalog zaščite in reševanja: (1) Vrste in pristojnosti državnih organov, regijskih in občinskih organov na področju zaščite in reševanja; (2) Evropske inštitucije in mehanizmi na področju zaščite in reševanja; (3) moduli civilne zaščite in razvoj novih modulov; (4) Bilateralno sodelovanje; (5) standardni cikel zaščite in reševanja; (6) proces aktiviranja sil zaščite in reševanja.; (7) mehanizmi in postopki vodenja intervencij; (8) viri financiranja za delovanje sistema zaščite in reševanja. Zakonodaja na področju zaščite in reševanja, obveščanja in alarmiranja. Obnašanje in odziv javnosti v primeru nastopa naravnih nesreč. Mehanizmi ocenjevanja ogroženosti, postopki ocenjevanja posledic nesreč, blaženje posledic in

Content (Syllabus outline):

Lectures
Definition of the types of natural disasters. Organisation framework for performing the protection and rescue tasks: (1) Types and competences of state agencies, regional and municipal bodies in the field of civil protection and rescue; (2) European institutions and mechanisms for civil protection and rescue; (3) EU modules of civil protection and development of new modules; (4) bilateral cooperation; (5) standard protection and rescue cycle; (6) process of activating the protection and rescue services; (7) mechanisms and procedures of intervention management; (8) sources of financing that enable the functioning of the civil protection and rescue system. Legislation in the field of: civil protection and rescue, communication/information and alarming.

zmanjševanje ogroženosti. Vpliv zanesljivosti (uporabljenih) podatkov in izbiri ustreznih modelov na končno oceno posledic in na obseg škode, ter pravilno zasnovano obveščanje in ukrepanje. Naravne nesreče v Republiki Sloveniji za katere obstajajo analize ogroženosti in načrti zaščite in reševanja. Sistemi za hiter odziv in podpora odločanju v primeru naravne nesreče: (1) vloga ekspertov (okoljsko gradbeništvo) v procesih cikla civilne zaščite; (2) sodelovanje in odziv javnosti v ciklu civilne zaščite v primeru naravnih nesreč. Vpliv zanesljivosti (merjenih in analiziranih) podatkov na ustrezno in pravočasno ukrepanje ob nastopu dogodka in posledični obseg škode. Sanacija posledic naravnih nesreč – pristojnosti in postopki. Percepcija in odzivi.

Seminar

Uporaba pridobljenega znanja pri individualni nalogi, ki obsega uporabo modelov za določanje nevarnosti, ranljivosti in ogroženosti pred naravnimi nesrečami. Izdelava ocene ogroženosti, ocena posledic (PAR; LOL) izdelava načrta zaščite in reševanja (tudi analiza in validacija podatkov). Analiza scenarijev razvoja možne naravne nesreče. Kritično tolmačenje rezultatov in predstavitev naloge.

Behaviour and response of public in case of natural disasters. Mechanisms of risk evaluation, procedures of disaster damage assessment, disaster mitigation and risk reduction. Data validation and selection of adequate models on the final evaluation of consequences and on the scope of damage, and impact of the data validation process on the response planning. Natural disasters in the Republic of Slovenia for which risk assessments and protection/rescue plans are prepared. Rapid response systems and decision making process in the event of natural disaster: (1) role of experts (environmental civil engineering) in the processes of the civil protection cycle; (2) cooperation and response of the public in the civil protection cycle in the event of natural disaster. Influence of (measured and analysed) data reliability on adequate and timely measures in the event of a disaster and the resulting scope of damage. Mitigation of natural disasters – competences and procedures. Perception and responses.

Seminar

Use of the acquired knowledge in individual seminary work that includes the use of models for the definition of risk, vulnerability and hazard of natural disasters. Elaboration of risk assessment, assessment of consequences (PAR; LOL) elaboration of protection and rescue plan (incl. data analysis and validation) Analysis of scenarios of possible natural disaster development. Critical interpretation of results and presentation of the work.

Temeljna literatura in viri / Readings:

Blaikie, P.; Cannon, T.; Davis, I.; Wisner, B. 2003. At risk: natural hazards, people's vulnerability and disasters 2nd edition, Routledge, 336 str.

Gaetani F., Parodi A., Siccardi F., Miozzo D. and Trasforini E. 2008. Disaster Risk Reduction for South Eastern Europe, SEEDRMAP report 114 str.

Izbrani članki iz revije: International Journal of Disaster Risk Reduction (npr.: J. Richard Eiser. 2012. Risk interpretation and action: A conceptual framework for responses to natural hazards).

Kline, M., Polič, M. Zabukovec, V. 1998. Javnost in nesreče – obveščanje, opozarjanje, vplivanje, Ljubljana, 227 str.

Modelna orodja za aktivni odziv v primeru naravnih nesreč (poplave, potresi, razlitja idr.) uradni list (področna zakonodaja) Dostopno na: <http://www.preventionweb.net/english/professional/publications/>.

Dokumenti, ki obravnavajo delovanje sistema zaščite in reševanja – civilne zaščite v EU. Spletne strani FEMA (Federal Emergency Management Agency). Dostopno na: http://ec.europa.eu/echo/civil_protection/civil/index.htm.

Cilji in kompetence:**Cilji**

- Poznavanja organizacije zaščite in reševanja,
- poznavanje pristojnosti posameznih organizacij in inštitucij, ki se vključujejo v varstvo pred naravnimi nesrečami in ukrepanje ob nastopu le-teh,
- poznavanje postopkov, ki jih te organizacije izvajajo,
- prepoznavanj vrst naravnih nesreč – mehanizmov nastanka in razvoja posamezne vrste in možnih posledic,
- poznavanje specifičnosti posamezne vrste naravne nesreče in možnosti zgodnjega ukrepanja, omilitve škode, odziva sil zaščite in reševanja,
- razumevanje razvoja naravne nesreče na učnih primerih s poudarkom na klasifikaciji ključnih faz razvoja nesreče,
- razumevanje pomena preventivnega ukrepanja in ustreznega, predvsem pa pravočasnega ukrepanja v času dogodka,
- razumevanje pomena zajema podatkov in uporabe primerne vzorca pri modeliranju pojavov in pri pripravi načrtov zaščite in reševanja ter kasnejšem ukrepanju.

Pridobljene kompetence

- Prepoznavanje različnih tipov naravnih nesreč in razvoja možnih scenarijev,
- razumevanje mehanizmov nastanka naravne nesreče in različnih faz odziva nanje,
- poznavanje organizacije zaščite in reševanja ter sposobnost vključevanja v strukturo civilne zaščite,
- poznavanje protokolov obveščanja in alarmiranja ter protokolov ukrepanja,
- sposobnost razumevanja državnega in mednarodnega okolja v katerem sile zaščite in reševanja delujejo.

Objectives and competences:**Objectives**

- Understanding the protection and rescue organisation
- understanding the competences of individual organisations and institutions involved in the protection against natural disasters and their actions taken in such events
- understanding the procedures applied by these organisations
- recognising the types of natural disasters – mechanisms of their appearance, development of individual types and the possible consequences
- understanding the specifics of individual type of natural disaster and possibilities of early actions, damage mitigation, protection and rescue response actions
- understanding the development of natural disaster on case studies with the emphasis on the classification of key phases of disaster development
- understanding the importance of preventive actions and adequate, most importantly timely, actions during the event
- understanding the importance of data acquisition and use of appropriate sample for modelling the phenomena and preparing the protection and rescue plans as well as subsequent actions

Gained competences

- Recognising different types of natural disasters and development of possible scenarios,
- understanding mechanisms for the appearance of natural disaster and different phases of response to it,
- understanding the protection and rescue organisation and ability of participating in the civil protection structure/processes.
- understanding the communication and alarm protocols as well as action protocols,
- ability to understand national and international environment where the protection and rescue services operate.

Predvideni študijski rezultati:

- Razumevanje osnovnih terminov na področju varstva pred naravnimi in drugimi nesrečami, organizacijske sheme zaščite pred naravnimi nesrečami in reševanja v primeru nastopa le-teh
- poznavanje protokolov obveščanja in alarmiranja,
- razlikovanje med preventivnimi ukrepi in ukrepanjem med in po dogodkih
- poznavanje specifičnih procesov, ki se navezujejo na postopke odločanja v primeru naravnih nesreč,
- poznavanje faz načrtovanja oz. pripravljenosti/preventive kot ključne faze za sistemsko zmanjšanje ogroženosti,
- poznavanje faz intervencije in njenih specifičnih elementov,
- poznavanje faz blaženja posledic (mitigacija) in njenih specifičnih elementov,
- vloge različnih znanj in strokovnjakov (ekspertov) v procesu varstva pred naravnimi nesrečami in nadalje ob nastopu naravne nesreče,
- znanje za prenos rezultatov modelov za analizo nevarnosti naravne nesreče s ciljem podpore institucijam zaščite in reševanja,
- prenos znanj o modeliranju pojavov v praktično okolje, ki jim je uporabnik izpostavljen v primeru naravnih nesreč,
- uporaba znanj pri kritičnem snovanju rešitev v vsakodnevni praksi,
- uporaba pridobljenega znanja pri predmetih, kjer se obravnava pojave, ki so lahko tudi naravne nesreče za poglobljeno razumevanje namena modeliranja.

Intended learning outcomes:

- Understanding of basic terms in the area of protection against natural and other disasters,
- To know organisation schemes of protection against natural disasters and rescue in case of disasters,
- To know communication and alarm protocols,
- To distinguishing between preventive measures and actions during and after events,
- To know specific processes related to the decision making actions in events of natural disasters,
- To know phases of planning or preparedness/prevention as key phases for systematic risk reduction,
- To know intervention phases and their specific elements,
- To know mitigation phase and its specific elements,
- roles of different knowledge and experts in the process of protection against natural disasters and later with the appearance of natural disaster,
- knowledge related to the transfer of results of models for the risk analysis of natural disaster with the aim to support protection and rescue institutions,
- Transfer of knowledge on modelling the phenomena that a user is exposed to in the event of natural disaster into practical environment,
- use of the acquired knowledge for critical design of solutions in everyday practice,
- use of the acquired knowledge in courses that deal with phenomena which may also be natural disasters, for in-depth understanding of the purpose of modelling.

Metode poučevanja in učenja:

Predavanja in uporaba pridobljenih znanj pri izdelavi individualne seminarske naloge.

Learning and teaching methods:

Lectures and use of the acquired knowledge for the elaboration of individual seminar work.

Načini ocenjevanja:

Način (pisni izpit, ustno izpraševanje, naloge, projekt):
Seminarska naloga
Pisni in/ali ustni izpit

Delež (v %) /
Weight (in %)

50 %
50 %

Assessment:

Type (examination, oral, coursework, project):
Seminar work
Written and/or oral exam

Reference nosilca / Lecturer's references:

HUMAR, Nina, SCHNABL, Simon, KRYŽANOWSKI, Andrej. How to manage the dam safety and the risk with a support of Slovenian legislation. V: Sharing experience for safe and sustainable water storage : proceedings [of the] 9th ICOLD European Club Symposium, 10-12 April 2013, Venice, Italy. Roma: ITCOLD (Italian Committee on Large Dams), cop. 2013, str. [1-8].

KRYŽANOWSKI, Andrej, ŠIRCA, Andrej, RAVNIKAR TURK, Mojca, HUMAR, Nina. The VODPREG project : creation of dam database, identification of risks and preparation of guidelines for civil protection, warning and rescue actions. V: Sharing experience for safe and sustainable water storage : proceedings [of the] 9th ICOLD European Club Symposium, 10-12 April 2013, Venice, Italy. Roma: ITCOLD (Italian Committee on Large Dams), cop. 2013, str. [1-8].

HUMAR, Nina, SCHNABL, Simon, KRYŽANOWSKI, Andrej. Sometimes simple measure can reduce the hazard considerably. V: WINTER, Jan (ur.), KOSIK, Anna, WITA, Andrzej. Zapory - bezpieczeństwo i kierunki rozwoju, (Monografie Instytutu Meteorologii i Gospodarki Wodnej). Warszawa: Instytut Meteorologii i Gospodarki Wodnej - Państwowy Instytut Badawczy, 2013, str. 52-61, ilustr.

KRYŽANOWSKI, Andrej, HUMAR, Nina. Dam safety practice in Slovenia. V: WINTER, Jan (ur.). Bezpieczeństwo zapor - nowe wyzwania. Warszawa: Instytut meteorologii i gospodarki wodnej państwowy, 2011, str. 200-207.

STEINMAN, Franci, KLASINC, Roman, BANOVEC, Primož. Ermittlung der erwarteten Schadengröße bei Überflutungen hochwassergefährdeter Gebiete unter Verwendung moderner Technologien = Determination of expected damage resulting from the inundation of areas exposed to flood risks, using up-to-date technologies. Österr. Wasser- Abfallwirtsch.. [Print ed.], 2001, jg. 53, h. 9/10, str. 242-247.

BANOVEC, Primož, CERK, Matej, CVERLE, Andrej. Upravljanje poplavne ogroženosti kot sestavni del integrirane odpornosti urbanih območij = Management of flood risks as an integral part of urban resilience. V: Geodezija pri upravljanju z vodami : 41. geodetski dan, Dolenjske Toplice 19. - 20. oktober 2012 : [zbornik prispevkov], (Geodetski vestnik, Letn. 56 (2012), št. 4). Ljubljana: Zveza geodetov Slovenije, 2012, dec. 2012, letn. 56, št. 4, str. 838-845.

HOLTEN LÜTZHOFT, Hans-Christian, DONNER, Erica, WICKMAN, Tonie, ERIKSSON, Eva, BANOVEC, Primož, MIKKELSEN, Peter Steen, LEDIN, Anna. A source classification framework supporting pollutant source mapping, pollutant release prediction, transport and load forecasting, and source control planning for urban environments. Environ. sci. pollut. res. int.. [Print ed.], maj 2012, letn. 19, št. 4, str. 1119-1130, doi:10.1007/s11356-011-0627-9.

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
--	--

Predmet:	Operacijske raziskave v gradbeništvu
Course title:	Operational research in civil engineering

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Vodarstvo in okoljsko inženirstvo – prva stopnja UN		2, 3	3–6
Water Science and Environmental Engineering – first cycle academic		2, 3	3–6

Vrsta predmeta / Course type: Izbirni strokovni / Elective professional

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
45		30			75	5

Nosilec predmeta / Lecturer: prof. dr. Goran Turk, izr. prof. dr. Marijan Žura

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

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

Opravljena izpita Matematika I, Matematika II, Statistične metode v gradbeništvu.

Prerequisites:

Passed exams in Mathematics I, Mathematics II and Statistical methods in civil engineering.

Vsebina:

Uvod v matematično programiranje; linearno programiranje, metoda Simplex; nelinearno programiranje, Newtonova metoda, genetski algoritmi; dinamično programiranje, diskretno dinamično programiranje; osnove stohastičnih procesov, Markovske verige; problemi odločanja, drevesa odločanja; osnove simulacij, različni principi in načini simuliranja; osnove geoinformatike, vloga tehnologije GIS; grafične baze podatkov; pregled prostorskih analiz.

Content (Syllabus outline):

Introduction to mathematical programming; linear programming, Simplex method; nonlinear programming, Newton's method, genetic algorithms; dynamic programming, discrete dynamic programming; basics of stochastic processes, Markov chains; problems of decisions, decision trees; introduction to simulations, different approaches and types of simulations; introduction to geoinformatics, the role of GIS technology; graphical data bases; the overview of spatial analyses.

Temeljni literatura in viri / Readings:

Turk G. 2012. Verjetnostni račun in statistika, UL FGG, Ljubljana, 2012.
 Zadnik Stirn, L. 2001. Metode operacijskih raziskav za poslovno odločanje. Novo mesto, Visoka šola za upravljanje in poslovanje.
 Benjamin, J.R., Cornell, C.A. 1970. Probability, Statistics and Decision for Civil Engineers, McGraw Hill, str. 321-348, 524-581.
 Hiller, F.S.; Lieberman, G.J. 2001. Introduction to operations research, McGraw Hill.
 Benjamin, J.R., Cornell, C.A. 1970. Probability, Statistics and Decision for Civil Engineers, McGraw Hill.

Cilji in kompetence:**Cilji**

- Spoznati osnove teorije optimalnega upravljanja in modelirati praktični problem s primernim modelom,
- spoznati uporabo matematičnega programiranja pri reševanju problemov optimalnega upravljanja,
- aktivno spoznati osnove in uporabo informacijske tehnologije, kot npr. geografskih informacijskih sistemov.

Pridobljene kompetence

- Zna praktično uporabiti metode optimalnega upravljanja pri različnih problemih s področja vodarstva in okoljskega inženirstva,
- pozna možnosti uporabe geografskih informacijskih sistemov.

Objectives and competences:**Objectives**

- Student learns about basics operational research, optimal management and modeling of the projects,
- student is introduced to mathematical programming as a tool for optimal management,
- student obtains active knowledge of information technology, e.g. geographical information systems.

Gained competences

- Student is able to use the methods of optimal management in different problems from the field of environmental civil engineering,
- student is introduced in the use of geographical information systems.

Predvideni študijski rezultati:

- Študent pozna osnove teorije optimalnega upravljanja. Zna modelirati problem s primernim modelom (na primer: linearni model) in ga reši z metodami matematičnega programiranja.
- Spozna osnove determinističnih in stohastičnih procesov in njihovo uporabo v transportnih in oskrbovalnih problemih.
- Spozna geografski informacijski sistem, kot enega izmed osnovnih informacijskih sistemov, s katerimi se inženir vodarstva in komunalnega inženirstva srečuje v praksi.
- Študent razume, kako izvesti proces zapisa različnih sistemov (transporta, strežba, skladiščenje...) v matematične modele, kot je na primer model za linearno programiranje, s katerim nato problem reši.
- Prenos teoretičnega znanja, pridobljenega na predavanjih in iz študijske literature, na uporabo v praktičnih primerih preprostih problemov optimizacije upravljanja (na primer v

Intended learning outcomes:

- Student understands the basic concepts of operational research. Student is able to use the appropriate model (e.g. linear model) and solve the problem with the use of mathematical programming.
- Student learns about the basics of deterministic and stochastic processes and their use in transport and supply problems.
- Student learns about geographical information systems as one of the basic information systems used by environmental and civil engineers.
- Student understands how to transform the process data into mathematical form suitable for analysis, e.g. linear programming model.
- Transfer of theoretical knowledge obtained during study into practical problems of searching for optimal management strategy.
- Ability to use different software (Excel, Mathematica, ArcGIS ...).

komunalnem inženirstvu).
 - V okviru tega predmeta študentje spoznajo vrsto uporabnih funkcij in modulov različne programske opreme (Excel, Mathematica, ArcGIS ipd.), ki jim olajša delo pri drugih predmetih.

Metode poučevanja in učenja:

Polovica poučevanja predstavlja predavanja ex-katedra s pogosto uporabo modernih učnih pripomočkov: prikazi programske opreme, simulacij in drugo.

Druga polovica so vaje, ki jih opravimo v računalniški učilnici, v okviru katerih rešuje relativno preproste optimizacije upravljanja oziroma operacijskih raziskav.

Learning and teaching methods:

One half of the teaching is performed through the lectures with often use of modern teaching techniques: demonstration of statistical and other software, simulations, etc.

The second half is teaching and learning in the computer lab where relatively simple problems in optimization of management and operational research.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Sprotno delo (oddane rešitve nalog)	50 %	Exercises during the semester
Ustni izpit	50 %	Oral examination

Reference nosilca / Lecturer's references:

KREGAR, Klemen, TURK, Goran, KOGOJ, Dušan. Statistical testing of directions observations independence. *Surv. rev. - Dir. Overseas Surv.*, 2013, letn. 45, št. 329, str. 117-125.

MARJETIČ, Aleš, AMBROŽIČ, Tomaž, TURK, Goran, STERLE, Oskar, STOPAR, Bojan. Statistical Properties of Strain and Rotation Tensors in Geodetic Network. *J. surv. eng.*, avgust 2010, letn. 136, št. 3, str. 102-110.

TRTNIK, Gregor, KAVČIČ, Franci, TURK, Goran. The use of artificial neural networks in adiabatic curves modeling. *Autom. constr.*. [Print ed.], 2008, letn. 18, št. 1, str. 10-15.

ŠELIH, Jana, KNE, Anžej, SRDIČ, Aleksander, ŽURA, Marijan. Multiple-criteria decision support system in highway infrastructure management. *Transport (Vilnius (Spausd.))*. [Print ed.], 2008, letn. 23, št. 4, str. 299-305.

ŽURA, Marijan, SRDIČ, Aleksander, ZUPANČIČ, Dušan, NAGODE, Petra. Decision and control model - case of national highway network realisation process. *WSEAS Trans. Syst.*, 2006, letn. 5, št. 3, str. 591-597.

ČERNE, Tomaž, ŽURA, Marijan, RAKAR, Albin. Informacijska podpora gospodarjenju z javnimi površinami v urbanem okolju = Information support for public area management. *Geod. vestn.*. [Tiskana izd.], 2010, letn. 54, št. 1, str. 46-60.

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Osnove masivnih konstrukcij
Course title:	Fundamentals of concrete and masonry structures

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Operativno gradbeništvo – prva stopnja VS		2	4
Construction Management – first cycle professional		2	4

Vrsta predmeta / Course type: Obvezni strokovni / Obligatory professional

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
60		60			120	8

Nosilec predmeta / Lecturer: prof. dr. Matej Fischinger

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

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

Opravljeni izpiti iz predmetov (ali njihovih ekvivalentov) Gradiva in Statika.

Prerequisites:

Passed exams in the topics of Construction and building materials and Statics.

Vsebina:

Lastnosti in zgodovinski razvoj masivnih konstrukcij. Metoda mejnih stanj in varnostni faktorji za masivne konstrukcije. Mehanske lastnosti materialov (betona, jekla in zidovja). Projektiranje armiranobetonskih elementov: mejno stanje prereza in dimenzioniranje pri upogibu z osno silo, strigu in torziji in izbira začetnih dimenzij mejna stanja uporabnosti (kontrola razpok in načela računa povosov) konstruiranje armiranobetonskih elementov (razporejanje in oblikovanje armature, sidranje, preklopi, stebri, grede, stene, globoki nosilci in kratke konzole) osnove projektiranja (s tabelami) in konstruiranja AB plošč izdelava armaturnih načrtov in spiska armature temeljni konstrukterski ukrepi za zagotavljanje potresne odpornosti AB elementov Osnovni pojmi iz prednapetega betona (ideja, izvedba, materiali, izgube prednapetja –

Content (Syllabus outline):

Characteristics of concrete and masonry structures illustrated by their historical development. Limit state method and partial safety factors for concrete and masonry structures. Mechanical properties of the materials (for concrete, steel and masonry). Design of reinforced concrete elements: Ultimate limit states of the reinforced concrete (RC) cross-section and design for flexure with axial load, shear and torque as well as the preliminary sizing of RC members; Serviceability limit states (the control of the crack widths and the basic principles of the calculations of deflections); Detailing of RC members (detailing of reinforcement, anchorage, laps, columns, beams, walls, deep beams, corbels); Fundamentals of the design (using the design tables) and detailing of RC slabs; Reinforcement plans drawings and lists; Fundamentals of the structural design of the earthquake resistant RC

informativno in pojem kabelske linije)

Projektiranje zidov: vrste zidakov in zidovja mejna strižna in upogibna nosilnost zida in dimenzioniranje osnove gradnje in utrjevanja zidanih stavb na potresnih območjih Temeljna pravila in predpisi za izvedbo masivnih konstrukcij.

members; Fundamentals of the prestressed concrete (idea, technologies, materials, short information about prestress losses, tendon line). Design of masonry: Masonry units; Masonry structural systems; Shear and flexural capacity of a masonry wall and related design; Fundamentals of the construction and retrofit of masonry buildings in seismic regions; Basic rules and codes for the construction of masonry structures.

Temeljni literatura in viri / Readings:

Izbrana poglavja iz:

Fischinger, M. Osnove masivnih konstrukcij, UL, FGG, učbenik v pripravi, 150 strani.

Isaković, T., Fischinger, M. Zbirka rešenih nalog iz projektiranja AB konstrukcij z uporabo standradov Eurokod, pred izidom, 186 strani.

Fischinger, M., et al. "DIAS : programski sistem za dimenzioniranje in analizo armiranobetonskih stavb : Priročnik za verzijo 1.0 (Poročilo IKPIR, 3/93). 1993. Ljubljana, FAGG, Oddelek za gradbeništvo in geodezijo, Inštitut za konstrukcije, potresno inženirstvo in računalništvo, Dostopno na računalnikih v računalniških učilnicah na FGG.

Sorić, Z. 1999. Zidane konstrukcije I, Hrvatski savez građevinskih inženjera, izbrane teme iz poglavij 1, 2, 3, 4, 8, 9 in 10 (izbrane teme iz skupaj 167 strani)

Učno gradivo v spletni učilnici in na <http://www.ikpir.fgg.uni-lj.si/EASY> .

SIST EN 1992-1-1 Eurokod 2: Projektiranje betonskih konstrukcij -Del 1-1: Splošna pravila in pravila za stavbe, 2004. (Urad za standardizacijo in meroslovje RS), 230 strani.

Cilji in kompetence:

Cilji

pridobiti potrebne osnove za projektiranje betonskih in zidanih konstrukcij in informativno o prednapetih betonskih konstrukcijah.

Predmetnospecifične kompetence:

- obvladovanje mejnega stanja v prerezu
- osvojitve osnovnih postopkov dimenzioniranja in konstruiranja
- poznavanje ustreznih predpisov za projektiranje in gradnjo masivnih objektov.

Objectives and competences:

Objectives

to get fundamental skills how to design concrete and masonry structures and only information about prestressed structures.

Competences

- understanding of the ultimate states,
- mastering of the basic procedures needed for design, proportioning and detailing
- knowledge of the relevant codes for the design and construction of concrete and masonry buildings.

Predvideni študijski rezultati:

Študent

- bo sposoben dimenzionirati betonske prereze in zidove na osnovne obremenitve (upogib z osno silo, strig in torzijo)
- bo sposoben prepoznati kritično kombinacijo vplivov in ustrezne varnostne faktorje za mejna stanja nosilnosti in uporabnosti
- bo sposoben razložiti konstrukcijske detajle za tipične elemente masivnih konstrukcij, temeljne

Intended learning outcomes:

Student

- will be able to design/proportion the cross-sections of the reinforced concrete and masonry elements subjected to basic types of loadings (flexure with axial force, shear and torque).
- will be able to identify and take into account critical combinations of load actions and to apply adequate safety factors for the ultimate and serviceability limit states

principe pri zagotavljanju duktilnosti armiranobetonskih prerezov in zidovja

- bo sposoben uporabiti predpise za projektiranje in graditev armiranobetonskih in zidanih konstrukcij, bistvene zahteve v predpisih, še posebej za izvedbo masivnih konstrukcij
- bo sposoben pripraviti projekt gradbenih konstrukcij: dimenzionirati armiranobetonske prereze in zidove na kritično kombinacijo vplivov z ustreznimi varnostnimi faktorji ter izdelati armaturne načrte temeljnih elementov betonskih konstrukcij
- bo sposoben delati na gradbišču pri izvedbi masivnih konstrukcij
- bo sposoben uporabiti inženirske modele in splošen program za račun in dimenzioniranje konstrukcij.

- will be able to explain structural details for typical elements of the masonry and concrete structures, the role of specific reinforcement details, ductility of reinforced concrete and masonry elements and the basic principles how to provide this ductility
- will be able to use the structural codes (Eurocodes) for the design and construction of reinforced concrete and masonry structures, the basic requirements for the construction of concrete and masonry structures
- will be able to prepare the design documentation for (reinforced) concrete and masonry structures: to design the reinforced concrete and masonry elements for critical load combinations and to prepare the relevant reinforcement plan
- will be able to work on the construction sites.
- will be able to use engineering models and a general computer program for the design of structure.

Metode poučevanja in učenja:

Predavanja in naloge iz projektiranja armiranobetonskih in (v nekaj manjši meri) zidanih konstrukcij. Vaje vključujejo tudi risanje preprostih armaturnih načrtov.

Learning and teaching methods:

Lectures and assignments to design and detail (including reinforcement plans) reinforced/concrete and (to somewhat lesser extend) masonry structures.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Kolokvij	40 %	midterm exam and
Končni izpit	60 %	final exam
(oba dela morata biti pozitivna)		(both parts should be positive)
ali		or
končni izpit	100 %	final exam
Velja boljša ocena.		The better grade prevails.

Reference nosilca / Lecturer's references:

ZOUBEK, Blaž, ISAKOVIĆ, Tatjana, FAHJAN, Yasin, FISCHINGER, Matej. Cyclic failure analysis of the beam-to-column dowel connections in precast industrial buildings. Eng. struct.. [Print ed.], jul. 2013, letn. 52, str. 179-191, ilustr., doi: 10.1016/j.engstruct.2013.02.028.

REJEC, Klemen, ISAKOVIĆ, Tatjana, FISCHINGER, Matej. Seismic shear force magnification in RC cantilever structural walls, designed according to Eurocode 8. Bulletin of earthquake engineering, apr. 2012, letn. 10, št. 2, str. 567-586, ilustr., doi: 10.1007/s10518-011-9294-y.

VIDRIH, Zlatko, FISCHINGER, Matej, ISAKOVIĆ, Tatjana. Numerical investigation on smart magnetically controlled elastomeric bearings. J. vib. control, nov. 2012, letn. 18, št. 13, str. 2073-2084, ilustr., doi: 10.1177/1077546311429060.

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Planiranje in vodenje projektov
Course title:	Project planning and management

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Operativno gradbeništvo – prva stopnja VS		3	6
Construction Management – first cycle professional		3	6

Vrsta predmeta / Course type: Izbirni strokovni / Elective professional

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
30		30			60	4

Nosilec predmeta / Lecturer: viš. pred. dr. Aleksander Srđić

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

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

Predmet je del modula Organizacija.

Prerequisites:

The course is part of the module Organisation.

Vsebina:

Predavanja: definicija projekta; cilji projekta. Področja in procesi projektnega vodenja. Specifika in faze projektov v gradbeništvu. Metode in tehnike operativnega planiranja. Mrežno planiranje Optimizacije mrežnih planov z vidika virov in stroškov. Lokacijsko planiranje. Spremljanje in analiza realizacije projekta. Informacijski sistemi za podporo vodenju projektov v Gradbeništvu. Vaje: optimizacije mrežnih planov; uporaba programske opreme MS Project.

Content (Syllabus outline):

Lectures: definition of a project, project goals. Project management: Areas and processes. Project phases and specific features of construction projects. Methods and techniques of operational planning. Mesh planning. Plan optimisation from the viewpoint of costs and resources. location planning. Monitoring and analysis of project execution. Tutorials: optimisation of mesh plans. Practical use of MS Project software.

Temeljni literatura in viri / Readings:

Pšunder, M. 2009. Operativno planiranje. Maribor, Fakulteta za gradbeništvo.
 Rant, M., Jeraj, M., Ljubič, T. 1998. Vodenje projektov. ORFIN Radovoljica, str.1-142.
 Česen, A., Kern, T., Bajec, M. 2008. Vodnik po znanju projektnega vodenja, 3.izdaja. Založba Moderna organizacija.

Cilji in kompetence:**Cilji**

- pridobiti osnovna znanja s področja vodenja in spremljanja projekta
- pridobiti znanja za premostitev praznine med projektom in njegovo izvedbo.

Predmetnospecifične kompetence

- obvladanje metod, tehnik in orodij za planiranje, vodenje in spremljanje projekta (npr. MS Project)
- zna uporabiti sodobno informacijsko tehnologijo
- pridobi znanje in veščine za sodelovanje v skupini.

Objectives and competences:**Objectives**

- to obtain fundamental knowledge from the field of management and monitoring of projects
- to obtain knowledge that bridges the project initiation and execution

Competences

- mastering of methods, techniques and tools for planning, management and monitoring of projects
- ability to use the appropriate software used in practice
- acquires knowledge and skills required in group work.

Predvideni študijski rezultati:**Študent**

- bo sposoben samostojno pripraviti plan manjšega gradbenega projekta, pri čemer uporablja ustrezna sodobna računalniška orodja
- bo sposoben uporabiti programsko opremo pri projektnem delu v praksi.
- bo sposoben povezovati pridobljena znanja s prakso.

Intended learning outcomes:**Student**

- will be able to prepare independently small construction project plan, by using appropriate tools
- will be able to use contemporary information technology
- will be able to connect the acquired knowledge with real life case studies.

Metode poučevanja in učenja:

Predavanja in vaje na konkretnih primerih.

Learning and teaching methods:

Lectures and tutorial (case studies).

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Računski izpit	40 %	Exam – practical examples
Teoretični izpit	30 %	Exam – theoretical part
Zagovor vaj	30 %	Oral defence of the tutorial

Reference nosilca / Lecturer's references:

SRDIČ, Aleksander, ŠELIH, Jana. Tveganja v gradbenem projektu - so ali niso obvladljiva?. Proj. Mreža Slov., apr. 2012, letn. 15, št. 1, str. 4-9, 43.
 SRDIČ, Aleksander, ŠELIH, Jana. Integrated quality sustainability assessment in construction - a conceptual model. Technol. Econ. Dev. Econ. (Spausd.). [Print ed.], dec. 2011, letn. 17, št. 4, str. 611-626, ilustr. Dostopno na: <http://dx.doi.org/10.3846/20294913.2011.603177>, doi: 10.3846/20294913.2011.603177.
 ŠELIH, Jana, KNE, Anžej, SRDIČ, Aleksander, ŽURA, Marijan. Multiple-criteria decision support system in highway infrastructure management. Transport (Vilnius (Spausd.)). [Print ed.], 2008, letn. 23, št. 4, str. 299-305, ilustr. Dostopno na: http://www.transport.vgtu.lt./upload/tif_zur/2008-4-selih_kne_srdic_zura.pdf, doi: 10.3846/1648-4142.2008.23.299-305.

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Podrobno urbanistično načrtovanje
Course title:	Detailed urban planning

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Tehnično upravljanje nepremičnin – prva stopnja VS		3	5
Technical Real Estate Management – first cycle professional		3	5

Vrsta predmeta / Course type Obvezni strokovni / Obligatory professional

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
45		30			75	5

Nosilec predmeta / Lecturer: doc. dr. Alma Zavodnik Lamovšek

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

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

Prerequisites:

Vsebina:

Predavanja:
Uvod v podrobnejše urbanistično načrtovanje, zgodovina urbanizma, poglobitev znanja zakonskih ureditev na področju podrobnega prostorskega načrtovanja, sistem urejanja prostora v Sloveniji, državni prostorski načrt, občinski podrobnejši prostorski načrt, vsebine podrobnih prostorskih načrtov, različne vrste prostorskih ureditev (infrastruktura: ceste, železnice, energetske objekti, čistilne naprave ... vodnogospodarski objekti, ureditve naselij, delov naselij, načrti prenove ...), različne vrste metodoloških pristopov k podrobnemu prostorskemu načrtovanju (študije variant, natečaji, delavnice, ankete ...), izvajanje prostorskih analiz, sektorske strokovne podlage in priključevanje na gospodarsko javno infrastrukturo, tipologija gradenj (s poudarkom na stanovanjski gradnji), tipologije drugih objektov (javni, stanovanjski, industrijski, infrastrukturni objekti ...), normativi in standardi (raba in izraba prostora, grajene strukture, zelene površine, promet ...), povezava s prenosom načrta v

Content (Syllabus outline):

Lectures:
Introduction to detailed urban planning, history of urban design and planning, in-depth exploration of regulatory arrangements in detailed spatial planning, the spatial development system in Slovenia, national spatial plan, municipal detailed spatial plan, contents of detailed spatial plans, various types of spatial developments (infrastructure: roads, railway, energy facilities, treatment plants, water structures, development of settlements and parts of settlement, renovation plans etc.), different types of methodological approaches to detailed spatial planning (variant studies, competitions, workshops, surveys etc.), spatial analyses, sectoral professional groundwork and connections to community facilities, construction typology (with an emphasis on residential building), other buildings typology (public, housing, industrial, infrastructure facilities etc.), norms and standards (use and utilisation of space, urban tissue, green areas, transport etc.), transfer of the plan to the site (land allotment,

naravo (parcelacija, priključevanje na gospodarsko javno infrastrukturo ...).

connections to community facilities etc.).

Temeljni literatura in viri / Readings:

Pogačnik, A. 1999. Urbanistično planiranje. Univerzitetni učbenik, Ljubljana, UL FGG.

Čerpes, I. s sod. 2008. Urbanistično načrtovanje. Ljubljana, UL FA.

Urban Design Compendium 2007. 1 in 2 del. English Partnerships. www.urbandesigncompendium.co.uk

Levent, T., Batey, P., Buttom, K., Nijkamp, P. 2008. Urban Planning, Part I Planning Theory and Practice, Classics in Planning 9. Edvard Elgar Publishing, Great Britain.

Zavodnik Lamovšek, A. 2015. Gradiva za predmet Podrobno urbanistično načrtovanje.

Učno gradivo v spletni učilnici UL FGG.

Cilji in kompetence:

Cilji:

- Spoznavanje različnih ravni podrobnih prostorskih načrtov.
- Spoznavanje in razumevanje vsebine, metodoloških pristopov in načinov podrobnega prostorskega načrtovanja na državni in lokalni ravni.
- Spoznavanje različnih sektorskih in drugih vhodnih podatkov za podrobno prostorsko načrtovanje.
- Spoznavanje interdisciplinarnega, timskega dela v projektni skupini za izdelavo podrobnih prostorskih načrtov.
- Usposobiti študente za izbor ustreznih podatkov za obravnavanje obravnavanih prostorskih problemov in njihovo pridobitev z različnih institucij.
- Pokazati pomen in vlogo prostorskega načrtovanja na podrobni ravni s pomočjo dela na terenu.
- Navajati študente na samostojno delo.

Kompetence:

- Pozna in razume različne pristope k podrobnemu prostorskemu načrtovanju.
- Pozna in razume vsebino, metodološke pristope in namen podrobnih prostorskih načrtov na državni in lokalni ravni.
- Pozna in razume različne vhodne podatke, potrebne za izdelavo podrobnega prostorskega načrta.
- Pozna in razume način dela v interdisciplinarnih projektnih skupinah.
- Je sposoben izbiranja ustreznih podatkov kot podporo odločanju in njihovo pridobitev z različnih institucij.
- Pozna in razume pomen in vlogo podrobnega prostorskega načrtovanja s pomočjo dela na terenu.

Objectives and competences:

Objectives:

- Knowledge of different levels of detailed spatial plans.
- Knowledge and understanding of topics, methodological approaches and ways of detailed spatial planning at the national and local levels.
- Knowledge of different sectoral and other input data needed in spatial planning.
- Knowledge of interdisciplinary, team work in a project team for elaboration of detailed spatial plans.
- To train the students to select appropriate data for the relevant spatial problem and to acquire the data from different institutions.
- To show the significance and role of detailed spatial planning during field work.
- To get the students accustomed to work independently.

Competences:

- Knowledge and understanding of different approaches to detailed spatial planning,
- Knowledge and understanding of topics, methodological approaches and purpose of detailed spatial plans at the national and local levels.
- Knowledge and understanding of different input data necessary for the elaboration of a detailed spatial plan.
- Knowledge and understanding of the nature of work in interdisciplinary project teams.
- The ability to select appropriate data to support decision-making and to acquire the data from different institutions.
- Knowledge and understanding of the significance and role of detailed spatial planning during field work.
- Ability of independent professional work.

- Je sposoben samostojnega strokovnega dela.

Predvideni študijski rezultati:

- Osnove razumevanja podrobnega prostorskega načrtovanja ter povezanosti z drugimi strokami in ravnmi planiranja.
- Razumevanje podrobnih prostorskih načrtov in njihove izvedbe glede na različne vsebinske ali problemske sklope.
- Poznavanje ustreznih grafičnih metod in orodij ter sposobnost samostojne izdelave analize obravnavanega območja in oblikovanja prostorske rešitve na praktičnem primeru.
- Povezava urejanja prostora z vedo geodezije in enostavna dela pri planiranju.
- Zavedanje pomena sodelovanja med strokami, zlasti pri prenosu projektov v naravo.
- Osnove načrtovanja na podrobni ravni.
- Sposobnost razumevanja prostorskega problema na lokalni ravni.
- Pregledno poznavanje podrobnega prostorskega načrtovanja in umestitev predmeta v ustrezen zakonodajni okvir (sistem prostorskega planiranja, varstva okolja ...).
- Sposobnost samostojne analize, sinteze in prezentacije praktičnega primera,
- Sposobnost vključevanja v interdisciplinarno delo z različnimi strokami.

Intended learning outcomes:

- Basic understanding of detailed spatial planning, and integration with other fields and planning levels.
- Understanding of detailed spatial plans and their implementation in view of various topics and problem segments.
- Knowledge of appropriate graphical methods and tools and ability of independent analysis of the area in question, and design of a spatial solution on a practical example.
- Connection of spatial planning and geodesy, and simple tasks in planning.
- Awareness of the significance of cooperation between various fields, particularly in the transfer of projects to the nature.
- Basis of planning at a detailed level.
- The ability to understand a spatial problem at the local level.
- Overall knowledge of detailed spatial planning and contextualization in the appropriate legislative framework (spatial planning system, environmental protection etc.).
- Ability of independent analysis, synthesis, and presentation of a practical case.
- Ability of taking part in interdisciplinary work involving different professions.

Metode poučevanja in učenja:

Sistematična predavanja, dialog, praktične vaje terensko delo.

Systematic lectures, dialogue, tutorials, field work.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Pisni izpit	50 %	Written examination
Vaje	50 %	Tutorials

Reference nosilca / Lecturer's references:

ZAVODNIK LAMOVŠEK, Alma, DROBNE, Samo, ŽAUCER, Tadej. Small and medium-size towns as the basis of polycentric urban development = Majhna in srednje velika mesta kot ogrodje policentričnega urbanega razvoja. Geod. vestn.. [Tiskana izd.], 2008, letn. 52, št. 2, str. 290-312. http://www.geodetski-vestnik.com/52/2/gv52-2_290-312.pdf

ZAVODNIK LAMOVŠEK, Alma. Prostorsko planiranje na poti k sistemski ureditvi = Spatial planning on route to a systems solution. Urbani izziv (Tisk. izd.). [Tiskana izd.], 2003, let. 14, št. 1, str. 15-20, 107-110.

ZAVODNIK LAMOVŠEK, Alma, FOŠKI, Mojca, ČEH, Marjan. Urban Development and Planning Tools in Slovenia. V: LAMI, Isabella M. (ur.). An overview on planning systems and urban markets in Europe, (AO8, 50). Roma: Aracne editrice, 2005, str. 147-161.

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
---------------------------------------	--

Predmet:	Programiranje
Course title:	Computer Programming

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Geodezija in geoinformatika - prva stopnja UN		2, 3	3-6
Geodesy and Geoinformatics - first cycle academic		2, 3	3-6

Vrsta predmeta / Course type: Izbirni strokovni / Elective professional

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
15		45			60	4

Nosilec predmeta / Lecturer: doc. dr. Matevž Dolenc

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

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

Prerequisites:

Vsebina:

Pregled vsebine predmeta, izrazoslovje in izbrana literatura. Programski jezik Visual Basic. Izdelava okenskih programov z grafiko (vizualno programiranje, programiranje računalniške grafike). Spletni standardi, formati in metajezik XML. Baze podatkov (uporaba, programiranje); Osnove varne komunikacije. Osnove informacijskih sistemov.

Content (Syllabus outline):

Programming language Visual Basic. Graphical user interfaces (programming, graphics) XML metadata language and web standard formats. Relational databases (use of advanced database systems, programming). Introduction to secure communication. Introduction to information systems.

Temeljni literatura in viri / Readings:

Hunt, A. and Thomas, D. 1999. The Pragmatic Programmer: From Journeyman to Master, Addison Wesley.
 Frederick, P. Brooks Jr.(1995. The Mythical Man Month and Other Essays on Software Engineering, Addison Wesley.
 Fowler, M., Beck, K., Brant, J., Opdyke, W., Roberts, D. 1995. Refactoring: Improving the Design of Existing Code, Addison Wesley.
 Erl, T. 2007. SOA: Principles of Service Design, Prentice Hall.
 Rogers, Y., Sharp, H., Preece, J. 2011. Interaction Design: Beyond Human-Computer Interaction, John Wiley & Sons.

Cilji in kompetence:**Cilji:**

- Poglobljeno znanje izbranega programskega jezika.
- Samostojna zasnova in implementacija inženirskih programov za različne naprave.
- Osnovno znanje različnih metod in orodij razvoja programske opreme.

Objectives and competences:**Objectives:**

- Advanced knowledge of the selected programming language.
- Design and development of engineering applications for different devices.
- Basic knowledge of software development methods and tools.

Predvideni študijski rezultati:

- Poglobljeno znanje in razumevanje inženirskih problemov.
- Reševanje problemov s pomočjo sodobnih informacijskih tehnologij.
- Razumevanje informacijskih tehnologij in njihov vpliv na družbo in delovno okolje.

Intended learning outcomes:

- In-depth knowledge and understanding of engineering problems.
- Using information technology for providing solutions to engineering problems.
- Understanding of impact information technologies have on society and working environment.

Metode poučevanja in učenja:

Predavanja, vaje, samostojno seminarsko delo.

Learning and teaching methods:

Lectures, tutorials, individual seminar work.

Načini ocenjevanja:

Projektna naloga
Sprotno delo

Delež (v %) /
Weight (in %)

Assessment:

Project work
Participation

Reference nosilca / Lecturer's references:

Dolenc, Matevž. Developing extendible component-oriented finite element software. Adv. eng. softw. (1992). [Print ed.], 2004, vol. 35, str. 703-714, graf. prikazi.

Dolenc, Matevž, Katranuschkov, Peter, Gehre, Alexander, Kurowski, Krzysztof, Turk, Žiga. The InteliGrid platform for virtual organisations interoperability. J. inf. tech. constr., 2007, vol. 12, str. 459-477. www.itcon.org/cgi-bin/works/Show?2007_30.

Klinc, Robert, Turk, Žiga, Dolenc, Matevž. Engineering collaboration 2.0 : requirements and expectations. J. inf. tech. constr., 2009, letn. 14, pos. št., str. 473-488, ilustr. www.itcon.org/2009/31.

Peruš, Iztok, Klinc, Robert, Dolenc, Matevž, Dolšek, Matjaž. A web-based methodology for the prediction of approximate IDA curves. Earthquake eng. struct. dyn.. [Print ed.], 2012, letn. 41, št. , str. 1- 18, ilustr., doi: 10.1002/eqe.2192.

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
---------------------------------------	--

Predmet:	Temelji ekonomske analize
Course title:	Introduction to economic analysis

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Vodarstvo in okoljsko inženirstvo – prva stopnja UN		3	5
Water Science and Environmental Engineering – first cycle academic		3	5

Vrsta predmeta / Course type: Obvezni splošni / Obligatory general

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
45					45	3

Nosilec predmeta / Lecturer: izr. prof. dr. Polona Domadenik

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

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

Prerequisites:

Vsebina:

Razmišljati kot ekonomist. Vloga ekonomske analize za inženirje Osnove ponudbe in povpraševanja Obnašanje potrošnika. Povpraševanje na področju vodnih storitev, upravljanje s povpraševanjem, stanje; oblikovanje ponudbe na področju vodnih storitev, regulacija trgov vodnih storitev. Osnove teorije proizvodnje in stroškov. Stroški vodnih storitev, teorija stroškov, omejenost virov, oblikovanje krivulje ponudbe na področju vodnih storitev. Časovna vrednost denarja, obresti in načelo ekvivalence – teorija analize stroškov in koristi Sedanja vrednost in notranja stopnja donosa. Primeri vrednotenja na področju upravljanja z vodami. (različna masovna vrednotenja, politične odločitve). Ocenjevanje stroškov za inženirje, ocenjevanje koristi, analiza stroškov in koristi. Investicijska dokumentacija, priprava investicijske dokumentacije, vrste investicijske dokumentacije, primeri, obravnava investicijske tveganji dokumentacije, upravljanje s

Content (Syllabus outline):

Thinking like economist. The role of economic analysis for engineers. Fundamentals of demand and supply. Consumer behavior. Demand for water services, water demand management, supply of water services, regulation of market for water services. Fundamentals of production and cost theories Costs of water services, cost theory, scarcity of resources, deriving supply curve in the field of water service. Time equivalent of money, interests and principle of equivalence – theory of cost and benefit analysis. Present value and internal rate of return. Examples of evaluation in the field of water management (different mass evaluation, political decisions). Cost evaluation for engineers, evaluation of benefits, analysis of costs and benefits Investment documentation, preparation of investment documentation, types of investment documentation, examples, treatment of investment documentation, risk management. How to choose the best project? C/B analysis,

tveganji. Kako izbrati najboljši projekt? C/B analiza, hierarhična odločitvena drevesa, podatkovni modeli, primeri. Tržne strukture – popolna konkurenca, monopol in oligopol. Ekonomska analiza javnega sektorja Osnove makroekonomije.

hierarchical decision trees, data models, cases
Market structures – perfect competition, monopoly, oligopoly. Economic analysis of public sector. Fundamentals of macroeconomics.

Temeljna literatura in viri / Readings:

Prašnikar, J., Domadenik, P., Koman M. 2009. Mikroekonomija. Ljubljana: Gospodarski vestnik.
Newnan, D., Eschenbach, T., Lavelle, J. 2009. Engineering Economic Analysis, Oxford University Press.

Cilji in kompetence:

Cilji

- Seznaniti slušatelja z osnovnim ekonomskim analitičnim aparatom, ki omogoča razumevanje in razčlenitev realnih ekonomskih problemov.
- Študent se bo v okviru predmeta seznanil z osnovno ekonomsko terminologijo, ki jo bo nadgradil s specifikami s področja vodarsko-komunalnega inženirstva.

Pridobljene kompetence

- Sposobnost pravilne presoje ekonomskih odločitev,
- sposobnost razumevanja osnovnih ekonomskih pojavov na mikro in makroekonomskem nivoju,
- sposobnost aplikacije ekonomskih konceptov na primerih vodarstva in komunalnega inženirstva.
- Sposobnost kritične presoje.

Objectives and competences:

Objectives

- To acquaint student with the basic economic analytical framework that allows understanding of real economic problems.
- Student will get familiar with the basic economic terminology, which will be upgraded to specifics in the field of water engineering.

Gained competences

- Ability to assess economic decisions,
- ability to understand basic economic phenomena on micro and macroeconomic levels,
- ability to apply economic concepts in the field of water engineering,
- ability of critical assessment.

Predvideni študijski rezultati:

- Znanje in razumevanje osnovnih pojmov mikro in makroekonomije,
- znanje in razumevanje osnovnih pojmov ekonomike, vezane na inženirske probleme,
- razumevanje medsebojnega vpliva procesov na ravni podjetja in v gospodarstvu,
- razumevanje delovanja numeričnih modelov pri reševanju problemov ekonomike,
- uporaba modelov marginalnega ocenjevanja škod in koristi pri presoji inženirskih rešitev,
- kritično presojanje inženirskih rešitev,
- uporaba pridobljenega znanja pri predmetih, kjer je potrebno znanje Ekonomike.

Intended learning outcomes:

- Knowledge and understanding of basic concepts in the field of micro and macroeconomics,
- knowledge and understanding of basic concepts in the field of engineering economics,
- understanding of interaction of processes on the level of company and economy,
- understanding of operations of numerical models in solving business problems,
- using models of marginal assessment of damages and benefits in evaluating engineering solutions,
- critical assessment of engineering solutions,
- use of knowledge in courses where basic economic concepts are necessary.

Metode poučevanja in učenja:

Predavanja, študije primerov, uporaba programske opreme pri reševanju problemov.

Learning and teaching methods:

Lectures, case studies, use of software in solving problems.

Načini ocenjevanja:

Delež (v %) /

Weight (in %)

Assessment:

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Dva kolokvija	67 %	Two midterm tests
Pisni izpit	33 %	Final exam

Reference nosilca / Lecturer's references:

BANOVEC, Primož, DOMADENIK, Polona. Water governance as a key element of sound water management system. V: 8th International Conference "Challenges of Europe: Financial Crisis and Climate Change", May 21-23, 2009, Split-Bol, Croatia : working papers. Split: Faculty of Economics, 2009, 12 str.

CIRMAN, Andreja, DOMADENIK, Polona, KOMAN, Matjaž, REDEK, Tjaša. The Kyoto protocol in a global perspective. Econ. bus. rev, February 2009, vol. 11, no. 1, str. 29-54.

DOMADENIK, Polona, PRAŠNIKAR, Janez, SVEJNAR, Jan. How to increase R&D in transition economies? : evidence from Slovenia. Rev. dev. econ. (Print), 2008, vol. 12, no. 1, str. 193-208.

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
---------------------------------------	--

Predmet:	Zagotavljanje in kontrola kakovosti
Course title:	Quality assurance and quality control

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Operativno gradbeništvo – prva stopnja VS		3	5
Construction Management – first cycle professional		3	5

Vrsta predmeta / Course type: Izbirni strokovni / Elective professional

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
30		30			60	4

Nosilec predmeta / Lecturer: izr. prof. dr. Jana Šelih

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

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

Predmet je del modula Organizacija.

Prerequisites:

The course is part of the module Organisation.

Vsebina:

Predavanja: definicije in pojem kakovosti, razvoj zagotavljanja; kakovosti skozi čas; eksterna in interna kontrola kakovosti; standardizacija; slovenski in evropski standardi; značilnosti sistemov vodenja kakovosti s poudarkom na njihovih značilnostih v gradbenih podjetjih; zagotavljanje kakovosti v vseh fazah procesa graditve (projektiranju, gradnji, vzdrževanju objektov); tehnike kontrole kakovosti vhodnih in izhodnih materialov v procesu proizvodnje; potrjevanje skladnosti gradbenih proizvodov; celovito zagotavljanje kakovosti.

Content (Syllabus outline):

Lectures: definition of quality, development of quality assurance concept; external and internal quality control; standardisation, Slovene and European standards; properties of quality management systems, with emphasis on their specified features in construction companies; quality assurance in all phases of construction process (design, construction, maintenance of structures); techniques of quality control of input and output material in the production process; conformity assessment of construction products; total quality management.

Temeljni literatura in viri / Readings:

Reflak, J., 2005. Zagotavljanje kakovosti, skripta UL FGG, Ljubljana, 165 str.

Cilji in kompetence:**Cilji**

- pridobiti osnovna znanja s področja zagotavljanja in kontrole kakovosti
- razumevanje pomena vodenja in zagotavljanja kakovosti v današnjem času, pri čemer je poudarek na posebnostih gradbene proizvodnje.

Predmetnospecifične kompetence

- razume pomen kakovosti kot enega ključnih poslovnih ciljev gradbenega podjetja
- pridobi znanja za celovito obvladovanje in kontrolo kakovosti proizvodnih in storitvenih postopkov v gradbeništvu
- razume načine zagotavljanja kakovosti gradbenih proizvodov in gradbenih objektov
- obvlada osnovne pojme s področja normizacije in standardizacije
- je sposoben povezovati pridobljena znanja s predhodno pridobljenim znanji s področja organizacije
- je sposoben reševati konkretne strokovne naloge s področja zagotavljanja kakovosti.

Objectives and competences:**Objectives**

- to obtain fundamental knowledge from the field of quality management
- to understand the importance of quality assurance and management today; with emphasis on the specific features of construction production

Competences

- understands the meaning of quality as one of the key business goals of a company
- acquires knowledge for comprehensive quality control used in production and service procedures in construction
- understands the ways of construction product and construction service quality assurance
- understands the fundamental concepts from the field of norms and standardization
- is able to connect the acquired knowledge with previously gained knowledge from the management field
- is able to solve concrete professional tasks from the quality management field.

Predvideni študijski rezultati:**Študent**

- bo sposoben opredeliti praktične načine za zagotavljanje kakovosti v gradbenem podjetju in pri izvedbi gradbenega projekta
- bo sposoben v gradbenem podjetju vzpostaviti sistem vodenja kakovosti
- bo sposoben analizirati skladnost gradbenih proizvodov in zagotavljanje kakovosti med gradnjo
- bo sposoben analizirati stanje zagotavljanja kakovosti in predlagati možne rešitve za izboljšanje
- bo sposoben povezovati pridobljeno znanje z gradbeno prakso.

Intended learning outcomes:**Student**

- will be able to identify practical ways for ensuring quality in the organisation as well as in a construction project
- will be able to establish a quality management system in the organisation
- will be able to analyze construction products conformity and quality assurance during construction
- will be able to analyze the state concerning quality assurance and to propose possible solution to improve it
- will be able to connect the acquired knowledge with construction practice.

Metode poučevanja in učenja:

Predavanja in vaje na konkretnih primerih, izdelava seminarskih nalog.

Learning and teaching methods:

Lectures and tutorial (case studies), preparation of seminar work.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
2 seminarski nalogi	50 %	2 seminar works
Izpit	50 %	Exam

Reference nosilca / Lecturer's references:

SRDIČ, Aleksander, ŠELIH, Jana. Integrated quality sustainability assessment in construction - a conceptual model. Technol. econ. dev. econ. [Print ed.], dec. 2011, letn. 17, št. 4, str. 611-626.

ŠELIH, Jana. Environmental management systems and construction SMEs : a case study for Slovenia. J. civ. eng. manag.. 2007, letn. 13, št. 3, str. 217-226.

ŠELIH, Jana. Residential building stock refurbishment design supported by a multi criteria decision support system. WSEAS Trans. Syst., 2007, letn. 6, št. 6, str. 1124-113.