FGG
UNIVERZA V LJUBLJANI
Fakulteta za gradbeništvo in geodezijo

LETOPIS
FAKULTETE ZA GRADBENIŠTVO IN GEODEZIJO UNIVERZE V LJUBLJANI

YEARBOOK
FACULTY OF CIVIL AND GEODETIC ENGINEERING, UNIVERSITY OF LJUBLJANA

2021/22, 2022/23

FGG | UNIVERSITY OF LJUBLJANA
Faculty of Civil and Geodetic Engineering

LETOPIS
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NAŠE POSLANSTVO

UČIMO, USTVARJAMO NOVA ZNANJA IN RAZVIJAMO INOVATIVNE REŠITVE NA PODROČJU GRADBENIŠTVA, OKOLJSKEGA INŽENIRSTVA IN GEODEZIJE.

RAZISKOVALNO DELO, VPETO V MEDNARODNO OKOLJE, STROKOVNA ODLIČNOST IN ODLIČNO IZOBRAŽEVANJE NAM OMOGOČAJO IZOBRAŽEVANJE INOVATIVNIH INŽENIRJEV PRIHODNOSTI.

V SODELOVANJU Z GOSPODARSTVOM IN DRUŽBO REŠUJEMO RAZVOJNA IN STROKOVNA VPRAŠANJA, RAZVIJAMO TRAJNOSTNO GRADNJO IN SOUSTVARJAMO POGOJE ZA ZDRAVO IN VARNO OKOLJE.

NAŠA VIZIJA

DO LETA 2025 SE UVRSTITI MED NAJBOLJŠE FAKULTETE NA PODROČJU GRADBENIŠTVA, OKOLJSKEGA INŽENIRSTVA IN GEODEZIJE V SREDNJI EVROPI.

DVIG KAKOVOSTI RAZISKOVALNEGA DELA NA NAJVIŠJO MEDNARODNO RAVEN.

STALNO IZBOLJŠEVANJE IN POSODABLJANJE ŠTUDIJSKIH PROGRAMOV IN KAKOVOSTI PEDAGOŠKEGA DELA.

DVIG POMENA IN KAKOVOSTI INŽENIRSKEGA IZOBRAŽEVANJA IN POKLICA V SODOBNI DRUŽBI.

VEČJA VKLJUČENOST V REŠEVANJE RAZVOJNIH IN STROKOVNIH VPRAŠANJ V SLOVENIJI IN TUJINI.

OUR MISSION STATEMENT

TO TEACH, CREATE NEW KNOWLEDGE AND DEVELOP INNOVATIVE SOLUTIONS IN THE AREAS OF CIVIL ENGINEERING, ENVIRONMENTAL ENGINEERING AND GEODESY.

RESEARCH WORK INTERTWINED IN INTERNATIONAL ENVIRONMENT, PROFESSIONAL EXCELLENCE AND EXCELLENT TEACHING ENABLE US TO EDUCATE INNOVATIVE ENGINEERS OF THE FUTURE.

IN COOPERATION WITH THE ECONOMY AND SOCIETY WE SOLVE DEVELOPMENT AND PROFESSIONAL ISSUES, DEVELOP SUSTAINABLE CONSTRUCTION AND CO-CREATE CONDITIONS FOR A HEALTHY AND SAFE ENVIRONMENT.

OUR VISION

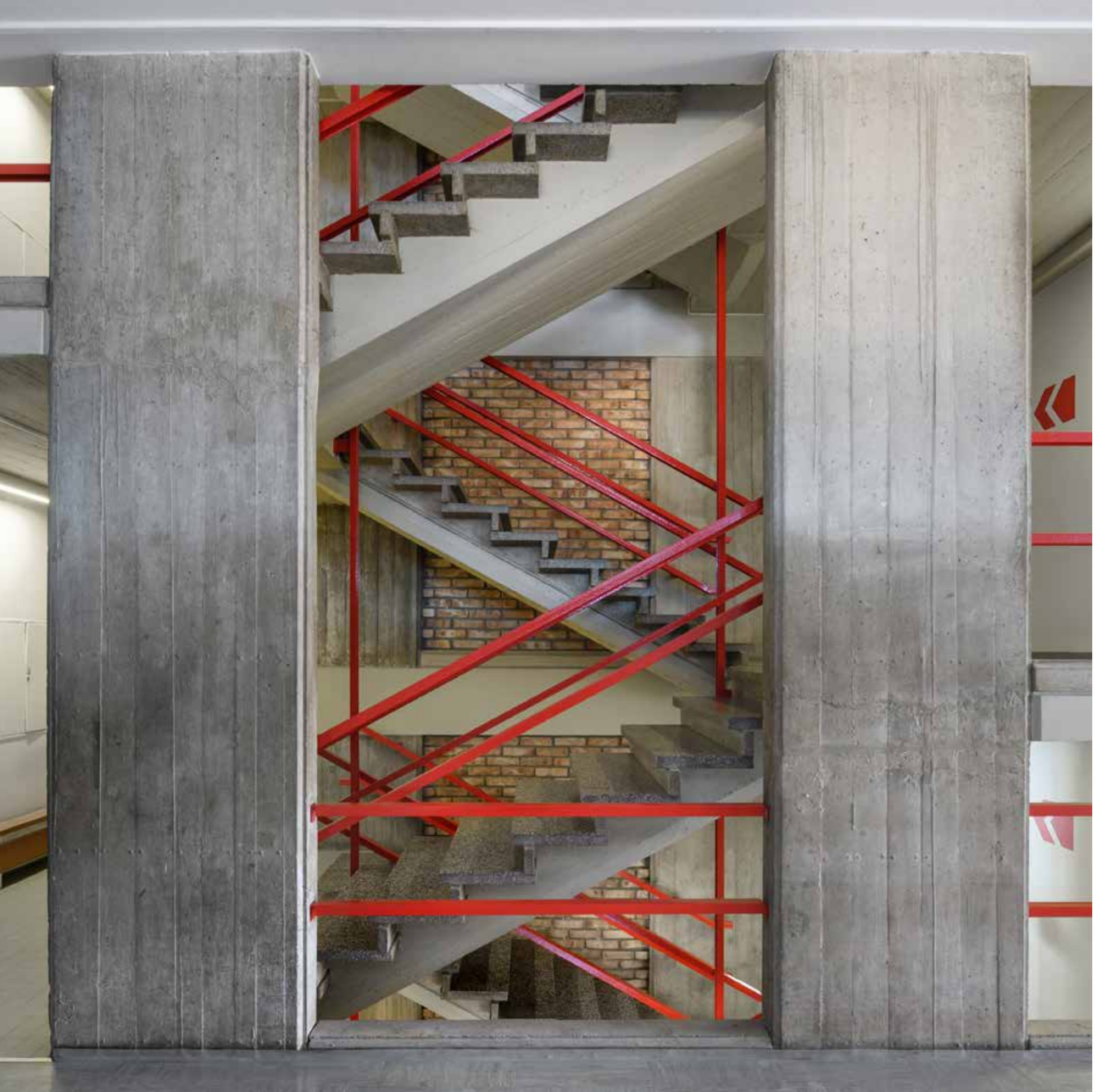
UNTIL 2025, TO BE AMONG THE BEST DEPARTMENTS IN THE AREAS OF CIVIL ENGINEERING, ENVIRONMENTAL ENGINEERING AND GEODETIC ENGINEERING IN CENTRAL EUROPE.

TO RAISE THE QUALITY OF RESEARCH WORK TO THE HIGHEST INTERNATIONAL LEVEL.

TO CONTINUOUSLY IMPROVE AND MODERNISE STUDY PROGRAMMES AND THE QUALITY OF EDUCATIONAL WORK.

TO RAISE THE IMPORTANCE AND QUALITY OF ENGINEERINGEDUCATION AND ENGINEERING PROFESSION IN MODERN SOCIETY.

TO GET BETTER INVOLVED IN THE SOLVING OF DEVELOPMENTAL AND PROFESSIONAL ISSUES IN SLOVENIA AND INTERNATIONALLY.



NAGOVOR DEKANJE
DEAN'S FOREWORD

prof. dr. **Violeta Bokan Bosiljkov**

Spoštovane bralke, spoštovani bralci,

pred vami je letopis Fakultete za gradbeništvo in geodezijo UL, ki povzema utrip in dosežke naše skupnosti v študijskih letih 2021/2022 in 2022/2023 – v obdobju ponovne vrnitve študija v živo po pandemiji covid-19, okrepljene raziskovalne dejavnosti ter izjemne študentske angažiranosti.

Ponovna prisotnost v predavalnicah in na terenu je obogatila študijsko izkušnjo ter znova oživila študentsko dogajanje. Naši študenti so postali soustvarjalci fakultetnega utripa – od organizacije prvega Kariernega dne do vključevanja v interdisciplinarne projekte, kjer so razvijali ključne veščine prihodnosti – sodelovanje, komunikacijo in kritično razmišljanje.

Raziskovalna dejavnost je dosegla nov zagon. Fakulteta je pridobila novo programsko skupino Dinamična zemlja, povečala število nacionalnih in evropskih projektov ter okrepila svojo vlogo v mednarodnem znanstvenem prostoru. Naši strokovnjaki so s svojim znanjem prispevali tudi k obvladovanju posledic naravnih nesreč, kot so poplave in plazovi.

Digitalna preobrazba in zeleni prehod sta postala jedro našega razvoja. Vključili smo se v številne projekte ULTRA (UL za trajnostno družbo), kjer se digitalne metode uporabljajo pri načrtovanju in gradnji ter spremljanju sprememb na objektih in v prostoru.

Poskrbeli smo tudi za kakovostno študijsko in raziskovalno okolje. V prostorih fakultete smo izvedli številne prenove, kupili novo opremo ter uredili prostore za učenje in druženje – vse z mislijo na skupnost, ki spodbuja ustvarjalnost, sodelovanje in vključevanje.

Hvala vsem študentom, sodelavcem in partnerjem za predanost in pogum pri soustvarjanju naše prihodnosti. Naj vas ta letopis spomni na številne zgodbe in uspehe, ki smo jih pisali skupaj.

Dear readers,

Before you is the Yearbook of the Faculty of Civil and Geodetic Engineering of the University of Ljubljana, capturing the pulse and achievements of our community in the academic years 2021/2022 and 2022/2023 – a period marked by the return of in-person learning after the COVID-19 pandemic, intensified research activities and exceptional student engagement.

The renewed presence in the classrooms and in the field enriched the study experience and revitalised student life. Our students became co-creators of the faculty's pulse – from organising the first Career Day to participating in interdisciplinary projects where they developed key skills of the future: collaboration, communication and critical thinking.

Research activity gained new momentum. The Faculty acquired a new program group Dynamic Earth, increased the number of national and European projects and strengthened its role in the international scientific community. Our experts also contributed their knowledge to managing the consequences of natural disasters, such as floods and landslides.

Digital transformation and the green transition have become the core of our development. We were involved in numerous ULTRA projects (University of Ljubljana for a Sustainable Society) that use digital methods in planning and construction, as well as in monitoring changes in facilities and the environment.

We also provided a high-quality study and research environment. We carried out numerous renovations to the faculty buildings, purchased new equipment and created spaces for learning and socialising – all with a view to creating a community that fosters creativity, collaboration and integration.

I would like to thank all students, colleagues and partners for your commitment and courage in helping to shape our future. May this yearbook remind you of the many stories and successes we created together.

UVODNIK UREDNIKOV
EDITORS' FOREWORD

izr. prof. dr. **Alma Zavodnik Lamovšek**
izr. prof. dr. **Mitja Košir**

Peta številka Letopisa UL FGG, ki jo držite v rokah ali berete na ekranu, predstavlja neke vrste jubilejno izdajo, saj z njo zaključujemo prvo desetletje izhajanja. Kot veste, ta izhaja bienalno: od prve izdaje, ki je obravnavala študijski leti 2013/14 in 2014/15, do te, ki pokriva leti 2021/22 in 2022/23, je preteklo natanko deset šolskih let. V desetih letih se lahko spremeni veliko ali pa skoraj nič. Če bi danes primerjali vsebine do sedaj izdanih Letopisov UL FGG, bi ugotovili oboje: nekatere stvari so ostale enake, druge so se popolnoma spremenile. In prav v slednjem je bistvo Letopisa UL FGG, saj nam omogoča kronološki presek skozi dogajanje na fakulteti in s tem predstavi spremembe kot tudi stalnice preteklih let.

V teh desetih letih in petih številkah se je spreminjal tudi sam letopis. Najbolj očitna sprememba je povečanje obsega, s 120 strani v prvi izdaji na 202 strani v tej. Seveda pa povečanje obsega pomeni tudi bogatenje vsebin. Prav te vsebine so tiste, ki jih s svojim pedagoškim, strokovnim, znanstvenoraziskovalnim in drugim delom prispevamo vsi študenti in zaposleni UL FGG. Zato gre zahvala za nastanek letopisa prav vam, dragi bralci, saj s svojim delom vsi gradimo zgodbe, ki so sicer v dokaj strnjenem pregledu predstavljene na teh straneh.

Ob zaključku redakcije se tako v uredništvu sprašujemo o prihodnosti Letopisa UL FGG. Vsekakor je treba zagotoviti njegovo kontinuiteto, saj ta predstavlja pisni vir informacij o delovanju in razvoju naše fakultete. Naj Heraklitov izrek »panta rhei« (vse teče) velja tudi za Letopis UL FGG, da bo doživel še mnogo takšnih jubilejev.

Vabiva vas k branju te in prejšnjih številk Letopisa UL FGG. Naj vam bo vsebina v navdih in spodbudo za vaše pedagoško in znanstvenoraziskovalno delo. Prepričana sva, da bodo tudi prihodnje številke letopisa enako zanimive in relevantne.

The fifth edition of the UL FGG Yearbook, which you are holding in your hands or reading on your screen, is a kind of anniversary edition, as it marks the end of the first decade of publication. As you know, it is published every two years: from the first edition, which covered the academic years 2013/14 and 2014/15, to this edition, which covers the years 2021/22 and 2022/23, exactly ten academic years have passed. A lot can change in ten years – or almost nothing. If we compare the contents of the yearbooks published so far, we can find both: some things have remained the same, and others have changed completely. This is precisely the essence of the UL FGG Yearbook, as it allows us to review the events at the Faculty in chronological order and thus present both the changes and the constants of the past years.

The yearbook has also changed in these ten years and five editions. The most obvious change is its increase in size, from 120 pages in the first edition to 202 pages in this one. Of course, the increase in volume also means an enrichment of content. It is precisely to this content that we all contribute with our educational, professional, scientific, research and other work at UL FGG. So, the thanks for producing this yearbook go to you, dear readers, because we all create the stories presented on these pages in a relatively concise overview.

At the end of the editorial process, the editorial team is reflecting on the future of the UL FGG Yearbook. It is undoubtedly necessary to ensure its continuity, as it constitutes a written source of information on the work and development of our faculty. May Heraclitus' saying "panta rhei" (everything flows) also apply to the UL FGG Yearbook so that it may experience many more such anniversaries.

We invite you to read this and previous issues of the UL FGG Yearbook. May the contents inspire and encourage your educational, scientific and research work. We are confident that future yearbook editions will be as interesting and relevant.

ŠTEVILKE IN DEJSTVA
FACTS AND FIGURES

VIZITKA PROFILE

UNIVERZA V LJUBLJANI
FAKULTETA ZA GRADBENIŠTVO IN GEODEZIJO
p.p. 3422
Jamova cesta 2
1000 Ljubljana, Slovenija
T: 01 476 85 00
E: fgg@fgg.uni-lj.si
W: http://www3.fgg.uni-lj.si/

Vodstvo, Oddelek za gradbeništvo, Oddelek za geodezijo
Jamova cesta 2
leto izgradnje: 1968
uporabna površina stavbe: 9.756 m^2

Finančno računovodska služba
Groharjeva cesta 2b
leto izgradnje: 1937
uporabna površina stavbe: 286 m2

Konstrukcijsko prometni laboratorij
Jamova cesta 2
leto izgradnje: 1984
uporabna površina stavbe: 974 m^2

KAFE FGG
Jamova cesta 2
leto izgradnje paviljona: 1968
leto prenove lokala: 2022
uporabna površina lokala: 70 m^2

Oddelek za okoljsko gradbeništvo
Hajdrihova ulica 28
leto izgradnje: 1949
uporabna površina stavbe: 2.245 m^2

UNIVERSITY OF LJUBLJANA
FACULTY OF CIVIL AND GEODETIC ENGINEERING
p.p. 3422
Jamova cesta 2
1000 Ljubljana, Slovenia
T: 01 476 85 00
E: fgg@fgg.uni-lj.si
W: http://www3.fgg.uni-lj.si/

Management, Department of Civil Engineering, Department of Geodetic Engineering
Jamova cesta 2
construction year: 1968
effective surface area: 9,756 m^2

Financial Accounting Department
Groharjeva cesta 2b
construction year: 1937
effective surface area: 286 m^2

Laboratory of Structural and Traffic Division
Jamova cesta 2
construction year: 1984
effective surface area: 974 m^2

KAFE FGG
Jamova cesta 2
construction year of the pavilon: 1968
renovation year of the premises: 2022
effective surface of the premises: 70 m^2

Department of Environmental Civil Engineering
Hajdrihova ulica 28
construction year: 1949
effective surface area: 2,245 m^2

VODSTVO FAKULTETE FACULTY MANAGEMENT

DEKANJA DEAN
prof. dr. **Violeta Bokan Bosiljkov**

PRODEKANI VICE-DEANS
doc. dr. **Klemen Kozmus Trajkovski** Prodekan za študentske zadeve Vice-Dean for Student Affairs
izr. prof. dr. **Dušan Žagar** Prodekan za izobraževalno področje Vice-Dean for Educational Affairs
doc. dr. **Alma Zavodnik Lamovšek** Prodekanja za gospodarske zadeve Vice-Dean for Economic Affairs
prof. dr. **Žiga Turk** Prodekan za razvojno področje Vice-Dean for Development
prof. dr. **Matjaž Dolšek** Prodekan za raziskovalno in mednarodno področje Vice-Dean for Research and International Affairs

ORGANIZIRANOST IN VODENJE ORGANISATION AND MANAGEMENT

ORGANI IN DELOVNA TELESA

VODSTVO

- Dekan
- Prodekani
  - Prodekan za gospodarske zadeve
  - Prodekan za izobraževalno področje
  - Prodekan za raziskovalno in mednarodno področje
  - Prodekan za razvojno področje
  - Prodekan za študentske zadeve
- Delovna telesa dekana
  - Kolegij dekana
  - Razširjeni kolegij dekana
  - Komisija za kakovost in razvoj
  - Komisija za reševanje vlog študentov
  - Komisija za informatiko
- Skrbnik študijskega programa
- Disciplinska komisija I. stopnje
- Akademski zbor
- Študentski svet
- Upravni odbor

SENAT

- Delovna telesa senata
- Študijski odbori
  - Študijski odbor Oddelka za gradbeništvo
  - Študijski odbor Oddelka za geodezijo
  - Študijski odbor Oddelka za okoljsko gradbeništvo
  - Študijski odbor doktorskega študija
- Kadrovska komisija
- Komisija za znanstvenoraziskovalno delo
- Komisija za knjižničarstvo in založništvo
- Odbor za Prešernove nagrade študentom UL FGG

BOARDS AND WORKING BODIES

MANAGEMENT

- Dean
- Vice Deans
  - Vice Dean for Economic Affairs
  - Vice Dean for Education
  - Vice Dean for Research and International Activity
  - Vice Dean for Development
  - Vice Dean for Student Affairs
- Dean's Working Bodies
  - Dean's Consulting College
  - Expanded Dean's Consulting College
  - Processing Student Applications
  - Quality Assurance and Development Commission
  - IT Commission
- Study Programme Administrator
- Disciplinary Commission of 1st Degree
- Academic Assembly
- Students Council
- Governing Board

SENATE

- Senate's Working Units
- Study Boards
  - Study Board of the Department of Civil Engineering
  - Study Board of the Department of Geodetic Engineering
  - Study Board of the Department of Environmental Civil Engineering
  - Study Board of the Doctoral Study Programme
- Personnel Commission
- Research Commission
- Library and Publishing Committee
- Committee for Prešeren Awards to UL FGG Students

ORGANIZACIJSKE ENOTE

TAJNIŠTVO DEKANAT

- Tajnik fakultete
- Kadrovska služba
- Referat za študijske zadeve
- Finančno-računovodska služba
- Služba za gospodarske zadeve
- Služba za mednarodno dejavnost
- Služba za raziskovalno dejavnost
- Center za informatiko
  - *Knjižnica*
  - *Promocijsko karierni center*
  - *Računalniški center*
- Pedagoška enota za športno vzgojo in šport na UL FGG

ODDELKI IN PEDAGOŠKO-RAZISKOVALNE ENOTE

- Oddelek za gradbeništvo
  - *Inštitut za komunalno gospodarstvo (IKG)*
  - *Katedra za gradbeno informatiko (KGI)*
  - *Katedra za mehaniko (KM)*
  - *Katedra za matematiko in fiziko (KMF)*
  - *Katedra za metalne konstrukcije (KMK)*
  - *Katedra za masivne in lesene konstrukcije (KMLK)*
  - *Katedra za geotehniko (KGT)*
  - *Katedra za operativno gradbeništvo (KOG)*
  - *Katedra za preskušanje materialov in konstrukcij (KPMK)*
  - *Katedra za stavbe in konstrukcijske elemente (KSKE)*
  - *Katedra za konstrukcije in potresno inženirstvo (KKPI)*
  - *Prometnotehniški inštitut (PTI)*
- Oddelek za geodezijo
  - *Katedra za geodezijo (KG)*
  - *Katedra za geoinformatiko in katastre nepremičnin (KGKN)*
  - *Katedra za inženirsko geodezijo (KIG) (do 1. 1. 2022)*
  - *Katedra za kartografijo, fotogrametrijo in daljinsko zaznavanje (KKFDZ)*
  - *Katedra za matematično in fizikalno geodezijo ter navigacijo (KMFGN)*
  - *Katedra za prostorsko planiranje (KPP)*
- Oddelek za okoljsko gradbeništvo
  - *Inštitut za zdravstveno hidrotehniko (IZH)*
  - *Katedra za mehaniko tekočin z laboratorijem (KMT)*
  - *Katedra za splošno hidrotehniko (KSH)*

LABORATORIJI

- Hidrotehniški laboratorij (HTL)
- Konstrukcijsko prometni laboratorij (KPL)

RAZISKOVALNI INŠTITUTI

- Inštitut za konstrukcije, potresno inženirstvo in računalništvo (IKPIR)
- Vodnogospodarski inštitut (VGI)
- Raziskovalni inštitut za geo in hidro tveganja (RIGHT)

UNESCOVA KATEDRA ZA ZMANJŠEVANJE TVEGANJ OB VODNIH UJMAH (UNESCO CHAIR WRDRR)

ORGANISATIONAL UNITS

SECRETARY'S OFFICE DEAN'S OFFICE

- Secretary of the Faculty
- Personnel Office
- Office for Study Affairs
- Financial and Accounting Services
- Office for Economic Affairs
- Office for International Activity
- Office for Research Activity
- IT Services
  - *Library*
  - *Promotion and Career Centre*
  - *Computer Centre*
- Teaching Unit for Sport Education and Sport at UL FGG

DEPARTMENTS AND TEACHING-RESEARCH UNITS

- Department of Civil Engineering
  - *Municipal Economics Institute*
  - *Chair of Construction IT*
  - *Chair of Structural and Earthquake Engineering*
  - *Chair of Concrete, Masonry and Timber Structures*
  - *Chair of Mathematics and Physics*
  - *Chair of Mechanics*
  - *Chair of Geotechnical Engineering*
  - *Chair for Metal Structures*
  - *Chair of Construction Management*
  - *Chair of Testing in Materials and Structures*
  - *Chair of Buildings and Constructional Complexes*
  - *Traffic Technical Institute*
- Department of Geodetic Engineering
  - *Chair of Geodesy*
  - *Chair of Geoinformation and Real Estate Cadastres*
  - *Chair of Engineering Geodesy (until 1. 1. 2022)*
  - *Chair of Cartography, Photogrammetry and Remote Sensing*
  - *Chair of Mathematical and Physical Geodesy and Navigation*
  - *Chair of Spatial Planning*
- Department of Einvironmental Civil Engineering
  - *Institute of Sanitary Engineering*
  - *Chair of Fluid Mechanics with Laboratory*
  - *Chair of Hydraulic Engineering*

LABORATORIES

- Hydraulic Laboratory
- Laboratory of Structural and Traffic Division

INSTITUTES

- Institute of Structural Engineering, Earthquake Engineering and Construction IT
- Water Management Institute
- Research Institute of Geo and Hydro Threats

UNESCO CHAIR ON WATER-RELATED DISASTER RISK REDUCTION (UNESCO CHAIR WRDRR)

MEDNARODNO SODELOVANJE INTERNATIONAL COOPERATION

DRŽAVA COUNTRY	**MESTO** CITY
Albanija Albania	Tirana
Avstrija Austria	Gradec, Salzburg, Dunaj
Bolgarija Bulgaria	Sofia
Češka Czech Republic	Praga, Labern, Brno
Danska Denmark	Lyngby
Francija France	Saint-Etienne, Compeigne, Pariz
Finska Finland	Savonia
Grčija Greece	Solun
Hrvaška Croatia	Reka, Zagreb, Split
Italija Italy	Neapelj, Firence, Calabria
Kosovo Kosovo	Priština
Latvija Latvia	Vilna
Nemčija Germany	Hamburg, Dresden, München, Weimar, Leipzig, Aachen
Norveška Norway	Bergen
Poljska Poland	Varšava, Olsztyn, Gdansk, Krakov
Portugalska Portugal	Lizbona, Braga, Porto
Romunija Romania	Bukarešta, Oradea
Slovaška Slovakia	Bratislava
Srbija Serbia	Novi Sad
Španija Spain	Valencia, Madrid, Barcelona
Švedska Sweden	Borås
Turčija Turkey	Istanbul

RAZISKOVALNA DEJAVNOST RESEARCH ACTIVITY

RAZISKOVALCI, RAZISKOVALNE SKUPINE IN RAZISKOVALNI PROJEKTI RESEARCHERS, RESEARCH GROUPS AND RESEARCH PROJECTS	**2022**	**2023**
SPLOŠNO GENERAL		
Programske skupine Core research groups	8	7
Število raziskovalcev Number of researchers	107	109
DOMAČI PROJEKTI NATIONAL PROJECTS		
Temeljni raziskovalni projekti Basic research projets	15	19
Aplikativni raziskovalni projekti Applied research projects	6	8
Ciljni raziskovalni projekti Targeted research projects	8	12
	29	39
MEDNARODNI PROJEKTI INTERNATIONAL PROJECTS		
EU raziskovalni projekti H2020 EU research projects of H2020	7	12
Drugi raziskovalni projekti Other research projects	13	21
Projekti COST COST projects	7	9
Bilateralni raziskovalni projekti Bilateral research projects	5	3
	32	40

OBJAVE RAZISKOVALCEV UL FGG PUBLICATIONS OF UL FGG RESEARCHERS

OBJAVE RAZISKOVALCEV UL FGG PUBLICATIONS OF UL FGG RESEARCHERS	**2022**	**2023**
ZNANSTVENE OBJAVE PO TIPOLOGIJI COBISS SCIENTIFIC PUBLICATIONS ACCORDING TO COBISS TYPOLOGY		
Izvirni znanstveni članki Original scientific articles	112	119
Pregledni znanstveni članki Synoptic scientific articles	10	8
Kratki znanstveni članki Short scientific articles	3	4
Vabljeni objavljeni znanstveni prispevki na konferenci Invited scientific articles published at conferences	4	3
Objavljeni znanstveni prispevki na konferenci Scientific articles published at conferences	76	73
Samostojni znanstveni sestavki v monografiji Independent scientific monograph based articles	13	13
Znanstvene monografije Scientific monographs	11	11
Patent ali patentna prijava Patents or patent applications	1	1
	230	232
STROKOVNE OBJAVE PROFESSIONAL PUBLICATIONS		
Strokovni članki Professional articles	6	6
Vabljeni objavljeni strokovni prispevki na konferenci Invited professional articles published at conferences	0	1
Objavljeni strokovni prispevki na konferenci Professional monograph based articles published at conferences	6	9
Samostojni strokovni sestavki v monografiji Independent professional monograph based articles	5	4
Strokovne monografije Professional monographs	1	2
	18	22
UČBENIKI IN UČNA GRADIVA TEXTBOOKS AND STUDY MATERIALS	11	19
STROKOVNA POROČILA IN ELABORATI EXPERT REPORTS	117	55
OSTALA ZNANSTVENA IN STROKOVNA DEJAVNOST OTHER SCIENTIFIC AND PROFESSIONAL ACTIVITY	421	511

ŠTUDENTI STUDENTS

	2021/22	2022/23
SPLOŠNO GENERAL		
študenti na UL FGG students at UL FGG	802	716
novo vpisani študenti new enrolments	219	206
tuji študenti in izmenjave foreign students and exchanges	np	36
moški male	65,0%	66,3%
ženske female	35,0%	33,7%
ŠTUDIJSKI PROGRAMI I. STOPNJE 1st CYCLE STUDY PROGRAMMES		
Univerzitetni študijski program prve stopnje Gradbeništvo Academic study programme Civil Engineering	235	208
Univerzitetni študijski program prve stopnje Geodezija in geoinformatika Academic study programme Geodesy and Geoinformation	71	67
Univerzitetni študijski program prve stopnje Vodarstvo in okoljsko inženirstvo Academic study programme Water Science and Environmental Engineering	33	21
Visokošolski strokovni študijski program prve stopnje Operativno gradbeništvo Higher education professional study programme Construction Management	135	118
Visokošolski strokovni študijski program prve stopnje Tehnično upravljanje nepremičnin Higher education professional study programme Technical Real Estate Management	65	55
	539	422
ŠTUDIJSKI PROGRAMI II. STOPNJE 2nd CYCLE STUDY PROGRAMMES		
Magistrski študijski program druge stopnje Gradbeništvo Master study programme Civil Engineering	84	98
Magistrski študijski program druge stopnje Geodezija in geoinformatika Master study programme Geodesy and Geoinformation	53	48
Magistrski študijski program druge stopnje Stavbarstvo Master study programme Buildings	9	4
Magistrski študijski program druge stopnje Vodarstvo in okoljsko inženirstvo Master study programme Water Science and Environmental Engineering	49	44
Magistrski študijski program druge stopnje Prostorsko načrtovanje Master study programme Spatial Planning	23	9
	218	203
ŠTUDIJSKI PROGRAMI III. STOPNJE 3rd CYCLE STUDY PROGRAMMES		
Doktorski študijski program tretje stopnje Grajeno okolje Doctoral study programme Built Environment	45	44
Doktorski študijski program tretje stopnje Varstvo okolja Doctoral study programme Environmental Protection	0	0
	45	44
ZAKLJUČNA DELA FINAL THESES		
zaključna dela I. stopnje - diplome UN 1st cycle final theses (academic)	49	51
zaključna dela I. stopnje - diplome VS 1st cycle final theses (higher education)	17	26
zaključna dela II. stopnje - magisteriji 2nd cycle final theses (master)	87	73
zaključna dela III. stopnje - doktorati 3rd cycle final theses (doctoral)	8	8
	161	158

ZAPOSLENI EMPLOYEES

	2021/22	2022/23
SPLOŠNO GENERAL		
zaposleni na UL FGG employees at UL FGG	196	182
moški male	63,27%	60,99%
ženske female	36,73%	39,01%
PEDAGOŠKO - RAZISKOVALNO OSEBJE TEACHERS - RESEARCHERS		
redni profesorji professors	20	21
izredni profesorji associate professors	15	16
docenti assistant professors	31	29
višji predavatelji senior instructors	2	2
asistenti z doktoratom teaching assistants: Ph.D.	44	39
asistenti teaching assistants: M.Sc., B.Sc.	15	17
mladi raziskovalci young researchers	21	17
	148	140
NEPEDAGOŠKO OSEBJE NON-TEACHING STUFF		
administracija administration	38	4
laboranti, tehnični sodelavci laboratory assistants, tehnical support	10	8
	48	42
DINAMIKA ZAPOSLOVANJA EMPLOYMENT DINAMICS		
novo zaposleni new employees	15	10
upokojeni retired	6	2

PROMOCIJA PROMOTIONAL ACTIVITIES

	2021/22	2022/23
TEHNIŠKI DNEVI TECHNICAL DAYS		
število izvedenih tehniških dni number of technical days	2	4
število učencev obiskovalcev number of attending pupils	178	268
število osnovnih šol obiskovalk number of attending elementary schools	3	4
število izvedenih delavnic number of workshops	8	13
število vseh izvedb number of all implementations	32	36
TEMATSKA IN PROMOCIJSKA PREDAVANJA THEMATIC AND PROMOTION LECTURES		
število izvedenih tehniških dni number of thematic lectures	6	22
predstavitve FGG FGG presentations	2	11
INFORMATIVNI DNEVI INFORMATION DAYS		
število dijakov obiskovalcev number of attending students	250	300
OSTALO OTHER		
tehniški dnevi v TMS Bistra technical days in TMS Bistra	+	+
dan odprtih vrat open doors day	-	-
sodelovanje na sejmu Informativa participation at the Informativa Fair	+	+
organizacija in izvedba poletne šole organisation of summer school	+	+
sodelovanje na Znanstivalu participation at the Znanstival Fair	+	-
tekmovanje Zotkini talenti competition Zotka's Talents	+	+
sodelovanje na poletni šoli Kariernega centra UL participation in Career Center Summer School	-	-
srečanje delovnih mentorjev in študentov meeting of working mentors and students	-	-
konferenca Biznis in trendi v gradbeništvu conference Business and Trends in Civil Engineering	+	+
Evropska noč raziskovalcev European Researchers' Night	+	+
mednarodna poletna šola Unesco katedre, prvič izvedena septembra 2023 international summer school, for the first time in September 2023	-	+

PRORAČUN BUDGET

	2021 (€)	2022 (€)	2023 (€)
PRIHODKI REVENUE			
MIZŠ - šolstvo Ministry of Science, Education and Sport – education	7.754.808	8.216.697	9.479.145
programske skupine AARS, projekti CRP, MR core research groups of ARRS, targeted research projects, young researchers	2.192.716	2.1613,475	4.130.198
drugi proračunski viri RS other budget sources of RS	299.836	333.686	441.938
projekti EU EU projects	571.040	807.962	735.519
izredni študiji part-time study	309.491	244.386	168.759
tržna dejavnost market activity	1.665.103	1.696.819	1.221.611
prihodki skupaj total revenues	12.792.994	13.465.934	16.177.170
ODHODKI EXPENDITURE			
stroški dela labour cost	8.870.865	9.246.624	9.948.358
stroški blaga, materiala, storitev cost of goods, materials, services	2.664.769	3.269.977	2.452.823
amortizacija depreciation	458.881	854.972	882.703
drugi odhodki other expenditures	90.068	94.361	156.504
odhodki skupaj total expenditures	12.084.583	13.465.934	14.440.388
REZULTAT = presežek prihodkov nad odhodki RESULT = surplus	708.411	447.091	1.736.782

MEJNIKI RAZVOJA FAKULTETE MILESTONES IN THE FACULTY'S DEVELOPMENT

1919

1. 2. 1919 je bilo izvedeno prvo predavanje.
23. 7. 1919 so bili z Zakonom o univerzi kraljevine SHS dokončno ustanovljeni tehniški visokošolski tečaji, ki so s tem pridobili status tehniške fakultete v okviru Univerze v Ljubljani. Ustanovljen je bil gradbeni oddelek.
Prvi dekan Tehniške fakultete je bil prof. dr. Karel Hinterlechner.
Na pobudo inženirja Lea Novaka, profesorja na takratni Državni obrtni šoli, so bili ustanovljeni zemljemerski tečaji.

On February 1, 1919, the first lecture was held.
On July 23, 1919, the Kingdom of Serbs, Croats and Slovenians, adopted the Act on University, finally establishing the technical higher education courses, which thus acquired the status of technical faculty within the University of Ljubljana. The Civil Engineering Department was established.
The first dean of the Technical Faculty was Prof. Dr. Karel Hinterlechner.
On the initiative of engineer Leo Novak, Professor at the then National Trade School, the land surveying courses were established.

1921

Leta 1921 odbor za izgradnjo tehniške fakultete pod vodstvom inženirja Milana Šukljeta uresniči Plečnikov načrt provizorija Tehniške fakultete na današnji Aškerčevi cesti 7, kasneje imenovana »Stara tehnika«. V njej so imeli prostore trije oddelki Tehniške fakultete: gradbeni oddelek, oddelek za arhitekturo in oddelek za elektrotehniko. V tej zgradbi je potekalo tudi poučevanje geodezije.

In 1921, the Committee for the Construction of the Technical Faculty, managed by an engineer, Milan Šuklje, managed to realise Plečnik's plan of temporary Technical Faculty on today's 7 Aškerčeva Street, later on called »Old Technical School«. It housed three departments of the Technical Faculty: Civil Engineering, Architecture and Electrical Engineering. In the same building geodesy was also taught.

1931

Študij gradbeništva je bil organiziran kot skupnost Inštituta za tehnično mehaniko in Inštituta za gradbeno inženirstvo.
Leta 1931 se inštituta razdelita na šest zavodov:
— Zavod za tehnično mehaniko in preiskavo materiala,
— Zavod za ojačen beton in gradbeno mehaniko,
— Zavod za visoke stavbe,
— Zavod za ceste in železnice,
— Zavod za mostne zgradbe in
— Zavod za vodne zgradbe.

The civil engineering study was organised in cooperation between the Institute of Technical Mechanics and the Institute of Building Engineering.
In 1931, the institutes split into six institutes:
— Institute of Technical Mechanics and Material Research,
— Institute of Reinforced Concrete and Building Mechanics,
— Institute of Buildings,
— Institute of Roads and Railroads,
— Institute of Bridge Structures, and
— Institute of Water Building.

1945

Po 2. svetovni vojni je postala Fakulteta za gradbeništvo in geodezijo samostojna članica Univerze v Ljubljani. Od leta 1945 do jeseni 1950 jo je kot dekan vodil prof. Alojzij Hrovat, s prekinitvijo v letih 1947/48, ko je dekanstvo prevzel dr. Anton Kuhelj.
Na Oddelku za gradbeništvo so bile ustanovljene tri študijske smeri: hidrotehnična (HS), konstrukcijska (KS) in prometna (PS).
Pobuda za ustanovitev Oddelka za geodezijo je prišla z Zavoda za geodezijo takratne Geodetske uprave LR Slovenije in od posameznikov iz prakse.

After World War II, the Faculty of Civil and Geodetic Engineering became an independent member of the University of Ljubljana. From 1945 to the autumn of 1950, its dean was Prof. Alojzij Hrovat.
At the Department of Civil Engineering, three study orientations were established: hydrotechnical, structural and traffic.
The initiative to establish the Department of Geodesy came from the Institute of Geodesy, which was at the time Geodetic Administration of Slovenia, and from individuals active in the profession.

1949

Leta 1949 je bil dograjen stavbni kompleks na Hajdrihovi ulici. Inženirsko ga je zasnoval prof. dr. Milovan Goljevšček, arhitektonsko izoblikoval pa docent Janez Valentinčič. Imenoval se je Vodogradbeni laboratorij Univerze v Ljubljani. Po drugi svetovni

In 1949, the complex at Hajdrihova Street was finished. It was designed by Prof. Dr. Eng. Milovan Goljevšček,

vojni je bila to v Sloveniji prva zgradba, namensko postavljena za izobraževanje. Danes so v tej zgradbi prostori Oddelka za okoljsko gradbeništvo.

1950

Med študijskima letoma 1950/51 in 1953/54 je študij tehnike potekal na samostojni Tehniški visoki šoli, ki je bila ločena od ljubljanske univerze. Tudi Fakulteta za gradbeništvo in geodezijo je bila članica samostojne Tehniške visoke šole.
Fakulteta za gradbeništvo in geodezijo je postala Oddelek za gradbeništvo in geodezijo tedanje Tehniške fakultete Univerze v Ljubljani.

according to architectural drawings of Assist. Prof. Eng. Arch. Janez Valentinčič. The building was called Water Building Laboratory of the University of Ljubljana. It was the first building after World War II constructed in Slovenia specifically for education. Today, the Department of Environmental Engineering is located in the building.

During the academic years 1950/51 and 1953/54, the study of engineering was implemented at the independent Technical Higher Education School, which was separated from the University of Ljubljana. The Faculty of Civil and Geodetic Engineering was member of the independent Technical Higher Education School. Then, it became Department of Civil and Geodetic Engineering at the Technical Faculty of the University of Ljubljana.

1957

28. 6. 1957 je bila na podlagi Zakona o univerzi v Ljubljani (2. člen) ustanovljena Fakulteta za arhitekturo, gradbeništvo in geodezijo (FAGG). Ta je imela tri oddelke:
— Oddelek za arhitekturo,
— Oddelek za gradbeništvo in
— Geodetsko-komunalni oddelek.

Prvi dekan FAGG je bil prof. Edo Mihevc (arhitekt), prodekan pa Janko Sketelj (gradbenik).

On June 28, 1957, the Act on University of Ljubljana was adopted. Based on its Article 2, the Faculty of Architecture, Civil and Geodetic Engineering (FAGG) was established. It had three departments:
— Department of Architecture,
— Department of Civil Engineering,
— and Geodetic-Municipal Department.

The first Dean was Prof. Edo Mihevc (architect), and its vice dean was Janko Sketelj (civil engineer).

1969

Leta 1969 je bila po načrtih prof. Edvarda Ravnikarja zgrajena nova stavba na Jamovi cesti 2.

In 1969, the new building at Jamova Street was built according to the design of Prof. Eng. Arch. Edvard Ravnikar.

1995

31. 12. 1994 je FAGG z Odlokom o preoblikovanju Univerze v Ljubljani prenehala obstajati. Nastali sta dve novi fakulteti: Fakulteta za arhitekturo (UL FA) in Fakulteta za gradbeništvo in geodezijo (UL FGG).
Zadnji dekan FAGG je bil prof. dr. Janez Duhovnik, zadnji predstojnik Oddelka za gradbeništvo in geodezijo pa prof. dr. Bojan Majes.

1. 1. 1995 je Fakulteta za gradbeništvo in geodezijo postala samostojna članica Univerze v Ljubljani.
V študijskem letu 1996/97 so se pričeli izvajati univerzitetni (UN) in visokošolski strokovni (VS) študijski programi:
— UN Gradbeništvo
— UN Vodarstvo in komunalno inženirstvo
— UN Geodezija
— VS Gradbeništvo
— VS Geodezija.

Univerzitetni študijski program Vodarstvo in komunalno inženirstvo se je pričel izvajati z dvoletnim zamikom, v študijskem letu 1998/99.
Že pred vstopom v EU začne UL FGG sodelovati v evropskih projektih (TEMPUS, SOCRATES, COST, Leonardo da Vinci idr.).
Podiplomskim študentom je bil v letu 2001 prvič omogočen neposredni prehod na doktorski študij brez dokončanega znanstvenega magisterija.

With a Decree on Reorganisation of the University of Ljubljana from December 31, 1994, FAGG ceased to exist. Two new faculties were formed: Faculty of Architecture (FA) and Faculty of Civil and Geodetic Engineering (FGG). The last dean of FAGG was Prof. Dr. Janez Duhovnik, and the last head of the Department of Civil and Geodetic Engineering was Prof. Dr. Bojan Majes.

On January 1, 1995, the Faculty of Civil and Geodetic Engineering became an independent member of the University of Ljubljana.
In the academic year 1996/97, the following academic and higher education professional study programmes were introduced:
— Academic study of Civil Engineering
— Academic study of Water Science and
— Municipal Engineering
— Academic study of Geodesy
— Higher education study of Civil Engineering
— Higher education study of Geodesy.

The academic study programme Water Science and Municipal Engineering was first implemented two years later, in the academic year 1998/99.
Even before Slovenia joined the European Union, the Faculty of Civil and Geodetic Engineering started to cooperate in European projects (TEMPUS, SOCRATES, COST, Leonardo da Vinci, etc.). In 2001, postgraduate students were for the first time allowed to transfer directly to doctoral studies, without finishing first the scientific master degree.

2007

V študijskem letu 2007/08 je senat Sveta za visoko šolstvo RS UL FGG izdal akreditacijo za 11 bolonjskih študijskih programov 1., 2. in 3. stopnje.
Bolonjski študijski programi so se nato začeli postopoma izvajati med študijskima letoma 2008/09 in 2012/13:
— dva bolonjska visokošolska strokovna študijska programa 1. stopnje – Operativno gradbeništvo in Tehnično upravljanje nepremičnin
— trije univerzitetni študijski programi 1. bolonjske stopnje: Gradbeništvo, Geodezija in geoinformatika in Vodarstvo in komunalno inženirstvo
— pet magistrskih študijskih programov 2. stopnje: Gradbeništvo, Prostorsko načrtovanje, Stavbarstvo, Geodezija in geoinformatika ter Okoljsko gradbeništvo
— doktorski študijski program 3. stopnje Grajeno okolje s tremi znanstvenimi področji Gradbeništvo, Geodezija in Načrtovanje prostora, ki se je v letu 2010 razširil še z znanstvenim področjem Geologija.

In the academic year 2007/08, the Senate of the Higher Education Council of the Republic of Slovenia awarded an accreditation to UL FGG for its 11 first, second and third cycle Bologna study programmes.
The Bologna study programmes were then gradually introduced from 2008/09 to 2012/13:
— two Bologna first cycle higher education professional study programmes: Construction Management and Technical Real Estate Management
— three Bologna first cycle academic study programmes: Civil Engineering, Geodesy and Geoinformation and Water Science and Municipal Engineering
— five second cycle master study programmes: Civil Engineering, Spatial Planning, Buildings, Geodesy and Geoinformation and Environmental Civil Engineering
— third cycle doctoral study programme Built Environment with three scientific areas – Civil Engineering, Geodesy and Spatial Planning, extended in 2010 to the scientific area Geology.

2009

V letu 2009 sta bila ustanovljena Oddelek za okoljsko gradbeništvo s prostori na Hajdrihovi ulici 28a in Vodnogospodarski inštitut.
Leta 2010 je bila kupljena hiša na Groharjevi ulici 2b, v katero se je vselilo računovodstvo UL FGG, v pritličje na Jamovi cesti 2 pa referat za študijske zadeve.

In 2009, the Department of Environmental Civil Engineering was established, located at Hajdrihova 28a, as well as the Water Management Institute. In 2010, UL FGG purchased a house at Groharjeva Street 2b. The faculty's financial services were relocated there. At the same time, the Office of Study Affairs moved from the first floor to the ground floor of the main building.

2014

Od leta 2014 dalje se sistematično preurejajo in posodabljajo notranji prostori fakultete. Najprej je bila na podlagi študentskega natečaja preurejena avla glavne stavbe UL FGG na Jamovi cesti 2. Sledile so ureditve študentskih kotičkov in študentske pisarne, preureditve hodnikov s postavitvijo stalnih in začasnih razstav ter preureditev predavalnic. Obnova še poteka in se širi tudi na zunanjo ureditev stavb UL FGG.
Obdobje med letoma 2011 in 2018 je bilo plodno in uspešno, kar se kaže tudi v pomembnejših dosežkih sodelavcev fakultete:
— 2011: akademik prof. dr. Peter Fajfar izvoljen za člana Evropske akademije znanosti
— 2013: nagrada IZS za življenjsko delo na področju graditve objektov akademiku prof. dr. Petru Fajfarju
— 2015: Zoisova nagrada za življenjsko delo akademiku profesorju dr. Petru Fajfarju
— 2013 – 2017: prof. dr. Goran Turk izvoljen za prorektorja Univerze v Ljubljani
— 2017: prof. dr. Matjaž Mikoš izvoljen za rednega člana Inženirske akademije Slovenije (IAS)
— 2018: akademik prof. dr. Peter Fajfar izvoljen za člana National Academy of Engineering (ZDA).

In 2014, the faculty management and staff worked out a new UL FGG vision and mission statement.
Since 2014, the UL FGG interiors have been systematically redesigned. First, the main hall of the UL FGG main building at Jamova Street 2 was redesigned by students based on a call for proposals. This was followed by rearrangement of student corners and a student office, corridors, with permanent and temporary exhibitions, and renovation of lecture rooms. Renovations are still ongoing and are expanding to the UL FGG exterior.
The time between 2011 and 2018 was fruitful and successful, which is evident also in the latest achievements of our staff:
— 2011: Acad. Prof. Dr. Peter Fajfar elected member of the European Academy of Science
— 2013: Life Achievement Award to Acad. Prof. Dr. Peter Fajfar by Slovenian Chamber of Engineers for his work in the area of structural engineering
— 2015: Zois Life Achievement Award to Acad. Prof. Dr. Peter Fajfar
— 2013-2017: Prof. Dr. Goran Turk elected Vice- Rector of the University of Ljubljana
— 2017: Prof. Dr. Matjaž Mikoš elected full member of the Slovenian Academy of Engineering (IAS)
— 2018: Acad. Prof. Dr. Peter Fajfar elected member of the National Academy of Engineering (USA).

2016

30. 9. 2016 so bili na podlagi Zakona o visokem šolstvu dokončno ukinjeni predbolonjski univerzitetni in visokošolski strokovni študijski programi ter podiplomski študijski programi na ravni znanstvenega magisterija.
V študijskem letu 2015/16 je fakulteta za obdobje petih let pridobila mednarodno akreditacijo ASIIN in EUR-ACE za vseh 10

On 30 Sept. 2016, based on the Higher Education Act, the pre-Bologna academic and higher education professional study programmes as well as postgraduate study programmes leading to the scientific master degree were finally abolished. In the academic year

študijskih programov 1. in 2. stopnje.
Leta 2016 je bila na Univerzi ustanovljena Unescova katedra za zmanjševanje tveganj ob vodnih ujmah.
Leta 2017 je UL FGG v Ljubljani organizirala 4. Svetovni forum o zemeljskih plazovih s 600 udeleženci.

2019

V okviru praznovanj 100-letnice Univerze v Ljubljani je UL FGG organizirala vrsto dogodkov, med katerimi sta izstopala Svetovni gradbeniški forum v soorganizaciji z Inženirsko zbornico Slovenije in 14. srečanje predstavnikov evropskih planerskih šol AESOP v soorganizaciji z Oddelkom za krajinsko arhitekturo Biotehniške fakultete Univerze v Ljubljani.
Prof. dr. Matjaž Dolšek je prejel Zoisovo priznanje za pomembne znanstvene dosežke v potresnem inženirstvu.

2020

Marca 2020 je Vlada RS razglasila pandemijo COVID-19, ki je zaznamovala vse nadaljnje obdobje. V tem času je večina pouka in dela potekala na daljavo. Kljub temu smo bili z rezultati relativno zadovoljni, saj je tudi število študentov ponovno pričelo naraščati.
December 2020: Dr. Marko Lavrenčič je prvi doktorant UL FGG, ki je dobil posebno pohvalo »cum laude« za odličen doktorat z naslovom Numerical Procedures for Nonlinear Static and Dynamic Analyses of Shell Systems of Various Sizes. Komisijo pri zagovoru doktorske disertacije so sestavljali profesorji iz Nemčije, Hrvaške in Slovenije.

2021

18. 5. 2021 je bila prof. dr. Violeta Bokan Bosiljkov, kot prva ženska v zgodovini fakultete, izvoljena za dekanjo UL FGG. Mandat je nastopila 1. 10. 2021.

2015/16, the faculty was awarded international ASIIN and EUR-ACE accreditations for all of its ten first and second cycle study programmes for a period of five years.
In 2016, Unesco Chair on Water-related Disaster Risk Reduction (WRDRR) was established at the University of Ljubljana.
In 2017, UL FGG organised the 4th World LandslideForum in Ljubljana with 600 participants.

On the occasion of the 100th anniversary of the University of Ljubljana, UL FGG organised a number of events. Especially worth mentioning are the World Construction Forum in co-organisation with the Slovenian Chamber of Engineers and 14th meeting of representatives from European planning schools AESOP in co-organisation with the Department of Landscape Architecture at the Biotechnical Faculty of the University of Ljubljana.
Prof. Dr. Matjaž Dolšek received the Zois Award for significant scientific achievements in earthquake engineering.

In March 2020, the Government of the Republic of Slovenia declared the COVID-19 pandemic, which shaped the entire subsequent period. During this period, most of the classes and work took place remotely. Nevertheless, we are relatively satisfied with the results, as the number of students started to increase again.
December 2020: Dr. Marko Lavrenčič is the first UL FGG doctoral student to receive a special commendation "cum laude" for his excellent doctoral thesis titled Numerical Procedures for Nonlinear Static and Dynamic Analyses of Shell Systems of Various Sizes. The defence jury of his doctoral thesis consisted of professors from Germany, Croatia and Slovenia.

On May 18, 2021, Prof. Dr. Violeta Bokan Bosiljkov was elected Dean of UL FGG, as the first woman in the history of the faculty. She took office on October 1, 2021.

NAGRADE IN PRIZNANJA AWARDS AND PRIZES

2021/22

Svečano listino mladim visokošolskim učiteljem in visokošolskim sodelavcem je prejel asist. dr. Jernej Tekavec.

Prejemnik Univerzitetne Prešernove nagrade je Mario Farič za raziskovalno delo z naslovom "Potresni odziv enostransko utrjenih prekladnih delov kamnitih zidov", mentor doc. dr. Matija Gams.

Fakultetno Prešernovo nagrado za študijsko leto 2021/2022 sta prejela:
— Neja Fazarinc za raziskovalno delo z naslovom »Digitalni pripomoček za poučevanje in učenje osnov dinamike konstrukcij«, mentor prof. dr. Matjaž Dolšek, somentor doc. dr. Robert Klinc,
— Žan Pleterski za raziskovalno delo z naslovom »Določitev geodetskega datuma geodetske mreže plazu Urbas«, mentor doc. dr. Tilen Urbančič, somentor doc. dr. Klemen Kregar.

Priznanje Fakultete za gradbeništvo in geodezijo UL so prejeli:
— Urška Prusnik, Andrej Vitek, Špela Šmalc, Simona Konda, Sonja Karakaš, Mateja Progar, Anja Ločičnik, Monika Golobar za aktivno sodelovanje pri implementaciji in odpravljanju napak novega informacijskega sistema APIS na UL FGG,
— Urška Prusnik za pomoč pri administrativnih postopkih, vpeljavi informacijskega sistema APIS in koordinacijo prenov, ki potekajo v stavbah fakultete,
— doc. dr. Robert Klinc za računalniško pomoč in razvoj spletnih obrazcev za lažje spremljanje dela.

Priznanja najuspešnejšim študentom za študijsko leto 2021/2022 so bila podeljena:
— na prvostopenjskih študijskih programih so priznanja dobili naslednji študenti: Maks Alič, Manca Simončič, Neja Fazarinc, Hana Vidic, Martina Stopar, Neja Flogie, Blažka Bojnec, Maja Filač, Meldin Bajramović, Sara Šopar, Žiga Černe, Klemen Konda in Martin Ravnik Papić,
— na drugostopenjskih študijskih programih so priznanja prejeli: Ema Kogovšek, Žan Pleterski, Nina Črnigoj, Tadej Dolenc, Luka Prezelj, Gaja Medved, Katjuša Potočnik, Matjaž Kravanja.

Pohvale najboljšim pedagogom, ki jih podeljuje Študentski svet UL FGG, so prejeli: doc. dr. Peter Lipar, prof. dr. Krištof Oštir, asist. dr. Peter Lamovec, prof. dr. Mojca Šraj, asist. dr. Marjeta Škapin Rugelj, prof. dr. Zvonko Jagličić, prof. dr. Goran Turk, asist. dr. Jasna Smolar, asist. dr. Jernej Tekavec, strok. sod. mag. Mojca Premuš.

The ceremonial prize to young higher education teachers and associates was awarded to Assist. Dr. Jernej Tekavec.

The recipient of the University Prešeren Award was Mario Farič for his research work titled "Seismic response of one side strengthened stone masonry spandrels", supervisor Assist. Prof. Dr. Matija Gams.

The Faculty Prešeren Award for the academic year 2021/2022 was awarded to:
— Neja Fazarinc for her research work titled "The web application for learning the dynamic response of a simple structure", supervisor Prof. Dr. Matjaž Dolšek, co-supervisor Assist. Prof. Dr. Robert Klinc,
— Žan Pleterski for his research work titled "Geodetic datum determination for the Urbas landslide geodetic network", supervisor Assist. Prof. Dr. Tilen Urbančič, co-supervisor Assist Prof. Dr. Klemen Kregar.

Receivers of the Award of the Faculty of Civil and Geodetic Engineering, UL, were:
— Urška Prusnik, Andrej Vitek, Špela Šmalc, Simona Konda, Sonja Karakaš, Mateja Progar, Anja Ločičnik, Monika Golobar for their active participation in the implementation and correction of errors in the new APIS information system at UL FGG,
— Urška Prusnik for her assistance in administrative procedures, introduction of the APIS information system and coordination of renovations within the faculty's buildings,
— Assist. Prof. Dr. Robert Klinc for his IT assistance and development of web forms to facilitate work processes.

Awards to the most successful students in the academic year 2021/2022:
— at the first-cycle study programmes the following students received awards: Maks Alič, Manca Simončič, Neja Fazarinc, Hana Vidic, Martina Stopar, Neja Flogie, Blažka Bojnec, Maja Filač, Meldin Bajramović, Sara Šopar, Žiga Černe, Klemen Konda, Martin Ravnik Papić,
— at the second-cycle study programmes the following students received awards: Ema Kogovšek, Žan Pleterski, Nina Črnigoj, Tadej Dolenc, Luka Prezelj, Gaja Medved, Katjuša Potočnik, Matjaž Kravanja.

The following teachers were awarded as the best educators by the UL FGG Student Council: Assist. Prof. Dr. Peter Lipar, Prof. Dr. Krištof Oštir, Assist. Dr. Peter Lamovec, Prof. Dr. Mojca Šraj, Assist. Dr. Marjeta Škapin Rugelj, Prof.

Goljevščkovo nagrado, ki jo podeljuje Oddelek za okoljsko gradbeništvo skupaj z Inštitutom za hidravlične raziskave za spodbujanje poglobljenega strokovnega in raziskovalnega dela študentov, sta v letu 2022 prejela:
— Aljaž Frank za zaključno delo z naslovom »Predlog sanacije odlagališča Globovnik«, mentor doc. dr. Matej Maček,
— Blaž Košorok za zaključno delo z naslovom »Analiza možnosti optimizacije energetske proizvodnje HE Medvode na Savi«, mentor izr. prof. dr. Andrej Kryžanovski, somentor Dušak Mitja.

Častno Valvasorjevo priznanje za leto 2021, podeljeno maja 2022, je prejel izr. prof. dr. Dušan Kogoj za zasnovo, postavitev in ureditev zbirke geodetskih instrumentov na UL FGG.

Izr. prof. dr. Samo Drobne je prejel priznanje Državnega sveta za pripravo pokrajinske zakonodaje.

Žiga Maroh je prejel priznanje za najboljše Esri zaključno delo »Metode vizualizacije digitalnega modela reliefa z uporabo ArcGIS Pro rastrskih funkcij«, mentor prof. dr. Krištof Oštir, somentorja mag. Doerffel Guenter in doc. dr. Žiga Kokalj. Nagrado podeljuje podjetje GDi.

Prof. dr. Jože Korelc je prejel O. C. Zienkiewicz medaljo za tuje znanstvenike s posebnimi zaslugami za razvoj mehanike na Poljskem.

Izr. prof. dr. Samo Drobne je prejel Zlati častni znak Slovenskega društva Informatika za izredno aktivno delovanje v Sekciji za operacijske raziskave.

Zlato plaketo Univerze v Ljubljani za izjemne zasluge redno zaposlenega posameznika na Univerzi v Ljubljani pri razvijanju znanstvenega, pedagoškega ali umetniškega ustvarjanja univerze in za krepitev njenega ugleda je prejel prof. dr. Matjaž Dolšek.

Svečano listino za študente Univerze v Ljubljani vseh treh stopenj za najboljše študijske dosežke je prejel Maks Alič.

Fakultetno Prešernovo nagrado za študijsko leto 2022/2023 sta prejela:
— Veronika Pučnik za raziskovalno delo z naslovom »Eksperimentalno podprto modeliranje potresnega odziva zidane stavbe v obstoječem in utrjenem stanju«, mentor doc. dr. Matija Gams, somentorica prof. dr. Tatjana Isaković,
— Lana Radulović za raziskovalno delo z naslovom »Vpliv prestrezanja padavin na mikrostrukturo padavin«, mentorica prof. dr. Mojca Šraj, somentor doc. dr. Nejc Bezak.

Priznanje Fakultete za gradbeništvo in geodezijo UL so prejeli:
— asist. dr. Marjeta Škapin Rugelj za prispevanje k uspešnemu delovanju KMF, predanosti pedagoškemu delu in skrbi za vzdrževanje spletnih učilnic,
— Mojca Vilfan za strokovno opravljanje dela in podpore pri raziskovalnih in strokovnih projektih.

Priznanja najuspešnejšim študentom za študijsko leto 2022/2023 so bila podeljena:
— na prvostopenjskih študijskih programih so priznanja dobili naslednji študenti: Maks Alič, Andraž Novinšek Petrovčič, Miha Smrkolj, Manca Simončič, Jan Panič, Hana Vidic, Neja Flogie, Blažka Bojnec, Maja Filač, Meldin Bajramović, Žiga Černe, Irena Čepon, Nejc Pevec,
— na drugostopenjskih študijskih programih so priznanja prejeli: Neja Fazarinc, Martina Stopar, Špela Gorišek, Sara Šopar, Nina Črnigoj, Žiga Obrstar, Luka Prezelj, Katjuša Potočnik, Luka Jurko.

Pohvale najboljšim pedagogom, ki jih podeljuje Študentski svet UL FGG, so prejeli: prof. dr. Anka Lisec, izr. prof. dr. Polona Pavlovčič Prešeren, asist. dr. Jernej Tekavec, doc. dr. Jure Kokalj, asist. dr. Marjeta Škapin Rugelj, izr. prof. dr. Gašper Rak, prof. dr. Dušan Žagar, prof. dr. Goran Turk, doc. dr. Peter Lipar, doc. dr. Anže Babič.

Goljevščkovo nagrado, ki jo podeljuje Oddelek za okoljsko gradbeništvo skupaj z Inštitutom za hidravlične raziskave za spodbujanje poglobljenega strokovnega in raziskovalnega dela študentov, sta v letu 2023 prejela:
— Luka Prezelj za zaključno delo z naslovom »Modeliranje transporta plavin na porečju Save Dolinke«, mentor doc. dr. Nejc Bezak,
— Avdo Jusufbegović za zaključno delo z naslovom »Tehnične rešitve odvodnje tramvajske proge«, mentor doc. dr. Mario Krzyk.

Prof. dr. Jože Korelc je prejel mednarodno nagrado za znanstvene dosežke, Computational Mechanics Award, ki jo podeljuje Central European Association of Computational Mechanics (CEACM).

Doc. dr. Gregor Čok je na 31th International Urban Planners Exhibition Društva urbanistov Republike Slovenije prejel nagrado za projekt Pomorski prostorski plan Slovenije.

Prof. dr. Bojan Stopar je prejel Priznanje Zveze geodetov Slovenije za pomemben prispevek k razvoju geodetske stroke.

2022/23

Dr. Zvonko Jagličić, Prof. Dr. Goran Turk, Assist. Dr. Jasna Smolar, Assist. Dr. Jernej Tekavec, Profess. Assoc. Mojca Premuš, MSc.

In 2022, the Goljevšček Award, which is awarded by the Department of Environmental Engineering together with the Institute for Hydraulic Research to promote in-depth professional and research work of students, was awarded to:
— Aljaž Frank for his final thesis titled "Remediation proposal for the Globovnik landfill", supervisor Assist. Prof. dr. Matej Maček,
— Blaž Košorok for his final thesis titled "Analysis of the possibility of optimizing the energy production of Medvode HPP on the Sava River", supervisor Assoc. Prof. Dr. Andrej Kryžanowski, co-supervisor Mitja Dušak.

The honorary Valvasor Award for 2021, awarded in May 2022, was awarded to Assoc. Prof. Dr. Dušan Kogoj for the design, installation, and arrangement of the collection of geodetic instruments at UL FGG.

Assoc. Prof. Dr. Samo Drobne received a recognition by the National Council for the preparation of the legislation for Slovenian provinces.

Žiga Maroh received a recognition for the best Esri final thesis "The methods for the visualization of digital elevation model with ArcGIS Pro raster functions", supervisor Prof. Dr. Kristof Oštir, co-supervisor, M.Sc. Doerffel Guenter and Assoc. Prof. Dr. Žiga Kokalj. The recognition is awarded by the company GDi.

Prof. Dr. Jože Korelc received an O. C. Zienkiewicz Medal for international scientists with special merits for the development of mechanics in Poland.

Assoc. Prof. Dr. Samo Drobne received the Golden Medal of Honour of the Slovenian Informatics Society for his extremely active work in the Operation Research Section.

The Golden Plaque of the University of Ljubljana for outstanding merits of a full-time employee of the University of Ljubljana in developing the university's scientific, educational or artistic work and for strengthening its reputation was awarded to Prof. Dr. Matjaž Dolšek.

Maks Alič received a ceremonial prize for students of the University of Ljubljana of all three cycles for the best academic achievements.

Receivers of the Faculty Prešeren Award in the academic year 2022/2023 were:
— Veronika Pučnik for her research work titled "Experimentally supported modeling of seismic response of an unstrengthened and strengthened masonry building", supervisor Assist Prof. Dr. Matija Gams, co-supervisor Prof. Dr. Tatjana Isaković,
— Lana Radulović for her research work titled "The influence of precipitation interception on the microstructure of precipitation", supervisor Prof. Dr. Mojca Šraj, co-supervisor Assist. Prof. Dr. Nejc Bezak.

Receivers of the Award of the Faculty of Civil and Geodetic Engineering, UL, were:
— Assist. Dr. Marjeta Škapin Rugelj for her contribution to successful activities of the Chair of Mathematics and Physics, her dedication to educational work and care in maintaining web classrooms,
— Mojca Vilfan for her professional work and support in research and expert projects.

Awards to the most successful students in the academic year 2022/2023:
— at first-cycle study programmes the awards were given to: Maks Alič, Andraž Novinšek Petrovčič, Miha Smrkolj, Manca Simončič, Jan Panič, Hana Vidic, Neja Flogie, Blažka Bojnec, Maja Filač, Meldin Bajramović, Žiga Černe, Irena Čepon, Nejc Pevec,
— at the second-cycle study programmes the awards were given to: Neja Fazarinc, Martina Stopar, Špela Gorišek, Sara Šopar, Nina Črnigoj, Žiga Obrstar, Luka Prezelj, Katjuša Potočnik, Luka Jurko.

The following were awarded to the best educators by the UL FGG Student Council: Prof. Dr. Anka Lisec, Assoc. Prof. Dr. Polona Pavlovčič Prešeren, Assist. Dr. Jernej Tekavec, Assist. Prof. Dr. Jure Kokalj, Assist. Dr. Marjeta Škapin Rugelj, Assoc. Prof. Dr. Gašper Rak, Prof. Dr. Dušan Žagar, Prof. Dr. Goran Turk, Assist. Prof. Dr. Peter Lipar, Assist. Prof. Dr. Anže Babič.

In 2023, the Goljevšček Award, which is awarded by the Department of Environmental Civil Engineering together with the Institute for Hydraulic Research to promote in-depth professional and research work of students, was awarded to:
— Luka Prezelj for his final thesis titled "Sediment transport modelling in the Sava Dolinka River", supervisor Assist Prof. Dr. Nejc Bezak,
— Avdo Jusufbegović for his final thesis titled "Technical solutions for the drainage of the tram line", supervisor Assist. Prof. Dr. Mario Krzyk.

Prof. Dr. Jože Korelc received an international award for scientific achievements, the Computational Mechanics Award, bestowed by the Central European Association of Computational Mechanics (CEACM).

Assist. Prof. Dr. Gregor Čok received an award for the Maritime Spatial Plan of Slovenia at the 31st International Urban Planners Exhibition of the Association of Urban Planners of the Republic of Slovenia.

Prof. Dr. Bojan Stopar received the Award of the Association of Surveyors of Slovenia for his significant contribution to the development of the surveying profession.

UNESCO KATEDRA
UNESCO CHAIR

UNESCO KATEDRA ZA ZMANJŠEVANJE TVEGANJ OB VODNIH UJMAH (UNESCO CHAIR WRDRR) UNESCO CHAIR ON WATER-RELATED DISASTER RISK REDUCTION (UNESCO CHAIR WRDRR)

KADER PERSONNEL

PREDSTOJNIK HEAD
prof. dr. **Matjaž Mikoš**

PEDAGOGI TEACHERS
doc. dr. Nejc Bezak, asist. dr. Mateja Klun, izr. prof. dr. Andrej Kryžanowski, izr. prof. dr. Simon Rusjan, prof. dr. Mojca Šraj, viš. pred. dr. Andrej Vidmar

RAZISKOVALCI RESEARCHERS
Mark Brian Alivio, asist. Tamara Kuzmanić, asist. dr. Matej Radinja, asist. dr. Klaudija Sapač

SODELAVCI ASSOCIATES
dr. Mira Kobold, asist. dr. Sašo Petan, viš. pred. dr. Jošt Sodnik, dr. Katarina Zabret

Unescova Katedra za zmanjšanje tveganj ob vodnih ujmah je bila ustanovljena leta 2016 in je s soglasjem Unesca v letu 2020 podaljšala svoj status za nadaljnja štiri leta (2020–2024).

Njen predstojnik ostaja dr. Matjaž Mikoš, redni profesor za področje inženirske hidrotehnike (izvolitev 2006) in redni profesor za področje hidrologije (izvolitev 2010). Rezultati dejavnosti katedre so vidni na spletnih straneh katedre (www.unesco-floods.eu). Predstojnik katedre je aprila 2021 postal predsednik Komisije za sistemsko financiranje in član Upravnega odbora Univerze v Ljubljani (mandat 2021–2025). Predstojnik katedre je januarja 2022 postal predsednik Globalnega promocijskega odbora Mednarodnega programa za zemeljske plazove (IPL) in Kjotske zaveze o zemeljskih plazovih 2020 (GPC IPL-KLC2020) ter začel drugi mandat podpredsednika Slovenske inženirske akademije (IAS, 2021–2024). Profesor Mikoš je kot priznani strokovnjak nadaljeval delo v Svetu za razvoj pri Slovenski akademiji znanosti in umetnosti (SR SAZU) ter postal član njene stalne delovne skupine. Člana katedre (prof. Kryžanowski in prof. Mikoš) sta poleti 2023 postala člana Sveta za vode pri Ministrstvu za naravne vire in prostor.

UNESCO Chair on Water-related Disaster Risk Reduction – WRDRR was founded in 2016, and in 2020 it prolonged its status for another four years (2020–2024) following UNESCO's approval.

The Head of the Chair remains Dr Matjaž Mikoš, full professor in hydraulic engineering (election 2006) and full professor in hydrology (election 2010). The results of the Chair's activities can be viewed on the Chair's website (www.unesco-floods.eu). In April 2021, the Head of the Chair was appointed president of the Commission for Systemic Financing and member of the Board of Directors of the University of Ljubljana (term of office 2021–2025). In January 2022, the Head of the Chair was appointed president of the Global Promotion Committee of the International Programme on Landslides (IPL) and the Kyoto Landslide Commitment 2020 (GPC IPL-KLC2020) and began his second term of office as vice president of the Slovenian Academy of Engineers (IAS, 2021–2024). As a recognised expert, Professor Mikoš continued to work in the Council for Development at the Slovenian Academy of Sciences and Arts (SR SAZU) and became a member of its permanent working group. In the summer of 2023, two members of the Chair (Prof. Kryžanowski

PEDAGOŠKA DEJAVNOST

Katedra sodeluje pri izvedbi mednarodnega magistrskega študijskega programa Erasmus Mundus Upravljanje poplavnega tveganja (Flood Risk Management) skupaj z univerzami iz Dresdna, Delfta in Barcelone. V letu 2021 je katedra pridobila letno financiranje v okviru razvojnega stebra financiranja univerze za obdobje štirih let (2021–2024), in sicer na področju institucionalnega financiranja za krepitev kompetenc učiteljev z vključevanjem družbenih izzivov in mednarodnih izkušenj in praks v pedagoški proces preko sodelovanja v aktivnostih katedre. Katedra načrtuje svojo usmeritev v snovanje in pripravo prosto dostopnih učnih vsebin. Septembra 2023 je katedra izvedla odmevno poletno šolo na temo hidroloških podatkov.

ZNANSTVENA IN RAZISKOVALNA DEJAVNOST

Na Unescovi katedri smo raziskovali v okviru dela na raziskovalnem programu P2-0180 »Vodarstvo in geotehnika: orodja in metode za analize in simulacije procesov ter razvoj tehnologij« (2022–2027), ki ga financira Javna agencija za raziskovalno dejavnost Republike Slovenije (ARRS). Katedra raziskovalno deluje tudi v okviru aktivnosti slovenskega Nacionalnega odbora za Medvladni hidrološki program IHP Unesco, ki ga vodi prof. dr. Matjaž Mikoš. Katedra je uspešno končala raziskovanje v okviru dvoletnega evropskega projekta mehanizma civilne zaščite »Prekomejna ocena tveganj za povečano preventivo in pripravljenost v Evropi« (BORIS, 2021–2022).

Člani katedre vzdržujemo stike z drugimi naravoslovno in inženirsko usmerjenimi katedrami v svetu – predvsem kot člani Unescove mreže UNITWIN za sodelovanje na področju obvladovanja tveganj pred naravnimi nesrečami, kot so zemeljski plazovi, potresi in vodne ujme. Mrežo UNITWIN koordinira Raziskovalni inštitut za preventivo pred nesrečami na Univerzi v Kjotu na Japonskem in Mednarodni konzorcij za zemeljske plazove (ICL).

Unescova katedra je bistveno prispevala k aktivnostim UL FGG kot Svetovnega centra odličnosti na področju zmanjševanja tveganj zaradi zemeljskih plazov (vse od leta 2008, nazadnje 2020–2023).

Katedra je v okviru svojega delovnega načrta aktivno sodelovala pri organizaciji in/ali izvedbi več mednarodnih strokovnih dogodkov: 5. regionalnega posvetovanja o zemeljskih plazovih na Jadransko-balkanskem območju (Reka, marec 2022), 6. Svetovnega foruma o zemeljskih plazovih (Firence, november 2023) in 15. kongresa INTERPRAEVENT (Dunaj, junij 2024) kot tudi 3. slovenskega kongresa o vodah (Ptuj, september 2023).

Člani katedre opravljajo obsežno recenzentsko in uredniško delo za številne odlične revije v svetu in v Sloveniji.

POMEMBNI DOSEŽKI

Kot poseben dosežek lahko štejemo novo imenovanje UL FGG za Svetovni center odličnosti za zmanjševanje tveganj zaradi zemeljskih plazov (neprekinjeno od leta 2008 naprej) kot tudi sistemsko

and Prof. Mikoš) became members of the Council for Waters at the Ministry of Natural Resources and Spatial Planning.

EDUCATIONAL ACTIVITY

The Chair is actively involved in the implementation of the international master's study programme Erasmus Mundus Flood Risk Management, in cooperation with universities from Dresden, Delft, and Barcelona. In 2021, the Chair obtained annual funding under the development pillar of university funding for a period of 4 years (2021-2024) in the field of institutional funding to strengthen teachers' competencies by integrating societal challenges and international experiences and practices into the pedagogical process through participation in the Chair's activities. The Chair's focus is on designing and preparing open-access learning content. In September 2023 the Chair organised a high-profile summer school dealing with hydrological data.

SCIENTIFIC AND RESEARCH ACTIVITES

The Unesco Chair performed its research work within the core research program P2-0180 Water Science and Technology, and Geotechnical Engineering: Tools and Methods for Process Analyses and Simulations, and Development of Technologies (2022–2027), financed by the Slovenian Research Agency (ARRS). It is active in research also under the framework of the Slovenian National Committee of the Intergovernmental Hydrological Programme IHP UNESCO, chaired by Professor Matjaž Mikoš. The Chair successfully finished research within the two-year European project from the EU Civil Protection Mechanism titled "Cross BOrder RISk assessment for increased prevention and preparedness in Europe" (BORIS, 2021–2022).

Members of the Unesco Chair maintain contacts with other natural and technical science chairs worldwide, mainly as members of the UNITWIN-UNESCO/KU/ICL Landslide, Earthquake and Water-related Disaster Risk Management for Society and the Environment Cooperation Programme. The UNITWIN Network is hosted by the Disaster Prevention Research Institute (DPRI) of the University of Kyoto, Japan, and the International Consortium on Landslides (ICL).

The Unesco Chair contributed substantially to UL FGG's activities as the World Centre of Excellence on Landslide Risk Reduction (since 2008, the last term 2020–2023).

Within its workplan, the Chair actively cooperated in the organisation and/or implementation of several international expert events, such as the 5th Regional Symposium on Landslides in the Adriatic-Balkan Region (Rijeka, March 2022), 6th World Landslide Forum (Florence, November 2023) and 15th INTERPRAEVENT Congress (Vienna, June 2024), as well as the 3rd Slovenian Water Congress (Ptuj, September 2023).

SIGNIFICANT ACHIEVEMENTS

As a significant achievement we consider the re-appointment of UL FGG as the World Centre of Excellence in Landslide Risk Reduction (all years after 2008), as well as the systematic financing of Chair's activities at the University of Ljubljana. Important achievements include the following scientific

financiranje delovanja katedre na Univerzi v Ljubljani.

Med pomembne dosežke uvrščamo tudi naslednje znanstvene objave:

Alexopoulos, M. J., Müller-Thomy, H., Nistahl, P., Šraj, M., and Bezak, N. (2023). Validation of precipitation reanalysis products for rainfall-runoff modelling in Slovenia. Hydrology and Earth System Sciences 27, 2559–2578, https://doi.org/10.5194/hess-27-2559-2023.
Panagos, P., Borrelli, P., Matthews, F., Liakos, L., Bezak, N., Diodato, N., Ballabio, C. (2022). Global rainfall erosivity projections for 2050 and 2070. Journal of Hydrology 610, 127865, https://doi.org/10.1016/j.jhydrol.2022.127865.
Raška, P., Bezak, N., Ferreira, C.S.S., et al. (2022). Identifying barriers for nature-based solutions in flood risk management: An interdisciplinary overview using expert community approach. Journal of environmental management 310, 114725, https://doi.org/10.1016/j.jenvman.2022.114725.

contributions:
Alexopoulos, M. J., Müller-Thomy, H., Nistahl, P., Šraj, M., and Bezak, N. (2023). Validation of precipitation reanalysis products for rainfall-runoff modelling in Slovenia. Hydrology and Earth System Sciences 27, 2559–2578, https://doi.org/10.5194/hess-27-2559-2023.
Panagos, P., Borrelli, P., Matthews, F., Liakos, L., Bezak, N., Diodato, N., Ballabio, C. (2022). Global rainfall erosivity projections for 2050 and 2070. Journal of Hydrology 610, 127865, https://doi.org/10.1016/j.jhydrol.2022.127865.
Raška, P., Bezak, N., Ferreira, C.S.S., et al. (2022). Identifying barriers for nature-based solutions in flood risk management: An interdisciplinary overview using expert community approach. Journal of environmental management 310, 114725, https://doi.org/10.1016/j.jenvman.2022.114725.

ŠTUDIJSKI PROGRAMI IN PEDAGOŠKO RAZISKOVALNE ENOTE

STUDY PROGRAMMES AND TEACHING-RESEARCH UNITS

ODDELEK ZA GRADBENIŠTVO
DEPARTMENT OF CIVIL ENGINEERING

prof. dr. **Goran Turk**
predstojnik Oddelka za gradbeništvo Head of the Department of Civil Engineering

Oddelek za gradbeništvo je največji oddelek na Fakulteti za gradbeništvo in geodezijo in združuje 12 kateder ter inštitutov. To so Inštitut za komunalno gospodarstvo, Katedra za geotehniko, Katedra za gradbeno informatiko, Katedra za konstrukcije in potresno inženirstvo, Katedra za masivne in lesene konstrukcije, Katedra za matematiko in fiziko, Katedra za mehaniko, Katedra za metalne konstrukcije, Katedra za operativno gradbeništvo, Katedra za preizkušanje materialov in konstrukcij, Katedra za stavbe in konstrukcijske elemente ter Prometno tehniški inštitut.

Celotni oddelek zaposluje 110 oseb, od tega 33 učiteljev, 21 asistentov, tri tehniške in administrativne sodelavce, 46 raziskovalcev in sedem mladih raziskovalcev.

Department of Civil Engineering is the largest department within the Faculty of Civil and Geodetic Engineering. It is comprised of 12 chairs and institutes: Municipal Economics Institute; Chair of Geotechnics; Chair of Construction Informatics; Chair of Structural and Earthquake Engineering; Chair of Concrete, Masonry and Timber Structures; Chair of Mathematics and Physics; Chair of Mechanics; Chair for Metal Structures; Chair of Construction Management; Chair for Testing in Materials and Structures; Chair of Buildings and Constructional Complexes; and Traffic Technical Institute.

The whole department employs 110 people, of which there are 33 teachers, 21 assistants, three technical and administrative associates, 46 researchers and seven young researchers.

Gradbeni objekti so unikati. Zato je gradbeništvo izredno široka panoga, ki zahteva ustvarjalne, inovativne in predane strokovnjake, kjer ni prostora za napake, kjer je enako pomembno dobro temeljno znanje kot poznavanje materialov in tehnologij in kjer je končni izdelek rezultat usklajenega dela interdisciplinarno sestavljene skupine strokovnjakov. Na Oddelku za gradbeništvo skrbimo za razvoj znanja in za ustrezno izobraževanje kadrov s področja gradbeništva.

Pouk poteka na štirih študijskih programih:
— univerzitetni študijski program prve stopnje Gradbeništvo,
— visokošolski strokovni študijski program Operativno gradbeništvo,
— magistrski študijski program druge stopnje Gradbeništvo in
— magistrski študijski program druge stopnje Stavbarstvo.

Poučujemo tudi predmete s področja gradbeništva na študiju tretje stopnje Grajeno okolje. Poleg tega sodelujemo v študijskih programih Vodarstvo in okoljsko inženirstvo na 1. in 2. stopnji ter v nekoliko manjši meri v študijskih programih s področja geodezije.

PEDAGOŠKA DEJAVNOST

Gradbeništvo je zelo široko strokovno področje. Vključuje skrb za stabilnost, varnost in trajnost gradbenih konstrukcij pa tudi energetsko učinkovitost stavb ter skrb za zdravo in ugodno bivanje v njih. Gradbeništvo seveda ni omejeno le na stavbe, saj so v domeni gradbeništva tudi projektiranje in gradnja prometnic, energetskih objektov, drugih inženirskih objektov za urejanje vodotokov, preprečevanje ali sanacijo plazov in podobno.

Pri pedagoškem delu redno uporabljamo sodobno informacijsko-komunikacijsko tehnologijo: v spletni učilnici najdejo študentje večino gradiva za študij, pri strokovnih predmetih se študentje spoznavajo tudi z rabo programov, ki jih bodo uporabljali v praksi. Ta del pouka poteka v računalniških učilnicah s sodobno strojno in programsko opremo. Pomemben del pedagoškega dela poteka v laboratorijih. Študentje najprej obiskujejo konstrukcijsko prometni laboratorij, kjer spoznavajo gradbene materiale, njihove lastnosti in načine preskušanja materialov pa tudi konstrukcijskih elementov. Del pouka poteka tudi v laboratorijih za geotehniko in mehaniko tekočin. Pri nekaterih predmetih poteka poučevanje delno na terenu, pri drugih organiziramo vsebinsko usmerjene ekskurzije, na katerih obiskujemo aktualna gradbišča, obrate za proizvodnjo gradbenih materialov in gradbenih polizdelkov, laboratorije inštitutov.

Building structures are unique. For this reason, civil engineering is a profession with an extremely wide scope that requires creative, innovative and dedicated professionals. There is no room for error and solid basic knowledge is as important as knowledge about materials and technologies. The final product is a result of joint work of an interdisciplinary group of experts. The Department of Civil Engineering is in charge of the development of knowledge and education for the field of civil engineering.

Teaching activities are provided within four study programmes:
— academic first-cycle study programme Civil Engineering,
— higher education professional study programme Construction Management,
— second-cycle master study programme Civil Engineering,
— second-cycle master study programme Buildings.

We also teach courses from the area of civil engineering in the third-cycle doctoral study programme Built Environment. Further on, our teachers are significantly involved in the first- and second-cycle study programmes Water Science and Environmental Engineering, and to a lesser degree in the study programmes of Geodesy.

EDUCATIONAL ACTIVITY

Civil engineering is a very wide professional area. It includes care for stability, safety and durability of building structures, as well as energy efficiency of buildings and care for healthy and comfortable living conditions. Of course, civil engineering is not limited only to buildings, but includes also design and construction of roads, power structures and other river engineering structures, landslide prevention and remediation, etc.

In our educational work, we consistently use modern ICT technology: in our web classroom students find most of the materials required for their studies; within professional courses students are also introduced to the use of software that they will need in practice. This part of the teaching activities is implemented in computer rooms with modern hardware and software equipment. An important part of teaching activities is held in laboratories. Students first attend classes in the structural and traffic laboratory, where they are introduced to building materials, their properties and principles of testing materials as well as structural elements. Part of the teaching activities is organised also in Geotechnical and Fluid Mechanics Laboratories.

Tradicionalno je študij gradbeništva v prvih letih namenjen pridobivanju osnovnega znanja iz matematike, fizike, statike, trdnosti, hidromehanike, mehanike tal, informacijskih tehnologij in osnovnim strokovnim predmetom, kot so Gradiva, Geodezija, Ceste, Tehnologija gradnje, Stavbarstvo. Ob koncu študija študentom ponujamo poglobljeno spoznavanje posameznih področij gradbeništva v obliki modulov ali smeri: komunalna, konstrukcijska, prometna, geotehnična, hidrotehnična, organizacijska in stavbarstvo.

Študentje komunalne smeri podrobneje spoznavajo urejanje prostora kot celote, gospodarjenje z nepremičninami, še posebej komunalno in stanovanjsko gospodarstvo, ter management in vrednotenje nepremičnin.

Na konstrukcijski smeri je poudarjeno zagotavljanje varnosti nosilnih konstrukcij stavb iz vseh gradbenih materialov. Študentje spoznavajo načela pravilne zasnove stavb in inženirskih gradbenih konstrukcij, metode statične in dinamične analize konstrukcij ter postopkov gradnje in detajlov lesenih, kovinskih in armiranobetonskih konstrukcij. Za naš prostor je posebej pomembno tudi temeljito poznavanje potresnega inženirstva.

Cilj predmetov v sklopu prometnega inženirstva je razumeti značilnosti in zakonitosti cestnega in železniškega prometa, pridobiti znanje o postopkih načrtovanja, gradnje in vzdrževanja prometne infrastrukture ter o napovedovanju in modeliranju prometa.

Diplomant stavbarstva je specialist za gradbeno fiziko, učinkovito rabo energije v stavbah in zagotavljanje bivalnega udobja.

Vse več naših študentov med študijem izkoristi možnosti, ki jih ponujajo evropski projekti, namenjeni internacionalizaciji, in del svojih obveznosti opravi na tujih univerzah. V zameno pri nas gostimo podobno število tujih študentov.

RAZISKOVALNA DEJAVNOST

Raziskovalno in strokovno delo na oddelku poteka po pedagoško-raziskovalnih enotah (inštitutih in katedrah), ki se na raziskovalnih programih in projektih povezujejo med seboj in z zunanjimi domačimi ter tujimi partnerji. V različnih oblikah delujemo skupaj z uglednimi inštituti in univerzami v tujini.

Pri zahtevnih strokovnih problemih doma in v tujini, pri razvoju standardov in drugih tehničnih predpisov v gradbeništvu ter pri prenosu evropskih standardov v domači prostor sodelujemo tudi z domačo gradbeno industrijo.

Some courses are implemented partly in the field, for others we organise expert field trips, visiting currently active building sites, factories manufacturing building materials and prefabricated products, and laboratories of institutes.

Traditionally, in the first few years the study of civil engineering is focused on providing basic knowledge from mathematics, physics, stability, strength, hydromechanics, soil mechanics, information technologies and basic professional courses, such as Materials, Geodesy, Roads, Construction Technology, Buildings, etc. Towards the end of the studies, students are offered in-depth knowledge of individual areas of civil engineering in the form of modules or orientations: municipal engineering, structural, traffic, geotechnical, hydrotechnical, construction management orientations and buildings.

Students of the Municipal Engineering orientation learn the details about spatial interventions as a whole, real estate management, especially municipal and housing economics, and real estate valuation.

At the Structural Division, the focus is on providing safety of load-carrying structures of buildings made of all building materials. Students learn about the principles of correct building design and engineering structures, methods of static and dynamic analysis of structures, construction procedures and details of timber, steel and reinforced concrete structures. For our territory, it is of special importance that engineers are also experts in earthquake engineering.

The purpose of the courses within Traffic Engineering is to teach students about the characteristics and laws of road and railway traffic, to give them knowledge on the procedures in the design, construction and maintenance of traffic infrastructure as well as the prediction and modelling of traffic.

Graduates from the orientation Buildings are specialists for building physics, efficient energy use in buildings and providing living comfort.

An increasing number of our students uses the opportunities offered by European programmes of internationalisation and they do part of their obligations at foreign universities. In exchange, we host a considerable number of foreign students.

RESEARCH ACTIVITY

Research and professional work at the department is carried out by teaching-research units (institutes and chairs), connected with each other and with external

Pogosto nastopamo kot recenzenti načrtov zahtevnih gradbenih konstrukcij, pa tudi sicer je sodelovanja z industrijo pri razvoju novih proizvodov in tehnologij v gradbeništvu vedno več, kar nas še posebej veseli.

Raziskovalno delo na oddelku trenutno poteka v petih raziskovalnih programih: E-gradbeništvo, Gradbene konstrukcije in gradbena fizika, Mehanika konstrukcij, Potresno inženirstvo, Vodarstvo in geotehnika. V tem obdobju smo vodili ali sodelovali tudi v različnih raziskovalnih projektih v okviru ARRS. Pri devetih projektih (Trajnostna raba lesenih konstrukcij – požarne in popožarne deterministične in verjetnostne rešitve; Zahteve duktilnosti in nosilnosti za vezne pločevine in vijake v strižnih spojih iz običajnih jekel in jekel visoke trdnosti; Napredno mapiranje nevrovaskularne sklopitve z združenima tehnikama bližnje infrardeče spektroskopije in magnetoencefalografije na osnovi optičnih magnetometrov; Študija toplotnih lastnosti in zmanjšanja vseživljenjskega vpliva alternativnih hibridnih eko-nanomaterialov v okolju z nizkim tlakom; Izračun letnega cirkadianega potenciala v stavbah z uporabo tehnik strojnega učenja (YCPdeep); Stohastični model oglenenja lesa v pogojih naravnega požara; Napredno modeliranje termo-mehanskega kontakta prostorskih nosilcev s podporo eksperimentalnih raziskav; Podatkovno podprto modeliranje obnašanja gradbenih konstrukcij; Numerično modeliranje širjenja razpok v krhkih in duktilnih konstrukcijah) so nosilci sodelavci našega oddelka. Za boljšo povezanost med programi in skupno investiranje v raziskovalno infrastrukturo skrbi Infrastrukturni center Grajeno okolje, ki že od leta 2015 deluje v okviru Oddelka za gradbeništvo.

Raziskovalci s področja gradbeništva delujejo tudi v delovnih telesih evropske organizacije za standardizacijo. To sodelovanje je tudi vir idej za raziskovalno delo ter zagotavlja relevantnost in aktualnost teh raziskav, sočasno pa prav tako prenos naših raziskovalnih dosežkov v sodobne standarde.

Vse večja vpetost raziskovalcev v mednarodne projekte se čuti tudi v utripu fakultete, saj vse pogosteje pri nas potekajo sestanki raziskovalnih konzorcijev in raznih mednarodnih delovnih teles. Vključeni smo v organizacijo mednarodnih delavnic in posvetovanj.

V tem obdobju smo sodelovali pri petih projektih H2020 in več drugih evropskih projektih, ki so financirani s strani različnihevropskih komisij. Aktivno sodelujemo tudi v različnih raziskovalnih akcijah, kakršni so na primer projekti COST.

national and international partners within research programs and projects. In various forms, we work together with reputable institutes and universities abroad.

We also cooperate with the national construction industry in demanding professional problems in Slovenia and abroad, in the development of standards and other technical regulations in the construction industry, and in the transfer of European standards to the national level. We often offer our services as reviewers of designs for complex constructions, and there is also an increasing number of collaborations with the industry in the development of new products and technologies in the construction industry, which makes us especially happy.

Research work at the department is currently carried out within five research programmes: E-Civil Engineering, Building Structures and Building Physics, Structural Mechanics, Earthquake Engineering, Water Science and Technology and Geotechnical Engineering. During this time we also led or participated in various research projects financed by the National Research Agency. In nine projects (Sustainable Long-Term Use of Timber Structures – Fire and Post-Fire Deterministic and Probabilistic Solutions; Ductility and Strength Demands for Connecting Plates and Bolts in Bearing Type Connections of Normal and High-strength Steels; Combining Functional Near-Infrared Spectroscopy and Magnetoencephalography Based on Optically Pumped Magnetometers for Advanced Mapping of Neurovascular Coupling; Study of Thermal Properties and Reduced Life Cycle Impact of Alternative Hybrid Eco-Nanomaterials under Low Pressure; Calculation of Yearly Circadian Potential in Buildings Using Deep Learning Techniques (YCPdeep); Charring of Timber under Fully Developed Natural Fire – Stochastic Modeling; Advanced Modelling of Thermo-Mechanical Contact of Spatial Beams Supported by Experimental Research; Data Driven Structural Behaviour Modelling in Civil Engineering – DataBridge; Computational Modelling of Fracture in Brittle, Quasi-Brittle and Ductile Structures) the project holders are the researchers from our department.The Infrastructure Center for the Built Environment, which has been operating within the Department of Civil Engineering since 2015, ensures a better connection between programmes and joint investment in research infrastructure.

Researchers in the field of civil engineering are also active in the working bodies of the European Standardization Organization. This cooperation is also a source of ideas for research work and ensures the

Raziskovalci redno objavljamo rezultate svojega raziskovalnega dela v mednarodnih revijah. Dosežki naših raziskovalcev so prepoznavni in cenjeni v mednarodnem merilu, kar izpričuje vsakoletna rast citiranosti naših objavljenih del. Mnogi smo aktivno in redno vključeni v recenziranje člankov v uglednih mednarodnih revijah kot recenzenti ali kot člani uredniških odborov.

relevance and timeliness of this research, as well as the transfer of our research achievements into modern standards.

The increasing involvement of researchers in international projects can also be felt in the pulse of the faculty, as meetings of research consortia and various international working bodies take place here more and more frequently. We are involved in the organization of international workshops and consultations.

During this period, we participated in five H2020 projects and several other European projects financed by various European commissions. We also actively participate in various research actions, such as COST projects.

Researchers regularly publish the results of their research work in international journals. The achievements of our researchers are recognized and appreciated on an international scale, as evidenced by the growing number of citations of our published work every year. Many of us are actively and regularly involved in reviewing articles in reputable international journals as reviewers or as members of editorial boards.

VISOKOŠOLSKI STROKOVNI ŠTUDIJSKI PROGRAM PRVE STOPNJE OPERATIVNO GRADBENIŠTVO FIRST-CYCLE PROFESSIONAL STUDY PROGRAMME CONSTRUCTION MANAGEMENT

SKRBNIK TRUSTEE
viš. pred. dr. **Robert Rijavec**

Visokošolski strokovni študijski program prve stopnje Operativno gradbeništvo traja tri leta in skupaj obsega 180 kreditnih točk. Študij omogoča pridobivanje strokovnih znanj in kompetenc, predvsem na področjih projektiranja, organiziranja, upravljanja in vodenja gradbenih del, vključno z vzdrževanjem stavb in infrastukture, gradbene proizvodnje, gradbene informatike, prostorskega načrtovanja in okoljske politike ter poznavanja prostorskih evidenc.

Gradbeništvo temelji na poznavanju fizike ter dinamike naravnega in družbenega okolja, zato med temeljnimi predmeti najdemo še inženirsko matematiko, inženirsko komunikacijo, mehaniko, geodezijo, stavbarstvo, gradiva in z vsemi povezano računalništvo. Eksperimentalno delo, tako na terenu kot tudi v laboratoriju, se začne že na začetku študija in se nadaljuje vse do diplomskega dela. Za strokovno in odgovorno snovanje funkcionalno in ekonomsko optimalnih, varnih in atraktivnih gradbenih konstrukcij so potrebna znanja s področja materialov, mehanike, zasnove in modeliranja konstrukcij, uporabe računalnikov ter tehnologije gradnje.

Študijske vsebine programa podrobno seznanjajo z načrtovanjem, gradnjo, ekonomiko in organizacijskimi vidiki delovanja infrastrukturnih sistemov, komunalno in urbano ekonomiko, vodenjem projektov od sprejemanja prostorskih planov pa do izdaje ustreznih dovoljenj. Poseben poudarek je na organizaciji del pri načrtovanju, izvedbi in vzdrževanju stavb, gradbenih inženirskih objektov ter drugih gradbenih posegov.

Utrjevanju celovite strokovne usposobljenosti je namenjen sprotni praktični pouk in štiritedensko praktično usposabljanje v gradbenih in sorodnih podjetjih, ki predstavljajo tudi ciljna zaposlitvena področja s prepletom pisarniškega in terenskega dela, npr. na gradbiščih.

Program izbirno ponuja module Konstruktiva, Organizacija in Promet.

First-cycle professional study programme Construction Management consists of three years and amounts to 180 credit points. The study programme offers professional knowledge and competences, mainly from the areas of design, organisation and management of construction works, including the maintenance of buildings and infrastructure as well as building production, construction IT, spatial planning and spatial policy, including knowledge about spatial records.

Civil engineering is based on the knowledge of physics and dynamics of natural and social environments. For this reason, the basic courses include Engineering Mathematics, Engineering Communication, Mechanics, Geodesy, Buildings, Materials and the all connecting Computer Science. Experimental work, in the field as well as in our laboratory, starts at the very beginning of the studies and continues all the way to the final thesis. For professional and responsible design of functional and economically optimum, safe and attractive building structures, one needs knowledge from the areas of materials, mechanics, design and modelling of structures, computer use and construction technology.

The content of the study programme provides students with knowledge about planning, construction, economical and organisational aspects of infrastructural system functioning, municipal and urban economics, as well as project management from the phase of monitoring spatial plans up to issuing of adequate permits. Special emphasis is on the organisation of the design, construction and maintenance of buildings, civil engineering works and other construction works.

Continuous practical tutorials and the four-week practical training in construction companies, which are also the targeted employers, ranging from office work to field work, for example at construction sites, are aimed at strengthening students' professional qualifications.

The programme offers elective modules Structures, Organisation and Traffic.

PREDMETNIK CURRICULUM

1. letnik 1st year

- Fizika Physics • ECTS 6
- Inženirska komunikacija Engineering Communication • ECTS 3
- Inženirska matematika I Engineering Mathematics I • ECTS 6
- Komunalno gospodarstvo in gradbena zakonodaja Municipal Economics and Construction Legislation • ECTS 4
- Stavbarstvo Buildings • ECTS 8
- Uvod v gradbeništvo Introduction to Civil Engineering • ECTS 3

- Geodezija Geodetic Engineering • ECTS 3
- GIS in prostorske evidence GIS and Spatial Records • ECTS 3
- Gradiva Building Materials • ECTS 6
- Hidromehanika in hidravlika Hydromechanics and Hydraulics • ECTS 6
- Računalništvo Computer Science • ECTS 4
- Statika Statics • ECTS 8

2. letnik 2nd year

- Inženirska matematika II Engineering Mathematics II • ECTS 5
- Osnove mehanike tal Fundamentals of Soil Mechanics • ECTS 5
- Površinska odvodnja (kanalizacija) Surface Drainage (Urban Drainage) • ECTS 4
- Trdnost Strength of Materials • ECTS 7
- Projektiranje in gradnja cest Design and Construction of Roads • ECTS 6
- Zunanji izbirni predmet I External Elective Course I • ECTS 3

- Geotehnične gradnje Geotechnical Constructions • ECTS 8
- Lesene konstrukcije Timber Structures • ECTS 4
- Osnove masivnih konstrukcij Fundamentals of Concrete and Masonry Structures • ECTS 8
- Statika gradbenih konstrukcij Structural Analysis • ECTS 4
- Zunanji izbirni predmet II External Elective Course II • ECTS 6

3. letnik 3rd year

- Tehnološki procesi Technological Processes • ECTS 5
- Masivni objekti Concrete Objects • ECTS 4
- Organizacija in vodenje gradbenih del Organisation and Management of Construction Works • ECTS 6
- Osnove jeklenih konstrukcij Fundamentals of Steel Structures • ECTS 7
- 1 predmet izbranega modula 1 Module Elective Course • ECTS 4
- Izbirni strokovni predmet Professional Elective Course • ECTS 4

- 3 predmeti izbranega modula 3 Module Elective Courses • ECTS 12
- Praktično usposabljanje (4 tedni) Practical Training (4 weeks) • ECTS 8
- Diplomsko delo Diploma Work • ECTS 10

Izbirni predmeti Elective Courses

- Požarna odpornost konstrukcij Fire Resistance of Structures • ECTS 5

Skupni izbirni predmeti Common Elective Courses

- Športna vzgoja Sports Education • ECTS 4
- Študentsko tutorstvo Student Tutoring • ECTS 4
- Projektno in izkustveno učenje 1 Project-based and Experiential Learning 1 • ECTS 4

Moduli Modules

Konstruktiva Constructions

- Osnove potresnega inženirstva Fundamentals of Earthquake Engineering • ECTS 4
- *Bioklimatske zgradbe Bioclimatic Buildings • ECTS 4
- Jeklene stavbe Steel Buildings • ECTS 4
- Računalniško projektiranje konstrukcij Computer-Aided Design • ECTS 4
- Masivni mostovi Concrete Bridges • ECTS 4

Organizacija Organisation

- Zagotavljanje in kontrola kakovosti Quality Assurance and Quality Control • ECTS 4
- Urejanje stavbnih zemljišč in cenilstvo Building Land Development and Valuation • ECTS 4
- Planiranje gradbene ekonomike Planning of Economics in Civil Engineering • ECTS 4
- Osnove gradbene ekonomike Fundamentals of Economics in Civil Engineering • ECTS 4

Promet Traffic

- Promet Traffic • ECTS 4
- Geotehnika prometnic Geotechnics of Roads • ECTS 4
- Inteligentni transportni sistemi Intelligent Transport Systems • ECTS 4
- Projektiranje in gradnja železnic Design and Construction of Railways • ECTS 4

*Ni izvedbe No implementation

UNIVERZITETNI ŠTUDIJSKI PROGRAM PRVE STOPNJE GRADBENIŠTVO FIRST-CYCLE ACADEMIC STUDY PROGRAMME CIVIL ENGINEERING

SKRBNIK TRUSTEE
asist. dr. **Jasna Smolar**

Prva stopnja univerzitetnega študija gradbeništva ima dva poglavitna cilja: ponuditi osnovna temeljna in strokovna znanja in poudariti interdisciplinarnost gradbeništva ter tako motivirati študenta k nadaljevanju študija. Študijski program Gradbeništvo traja tri leta (šest semestrov) in obsega 180 kreditnih točk. V šestem semestru študija je pet izbirnih modulov: Hidrotehnika, Komunala, Konstrukcije, Promet, Stavbarstvo.

Diplomanti pridobijo temeljna znanja na širšem področju gradbeništva. Sposobni so razumevanja in ustvarjalnega reševanja strokovnih problemov, kritičnega razmišljanja, upoštevanja sodobnih standardov in načel, strokovnega sporazumevanja, interdisciplinarnega povezovanja ter profesionalne odgovornosti in etike.

Dokončan univerzitetni študijski program prve stopnje Gradbeništvo omogoča nadaljevanje študija na različnih študijskih programih druge stopnje, ki so neposredno ali posredno povezani z grajenim okoljem, prvenstveno pa na specializiranih drugostopenjskih študijih Gradbeništva, v Sloveniji ali v tujini. Diplomanti pa so zaposljivi tudi v podjetjih in ustanovah, ki se ukvarjajo z grajenim okoljem in gradbeništvom.

The first-cycle academic study programme of Civil Engineering has two main goals: to offer basic knowledge and fundamental professional skills and knowledge, as well as to build on interdisciplinarity of civil engineering and thus motivate student to continue studies in the second cycle. Academic bachelor degree programme Civil Engineering consists of three years (six semesters) and amounts to 180 ECTS points. In the sixth semester, the study programme is organised in five modules: Hydraulics, Municipal Engineering, Structures, Traffic, Buildings.

General competences of the graduate after the completed university bachelor degree programme of Civil Engineering are the ability to understand and solve professional challenges independently and as members of working groups, the ability of critical thinking, taking into account contemporary standards and principles, skills related to professional communication and interdisciplinary connections, professional responsibility and ethics.

The study programme offers comprehensive knowledge within the wide area of civil engineering, employability in all fields, in companies and institutions that deal with civil engineering in a broad sense. The graduate will be able, on the basis of the acquired knowledge, to successfully continue the studies in various second-cycle programmes that are directly or indirectly related to the built environment.

PREDMETNIK CURRICULUM

1. letnik 1st year

Fizika Physics • ECTS 9
Gradiva Construction and Building Materials • ECTS 8
Matematika I Mathematics I • ECTS 10
Uvod v gradbeništvo Introduction to Civil Engineering • ECTS 3

Inženirska komunikacija Engineering Communication • ECTS 3
Matematika II Mathematics II • ECTS 8
Osnove statike in dinamike Introduction to Statics and Dynamics • ECTS 9
Računalništvo in informatika Computer Science and Informatics • ECTS 4
Stavbarstvo I Buildings I • ECTS 6

Izbirni predmeti Elective Courses

Športna vzgoja Physical Education • ECTS 4
Angleščina za gradbeništvo in geodezijo English for Civil and Geodetic Engineering • ECTS 4
Podjetništvo Entrepreneurship • ECTS 4
Pravica gradnje in gradbena pogodba Building Right and Building Contract • ECTS 4
Upravni postopek in upravni spor Administrative Procedure and Administrative Dispute • ECTS 4
Digitalno načrtovanje Digital Design • ECTS 4
Od ideje do gradbenega objekta From Idea to Building Structure • ECTS 5

2. letnik 2nd year

Ceste Roads • ECTS 6
Hidromehanika Hydromechanics • ECTS 5
Tehnologija Technologies in Civil Engineering • ECTS 5
Trdnost Strength of Materials • ECTS 10
Urejanje prostora Spatial Development • ECTS 4

Geodezija Geodetic Engineering • ECTS 4
Mehanika tal in inženirska geologija Soil Mechanics and Engineering Geology • ECTS 7
Organizacija gradbenih del in poslovanje Organisation and Management of Construction Works • ECTS 6
Statika linijskih konstrukcij Structural Analysis • ECTS 6
Stavbarstvo II Buildings II • ECTS 3
Izbirni predmet I (UL FGG ali UL) Elective Course I (UL FGG or UL) • ECTS 4

3. letnik 3rd year

Betonske konstrukcije Concrete Structures • ECTS 8
Geotehnika Geotechnical Engineering • ECTS 6
Inženirska hidrotehnika Engineering Hydraulics • ECTS 6
Jeklene konstrukcije I Steel Structures I • ECTS 6
Osnove potresnega inženirstva Fundamental Concepts of Earthquake Engineering • ECTS 4

Izbirni predmet II (UL FGG ali UL) Elective Course II (UL FGG or UL) • ECTS 8
Predmeti izbranega modula Module Elective Courses • ECTS 13
Praktično usposabljanje Practical Training • ECTS 4
Diplomsko delo Diploma Work • ECTS 5

Moduli Modules

Konstrukcije Structures
Ploskovne konstrukcije Plates and Shells • ECTS 5
Masivne konstrukcije Concrete and Masonry Structures • ECTS 4
Lesene konstrukcije Timber Structures • ECTS 4

Hidrotehnika Hydraulics
Hidravlika Hydraulics • ECTS 5
Hidrologija Hydrology • ECTS 4
Osnove zdravstvene hidrotehnike Introduction to Sanitary Engineering • ECTS 4

Promet Traffic
Železnice Railways • ECTS 5
Prometno inženirstvo Transportation Engineering • ECTS 4
Geografski informacijski sistemi Geographical Information Systems • ECTS 4

Komunala Municipal Engineering
Komunalno gospodarstvo Municipal Economics • ECTS 5
Upravljanje stavbnih zemljišč Building Land Management • ECTS 4
Komunalne naprave Communal Technical Infrastructure • ECTS 4

Stavbarstvo Buildings
Uvod v načrtovanje stavb Introduction to Building Design • ECTS 5
*Elementi gradbene fizike Elements of Building Physics • ECTS 4
*Bioklimatsko načrtovanje Bioclimatic Design • ECTS 4
*Prenova stavb Building Renovation • ECTS 4
*Vodenje projektov Project Management • ECTS 4

*Izmed 4 označenih predmetov se izbereta dva
Among the 4 marked courses, two are selected

MAGISTRSKI ŠTUDIJSKI PROGRAM DRUGE STOPNJE GRADBENIŠTVO – SMER: GRADBENE KONSTRUKCIJE SECOND-CYCLE ACADEMIC STUDY PROGRAMME CIVIL ENGINEERING – ORIENTATION: STRUCTURAL ENGINEERING

SKRBNIK TRUSTEE
izr. prof. dr. **Sebastjan Bratina**

Magistrski študijski program Gradbeništva druge stopnje, smer Gradbene konstrukcije, traja dve leti (štiri semestre) in obsega 120 kreditnih točk. V četrtem semestru so predvideni trije izbirni moduli: Interdisciplinarni projektni študij računalniško podprtega projektiranja konstrukcij, Masivne konstrukcije in Jeklene konstrukcije. V obsegu enega semestra je predviden tudi mednarodni magistrski modul Inženirsko modeliranje, ki v celoti poteka v tujem jeziku in ga neposredno vpišejo tuji študenti.

Cilj študija je usposobiti strokovnjaka s poglobljenim temeljnim znanjem na širšem področju gradbeništva, predvsem z usmerjenim znanjem na področju analize in projektiranja zahtevnejših stavb in inženirskih objektov. Študij ponuja tudi širok nabor izbirnih predmetov, tako študent poleg predmetov izbrane smeri posluša tudi predmete drugih smeri po lastni izbiri, kar mu omogoča specializacijo in pripravo za nadaljevanje študija po programih na tretji stopnji.

Študijski program zajema tudi praktično usposabljanje, ki je namenjeno seznanitvi z dejanskim delom v projektivnih birojih, izvajalskih podjetjih, inštitutih, zavodih in upravnih organih.

Med študijem se bo študent z delom v skupinah, projektnim delom in reševanjem problemskih nalog privajal javnemu nastopanju in poslovanju s strankami ter se dejavno vključeval v raziskave. Pridobljeno teoretično znanje bo preskusil na primerih vaj ter pri reševanju zahtevnih teoretičnih ali strokovno usmerjenih problemov in projektov. Vse to mu bo omogočalo lažjo vključitev v prakso po končanem študiju ter razumevanje izzivov na različnih področjih gradbeništva. Z diplomo se bo študentu odprla tudi pot do pridobitve licence za projektiranje in gradnjo najzahtevnejših stavb ter inženirskih objektov.

The 2nd cycle master study programme Civil Engineering, orientation Structural Engineering, consists of two years (four semesters) and amounts to 120 credit points. In the fourth semester, three elective modules are foreseen: Interdisciplinary Project Study of Computer-Aided Design of Structures, Concrete and Masonry Structures, Steel Structures. Additionally, International Master Module of Engineering Modelling is foreseen to be carried out within one semester only in foreign language and intended for foreign students.

The goal of the study is to train experts with in depth basic knowledge at the wider area of civil engineering, mainly with guided knowledge for the area of analysis and design of demanding buildings and engineering structures. The study also offers a wide selection of electives. In this way, students attend not only courses from the selected orientation, but also courses from other orientations, which allows them to specialise and prepare for further studies at the third-cycle programmes.

The study programme also includes practical training that provides students' knowledge and skills required at actual work for design offices, construction companies, institutes, institutions and administrative bodies.

During the studies students work in groups, on projects, and solve specific tasks, which helps them get accustomed to public appearance and communication with customers, as well as work on real research. All the acquired theoretic knowledge can be tested during tutorials, dealing with demanding theoretical or professional problems and projects. This helps graduates in easier transition to the working life after the studies, and to understand the challenges in different areas of civil engineering. With the finished studies, graduates can also acquire the licence for the design and construction of the most demanding buildings and engineering structures.

PREDMETNIK CURRICULUM

1. letnik 1st year

- Matematika III Mathematics III • ECTS 5
- Numerične metode Numerical Methods • ECTS 4
- Gradbena fizika Building Physics • ECTS 3
- Nelinearna mehanika Non-linear Mechanics • ECTS 6
- Statika gradbenih konstrukcij Structural Analysis • ECTS 5
- Zasnova gradbenih konstrukcij Conception of Building Structures • ECTS 3
- Izbirni predmet I (UL FGG ali UL) Elective Course I (UL FGG or UL) • ECTS 4

- Prenova in preizkušanje konstrukcij Repair and Testing of Structures • ECTS 5
- Nelinearna analiza konstrukcij Non-linear Analysis of Structures • ECTS 5
- Računalniško integrirana graditev Computer-Integrated Construction • ECTS 5
- Verjetnostni račun in statistika Theory of Probability and Statistics • ECTS 4
- Geotehnika visokih gradenj Geotechnics of Buildings • ECTS 7
- Praktično usposabljanje Practical Training • ECTS 4

2. letnik 2nd year

- Vodenje projektov Project Management • ECTS 4
- Dinamika gradbenih konstrukcij in potresno inženirstvo Structural Dynamics and Earthquake Engineering • ECTS 7
- Izbrana poglavja iz masivnih konstrukcij Selected Chapters from Concrete and Masonry Structures • ECTS 6
- Jeklene konstrukcije II Steel Structures II • ECTS 5
- Verjetnostne metode in zanesljivost konstrukcij Probabilistic Methods and Reliability of Structures • ECTS 4
- Izbirni predmet I (UL FGG ali UL) Elective Course I (UL FGG or UL) • ECTS 4

- Predmeti izbranega modula Module Elective Courses • ECTS 20
- Magistrsko delo Master Thesis • ECTS 10

Moduli Modules

Interdisciplinarni projektni študij računalniško podprtega projektiranja konstrukcij Interdisciplinary Project Study of Computer-aided Design of Structures

- Interdisciplinarni seminar računalniško podprtega projektiranja konstrukcij Interdisciplinary Seminar on Computer Aided Design of Structures • ECTS 10
- Informacijska in komunikacijska tehnologija za projektno delo Information and Communication Technology for Project Work • ECTS 4
- Izbirni predmet s področja GK Elective Course SE • ECTS 6

Masivne konstrukcije Concrete Constructions

- Seminar iz projektiranja masivnih konstrukcij Design of Concrete and Masonry Structures - Seminar • ECTS 10
- Izbirni predmet I s področja GK Elective Course SE I • ECTS 6
- Izbirni predmet II s področja GK Elective Course SE II • ECTS 4

Jeklene konstrukcije Steel Constructions

- Seminar iz projektiranja jeklenih konstrukcij Design of Steel Structures - Seminar • ECTS 10
- Izbirni predmet I s področja GK Elective Course SE I • ECTS 6
- Izbirni predmet II s področja GK Elective Course SE II • ECTS 4

Mednarodni magistrski modul Inženirsko modeliranje International Mster Modul Engineering Modelling

- Numerično modeliranje trdnin Numerical Modelling of Solids • ECTS 6
- Povezani problemi Coupled Problems • ECTS 4
- Modeliranje geotehničnih konstrukcij Numerical Modelling of Geotechnical Structures • ECTS 5
- Numerične metode v dinamiki tekočin Numerical Methods in Fluid Dynamics • ECTS 5

Izbirni predmeti Elective Courses

- Numerično modeliranje trdnin Numerical Modelling of Solids • ECTS 6
- Povezani problemi Coupled Problems • ECTS 4
- Tehnologija materialov na osnovi mineralnih veziv Technology of Material with Mineral Binders • ECTS 6
- Napredna gradiva Advanced Construction and Building Materials • ECTS 4
- Požarna varnost Fire Safety • ECTS 6
- Prednapeti beton Prestressed Concrete • ECTS 6
- Sovprežne konstrukcije Composite Structures • ECTS 4
- Inženirske lesene konstrukcije Engineering Timber Structures • ECTS 4
- Lupinaste konstrukcije Shell Structures • ECTS 4
- Mehanika kamnin in podzemni objekti Rock Mechanics and Underground Structures • ECTS 6
- Modeliranje geotehničnih konstrukcij Modelling of Geotechnical Structures • ECTS 6
- Nelinearna potresna analiza armiranobetonskih mostov Nonlinear Seismic Analysis of Reinforced Concrete Bridges • ECTS 6
- Zidane konstrukcije Masonry Structures • ECTS 4

MAGISTRSKI ŠTUDIJSKI PROGRAM DRUGE STOPNJE GRADBENIŠTVO – SMER: NIZKE GRADNJE SECOND-CYCLE ACADEMIC STUDY PROGRAMME CIVIL ENGINEERING – ORIENTATION: INFRASTRUCTURAL ENGINEERING

SKRBNIK TRUSTEE
izr. prof. dr. **Sebastjan Bratina**

Magistrski študijski program Gradbeništva druge stopnje, smer Nizke gradnje, traja dve leti (štiri semestre) in obsega 120 kreditnih točk. V četrtem semestru so predvideni štirje izbirni moduli: Komunalno inženirstvo, Organizacija – informatika, Prometno inženirstvo ter Projekt.

Cilj študija je usposobiti strokovnjaka s poglobljenim temeljnim znanjem na širšem področju gradbeništva, predvsem z usmerjenim znanjem na področju gospodarske javne infrastrukture, procesa graditve, informacijske tehnologije oziroma prometnega inženirstva. Študij ponuja tudi širok nabor izbirnih predmetov, tako študent poleg predmetov izbrane smeri posluša tudi predmete drugih smeri po lastni izbiri, kar mu omogoča specializacijo in pripravo za nadaljevanje študija po programih na tretji stopnji.

Študijski program obsega tudi praktično usposabljanje, ki je namenjeno seznanitvi z dejanskim delom v projektivnih birojih, izvajalskih podjetjih, inštitutih, zavodih in upravnih organih.

Med študijem se bo študent z delom v skupinah, projektnim delom in reševanjem problemskih nalog privajal javnemu nastopanju, poslovanju s strankami in dejavno sodeloval v raziskavah. Pridobljeno teoretično znanje bo preskusil na primerih vaj ter pri reševanju zahtevnih teoretičnih ali strokovno usmerjenih problemov in projektov. Vse to mu bo omogočalo lažjo vključitev v prakso po končanem študiju ter razumevanje izzivov na različnih področjih gradbeništva. Z diplomo se bo študentu odprla tudi pot do pridobitve licence za projektiranje in gradnjo najzahtevnejših stavb ter inženirskih objektov.

The 2nd cycle master study program Civil Engineering, orientation Infrastructural Engineering, consists of two years (four semesters) and amounts to 120 credit points. In the fourth semester, four elective modules are foreseen: Municipal Engineering, Construction and IT Management, Transportation Engineering and Project module.

The goal of the study is to qualify experts with in-depth basic knowledge from the wider area of civil engineering, mainly with guided teaching from the areas of public infrastructure, construction process, information technology and transportation engineering. The study also offers a wide selection of elective courses. Thus, apart from the courses from the selected orientation, students may also choose courses from other orientations, which allows them greater specialisation and preparation for further study at the third-cycle studies.

The study program includes practical training, which is intended for getting to know the real work in design offices, contracting companies, institutes and administrative bodies.

During the studies students work in groups, on projects, and solve specific tasks, which helps them get accustomed to public appearance and communication with customers, as well as work on real research. All the acquired theoretic knowledge can be tested during tutorials, dealing with demanding theoretical or professional problems and projects. This helps graduates in easier transition to the working life after the studies, and to understand the challenges in different areas of civil engineering. With the finished studies, graduates can also acquire the licence for the design and construction of the most demanding buildings and engineering structures.

1. letnik 1st year

Matematika III Mathematics III • ECTS 5

Numerične metode Numerical Methods • ECTS 4

Geotehnika nizkih gradenj Geotechnics of Infrastructural Facilities • ECTS 8

Zagotavljanje in kontrola kakovosti Quality Control and Quality Assurance • ECTS 6

Operativno planiranje in spremljanje projektov Operative Planning and Monitoring of Projects • ECTS 5

Izbirni predmet I Elective Course I • ECTS 4

Gospodarjenje z nepremičninami Real Estate Management • ECTS 5

Projektiranje gradbenih konstrukcij Design of Building Structures • ECTS 4

Inteligentni transportni sistemi Intelligent Transport Systems • ECTS 4

Optimizacijske metode v gradbeništvu Optimisation Methods in Civil Engineering • ECTS 4

Računalniško integrirana graditev Computer-Integrated Constructio • ECTS 5

Verjetnostni račun in statistika Theory of Probability and Statistics • ECTS 4

Praktično usposabljanje Practical Training • ECTS 4

2. letnik 2nd year

Vodenje projektov Project Management • ECTS 4

Mehanizacija in tehnologija gradnje cest Road Construction Machinery and Technology • ECTS 7

Mestne prometne površine Urban Roads • ECTS 5

Informacijsko modeliranje zgradbe Information Modelling of Buildings • ECTS 6

Izbirni predmet II Elective Course II • ECTS 4

Izbirni predmet III Elective Course III • ECTS 4

Predmeti izbranega modula Module Elective Courses • ECTS 20

Magistrsko delo Master Thesis • ECTS 10

Moduli Modules

Prometno inženirstvo Traffic Engineering

Projektiranje cest Road Design • ECTS 3

Seminar iz cest Road Seminar • ECTS 7

Projektiranje železnic Railway Design • ECTS 6

Seminar iz železnic Railway Seminar • ECTS 7

Komunalno inženirstvo Municipal Engineering

Komunalno in stanovanjsko gospodarstvo Municipal and Housing Economics • ECTS 6

Vodovod in kanalizacija Water Supply and Sewage Systems • ECTS 10

Projekt iz komunalne infrastrukture Project from Municipal Infrastructure • ECTS 4

Organizacija-informatika Organisation-Buildings Informatic

Procesno modeliranje in informacijski sistemi Process Modelling and Information Systems • ECTS 4

Izbrana poglavja iz gradbene informatike Selected Chapters of Building Informatics • ECTS 6

Management v gradbeništvu Management in Civil Engineering • ECTS 4

Organizacijska priprava gradnje Organisational Planning of Construction • ECTS 6

Projekt Project

Projekt iz gradbene informatike Construction Informatics Project • ECTS 4

Projekt iz prometne infrastrukture Project from Traffic Infrastructure • ECTS 8

Projekt iz komunalnega gospodarstva Project from Municipal Economics • ECTS 4

Projekt iz organizacijske priprave gradnje Project from Construction Organisation and Contracting • ECTS 4

Izbirni predmeti Elective Courses

Teorija prometnega toka in analiza kapacitivnosti Traffic Flow Theory and Capacity Analysis • ECTS 4

Planiranje gradnje in vzdrževanja prometnic Construction Planning and Road Maintenance • ECTS 4

Stvarno pravo Property Law • ECTS 4

Vrednotenje nepremičnin Real Estate Valuation • ECTS 4

Prometna ekologija Traffic Ecology • ECTS 4

Urbanistično načrtovanje Urban Planning • ECTS 4

Projektiranje in gradnja jeklenih stavb Design and Construction of Steel Buildings • ECTS 4

Nizke gradnje in infrastruktura za varstvo okolja Engineering Works and Water Protection • ECTS 4

MAGISTRSKI ŠTUDIJSKI PROGRAM DRUGE STOPNJE GRADBENIŠTVO – SMER: GEOTEHNIKA – HIDROTEHNIKA SECOND-CYCLE ACADEMIC STUDY PROGRAMME CIVIL ENGINEERING – ORIENTATION: GEO- & HYDROTECHNICS

SKRBNIK TRUSTEE
izr. prof. dr. **Sebastjan Bratina**

Magistrski študijski program Gradbeništva druge stopnje, smer Geotehnika - hidrotehnika, traja dve leti (štiri semestre) in obsega 120 kreditnih točk.

Cilj študija je usposobiti strokovnjaka s poglobljenim temeljnim znanjem na širšem področju gradbeništva, predvsem z usmerjenim znanjem na področju hidravlike in urejanja vodotokov ter analize in projektiranja zahtevnejših geotehničnih oziroma pregradnih in hidrotehničnih objektov.

Študijski program obsega tudi praktično usposabljanje, ki je namenjeno seznanitvi z dejanskim delom v projektivnih birojih, izvajalskih podjetjih, inštitutih, zavodih in upravnih organih.

Med študijem se bo študent z delom v skupinah, projektnim delom in reševanjem problemskih nalog privajal javnemu nastopanju, poslovanju s strankami in se aktivno vključeval v raziskave. Pridobljeno teoretično znanje bo preskusil na primerih vaj ter pri reševanju zahtevnih teoretičnih ali strokovno usmerjenih problemov in projektov. Vse to mu bo omogočalo lažjo vključitev v prakso po končanem študiju ter razumevanje izzivov na različnih področjih gradbeništva. Z diplomo se bo študentu odprla tudi pot do pridobitve licence za projektiranje in gradnjo najzahtevnejših stavb ter inženirskih objektov.

The second-cycle master study program Civil Engineering, orientation Infrastructural Engineering, consists of two years (four semesters) and amounts to 120 credit points.

The goal of the study is to qualify experts with in-depth basic knowledge from the wider area of civil engineering, mainly with guided teaching from the areas of hydraulics and river regulation as well as analysis and design of demanding geotechnical or dam and hydrotechnical structures.

The study program includes practical training, which is intended for getting to know the real work in design offices, contracting companies, institutes and administrative bodies.

During the studies students work in groups, on projects, and solve specific tasks, which helps them get accustomed to public appearance and communication with customers, as well as work on real research. All the acquired theoretic knowledge can be tested during tutorials, dealing with demanding theoretical or professional problems and projects. This helps graduates in easier transition to the working life after the studies, and to understand the challenges in different areas of civil engineering. With the finished studies, graduates can also acquire the licence for the design and construction of the most demanding buildings and engineering structures.

1. letnik 1st year

Matematika III Mathematics III • ECTS 5

Numerične metode Numerical Methods • ECTS 4

Geotehnika nizkih gradenj Geotechnics of Infrastructural Facilities • ECTS 4

Hidravlično modeliranje Hydraulic Modelling • ECTS 7

Hidrološko modeliranje Hydrological Modelling • ECTS 6

Izbirni predmet I Elective Course I • ECTS 4

Potresno inženirstvo Seismic Engineering • ECTS 5

Modeliranje geotehničnih konstrukcij Modelling of Geotechnical Structures • ECTS 6

Numerično modeliranje trdnin Numerical Modelling of Solids • ECTS 6

Projektiranje gradbenih konstrukcij Design of Building Structures • ECTS 4

Verjetnostni račun in statistika Theory of Probability and Statistics • ECTS 4

Izbirni predmet II Elective course II • ECTS 5

2. letnik 2nd year

Vodenje projektov Project Management • ECTS 4

Urejanje vodotokov River Engineering • ECTS 8

Hidrotehnični objekti Hydraulic Structures • ECTS 8

Eksperimentalne metode v geotehniki Experimental Methods in Geotechnical Engineering • ECTS 6

Izbirni predmet III Elective Course III • ECTS 4

Praktično usposabljanje Practical Training • ECTS 4

Hudourništvo Torrent • ECTS 6

Stabilnost pobočij Slope Stabilisation • ECTS 4

Mehanika kamnin in podzemni objekti Rock Mechanics and Underground Structures • ECTS 6

Magistrsko delo Master Thesis • ECTS 10

Izbirni predmeti Elective Courses

Hidravlični stroji in naprave Hydraulic Machines and Devices • ECTS 4

Vodne moči Hydroelectric Power • ECTS 4

Numerične metode v dinamiki tekočin Numerical Methods in Fluid Dynamics • ECTS 5

Geotehnika okolja Environmental Geotechnics • ECTS 5

MAGISTRSKI ŠTUDIJSKI PROGRAM DRUGE STOPNJE STAVBARSTVO
SECOND-CYCLE ACADEMIC STUDY PROGRAMME BUILDINGS

SKRBNIK TRUSTEE
izr. prof. dr. **Mitja Košir**

Študijski program Stavbarstvo se osredotoča na stavbe – njihovo načrtovanje, gradnjo, uporabo ter odstranitev. Velik poudarek je na načrtovanju zaščitnih konstrukcij stavbnega ovoja, ki zahteva povezovanje gradbene fizike z bioklimatskimi načrtovalskimi strategijami ter potrebami in zahtevami uporabnikov stavb. S tem predstavlja študijski program Stavbarstvo vezni člen med arhitekturnim in gradbeno konstrukcijskim načrtovanjem grajenega okolja.

Študijski program je prilagojen potrebam in zahtevam oblikovanja bivalnega in delovnega okolja v stavbah. Pri tem je osnovno vodilo čim večja uravnovešenost med človekovim grajenim in širšim naravnim okoljem, saj je le tako mogoče uresničiti dolgoročne cilje trajnostnega razvoja ob sočasnem zagotavljanju udobnega bivanja. S tem stavba kot gradbeno-tehnični proizvod postane del širšega ekosistema, z njo pa se omogoča učinkovitejše in udobnejše delovanje uporabnikov in celotne družbe.

V času študija študenti pridobijo znanja, tehnične spretnosti in inovacijske sposobnosti, ki bodo pripomogle k dvigu kakovosti projektov za načrtovanje izgradnje, distribucije, uporabe in odstranitve stavb. Diplomanti magistrskega študijskega programa Stavbarstvo so usposobljeni za projektiranje zahtevnih stavb s področja bistvenih zahtev varnosti pred požarom, higienske in zdravstvene zaščite ter zaščite okolja, varnosti pri uporabi, zaščite pred hrupom, varčevanja z energijo in ohranjanja toplote in trajnostne rabe naravnih virov. S tem pa predstavljajo ključne strokovnjake s področja grajenega okolja za doseganje ciljev zelenega prehoda Evropske unije ter podnebne nevtralnosti Evrope do 2050. Študenti, ki so zaključili študij na drugostopnjskem študiju Stavbarstvo ter predhodno tudi prvostopenjski študij Gradbeništvo, lahko pri Inženirski zbornici Slovenije pristopijo k strokovnemu izpitu za pooblaščenega inženirja s strokovnega področja gradbeništva.

V primerjavi s šolskim letom 2019/2020 sta predmetnik in vsebina študijskega programa ostala nespremenjena. Vpis študentov na drugostopenjski študijski program Stavbarstvo je v zadnjih nekaj letih upadel. Upad vpisa je predvsem posledica manjšega števila diplomantov prvostopenjskega študijskega programa Gradbeništvo, od koder prihaja večina vpisanih študentov. Zaradi omenjenega trenda se v šolskem letu 2020/21 prvi letnik študijskega programa ni izvajal, posledično pa se v šolskem letu 2021/22 nato ni izvajal 2. letnik. V šolskem letu 2022/23 se je vpis na študijski program nekoliko dvignil, a še vedno ostaja relativno nizek. Do sedaj je na drugostopenjskem študiju Stavbarstvo študij zaključilo 59 študentov.

The study programme Buildings focuses on buildings – their design, construction, use, and disposal. Great emphasis is placed on the design of protective structures of the building envelope, which requires the integration of building physics with bioclimatic design strategies and the needs and requirements of building occupants. In this way, the study programme Buildings represents a link between the architectural and structural design of the built environment.

The study programme is adapted to the needs and requirements of the design of living and working environments in buildings. The basic guideline is to achieve the best possible balance between the built human and the wider natural environment, as this is the only way to achieve the long-term goals of sustainable development while ensuring comfortable living conditions. In this way, the building, as a structural and technical product, becomes part of a wider ecosystem and enables users and society as a whole to function more efficiently and comfortably.

During their studies, students acquire knowledge, technical skills and innovation competences that will help increase the quality of projects for the design, distribution, use and removal of buildings. Graduates of the master study programme Buildings are qualified to design sophisticated buildings that meet essential requirements for fire safety, hygiene and health protection, environmental protection, operational safety, noise protection, energy saving and heat conservation as well as the sustainable use of natural resources. This makes them the most important experts in the field of the built environment for achieving the goals of the European Union's Green Transition and climate neutrality in Europe by 2050. Students who have completed their second-level studies in Civil Engineering and previously also the first-level studies in Construction can take the professional exam at the Chamber of Engineers of Slovenia for licensed engineer from the professional field of construction.

Compared to the academic year 2019/2020, the syllabi and the contents of the study programme remained unchanged. Enrolment of students in the second-cycle study programme Buildings has declined over the past few years. The drop in enrolments is primarily the result of a smaller number of graduates from the first-cycle study programme Civil Engineering, from which the majority of enrolled students come. Due to the above-mentioned trend, the first year of the study programme was not implemented in the academic year 2020/21, and as a result, the second year was not implemented in the academic year 2021/22. In the academic year 2022/23 enrolment in the study programme improved slightly, but remains relatively low. So far, the second-cycle study programme Buildings has produced 59 graduates.

1. letnik 1st year

Diferencialne enačbe in geometrija Differential Equations and Geometry • ECTS 6

Dnevna svetloba Daylight • ECTS 5

Projektiranje nosilnih konstrukcij stavb Design of Load-bearing Structures of Buildings I • ECTS 10

Požar Fire • ECTS 6

Praktično usposabljanje Practical Training • ECTS 4

Konstrukcijska gradbena fizika Constructional Building Physics • ECTS 12

Projektiranje nosilnih konstrukcij stavb II Design of Load-bearing Structures of Buildings II • ECTS 6

Informacijsko modeliranje stavb Building Information Modelling • ECTS 4

1. izbirni predmet Elective Course 1 • ECTS 6

2. letnik 2nd year

Napredni materiali Advanced Materials • ECTS 6

Učinkovita raba energije Efficient Energy Use • ECTS 9

Bivalno okolje Living Environment • ECTS 9

2. izbirni predmet Elective Course 2 • ECTS 6

Avtomatsko vodenje sistemov Automatic Management of Systems • ECTS 6

Vrednotenje trajnosti stavb Building Sustainability Assessment • ECTS 4

Pametna hiša Smart House • ECTS 4

Magistrski seminar Master Seminar • ECTS 6

Magistrsko delo Master Thesis • ECTS 10

Izbirni predmeti Elective Courses

Tehnologija instalacij Technology of Installations • ECTS 6

Informacijske in komunikacijske tehnologije v grajenem okolju Information and Communication Technologies in Built Environment • ECTS 6

Zapiranje snovnih tokov pri stavbah in naseljih Closing Material Cycles in Buildings and Agglomerations • ECTS 6

Športna vzgoja Sports Education • ECTS 3

INŠTITUT ZA KOMUNALNO GOSPODARSTVO MUNICIPAL ECONOMICS INSTITUTE

KADER PERSONNEL

PREDSTOJNICA HEAD
izr. prof. dr. **Maruška Šubic Kovač**

NAMESTNIK PREDSTOJNICE DEPUTY HEAD
doc. dr. Daniel Kozelj

PEDAGOGI TEACHERS
asist. dr. Peter Lamovec, asist. Ajda Kafol Stojanović,
asist. Bujar Fetai

SODELAVEC ASSOCIATE
Marko Fatur, zun. strok. sod.

Katedra Inštitut za komunalno gospodarstvo (IKG) je bila kot samostojna raziskovalna enota na tedanji FAGG ustanovljena leta 1968. Njegov ustanovitelj in prvi predstojnik je bil prof. dr. Tone Klemenčič. V obdobju 1978–2001 je bil predstojnik inštituta izr. prof. dr. Albin Rakar, od leta 2001 pa ga vodi izr. prof. dr. Maruška Šubic Kovač.

Raziskovalno delo inštituta je bilo sprva usmerjeno predvsem v proučevanje urbanskih stroškov in mestne rente. V drugi polovici sedemdesetih in v osemdesetih letih je potekalo raziskovalno delo v treh medsebojno povezanih raziskovalnih sklopih: organizacijski in ekonomski vidiki izgradnje ter obratovanja komunalnih oskrbovalnih sistemov, kvantitativne metode na področju komunalne in urbane ekonomike ter informacijski sistemi na področju komunalnega gospodarstva. Od osamosvojitve naprej je raziskovalno delo inštituta usmerjeno predvsem v vrednotenje in upravljanje nepremičnin ter zemljiško politiko, pri čemer so predmet obravnave zlasti stavbna zemljišča ter gospodarska javna infrastruktura.

Na raziskovalnem in pedagoškem področju se IKG že od vsega začetka povezuje s sorodnimi fakultetami in inštituti v ZR Nemčiji, Avstriji in po letu 1991 tudi s fakultetami na Poljskem. Sodelovanje poleg rednih medsebojnih obiskov visokošolskih učiteljev zajema tudi izmenjavo študentov, izvedbo predavanj in izdajo skupnih monografij.

The chair Municipal Economics Institute (IKG) was established as an independent research unit of the then Faculty of Architecture, Civil and Geodetic Engineering in 1968. It was founded by its first head Prof. Dr. Tone Klemenčič. Between 1978 and 2001 the head of the Institute was Assoc. Prof. Dr. Albin Rakar, and since 2001 its head has been Assoc. Prof. Dr. Maruška Šubic Kovač.

The Institute's research work was initially focused mainly on urban costs and land rent. In the second half of the 1970s and in the 1980s, the research work consisted of three interconnected research areas: organisational and economic aspects of construction and functioning of municipal supply systems; quantitative methods in the field of municipal and urban economics; and information systems in the field of municipal economics. Since the independence of Slovenia, the Institute's research work has been mainly focused on real estate valuation and management and on land policy, with building land as well as economic public infrastructure being the focus.

In research and educational areas, the Municipal Economics Institute has always kept close links with similar faculties and institutes in Germany, Austria, and, since 1991, with various faculties in Poland. Beside regular visits of higher education teachers, the cooperation also includes exchange of students, invited lectures and joint publication of monographs.

PEDAGOŠKA DEJAVNOST

IKG je vključen v pedagoško delo na skoraj vseh študijskih smereh.

V okviru prvostopenjskih študijskih programov na študente prenašamo temeljno znanje s področij, povezanih z našim delom, in sicer v okviru obveznih predmetov – Urejanje prostora, Komunalno gospodarstvo in gradbena zakonodaja, Komunalne naprave – ter pri več različnih obveznih predmetih o urejanju stavbnih zemljišč in vrednotenju nepremičnin.

Na drugostopenjskih študijskih programih študentom predstavljamo komunalno in stanovanjsko gospodarstvo, študente v sodelovanju s pedagogi drugih kateder seznanimo z infrastrukturnimi sistemi ter gospodarjenjem z nepremičninami in njihovim vrednotenjem.

Člani inštituta veliko truda usmerjajo tako v predavanja in vaje kot tudi v mentorsko oziroma somentorsko delo pri zaključnih diplomskih oziroma magistrskih nalogah. V okviru posameznih predmetov organiziramo tudi ekskurzije in predavanja strokovnjakov iz prakse.

RAZISKOVALNA IN STROKOVNA DEJAVNOST

Na raziskovalnem področju smo se v obravnavanem obdobju osredotočili na analizo strokovnih podlag za oblikovanje komunalnega prispevka v Sloveniji. Izhajali smo iz predpostavke, da morajo biti strokovne podlage, s katerimi se odmerja komunalni prispevek, v skladu z načeli, ki veljajo na področju javnih financ.

Zasnovali smo integriran dinamični model za oceno zmogljivosti vodovodnega sistema pri odločanju o razvoju naselij na lokalni ravni. Model izhaja iz simulacije gradnje na nepozidanih stavbnih zemljiščih in potreb novih porabnikov na teh zemljiščih po vodi.

Na področju razvoja stavbnih zemljišč smo analizirali pridobivanje zemljišč za gradnjo v javno korist, v povezavi z ustavno zagotovljeno zasebno lastnino in ugotovili neupoštevanje ustavne zagotovljenosti zasebne lastnine in številne pomanjkljivosti v cenitvah nepremičnin, kar pomembno vpliva na nepravočasno pridobitev zemljišč za gradnjo.

Na strokovnem področju smo sodelovali pri razvoju stroke v združenju sodnih cenilcev in izvedencev gradbene stroke (SICGRAS), in sicer pri pripravi pravnih predpisov in priporočil ter pri organizaciji izobraževanja.

EDUCATIONAL ACTIVITY

The Institute is involved in teaching activities at almost all study programs.

Within the first-cycle study programs, we provide students with basic knowledge from the areas related to our work, by teaching mandatory courses: Spatial Development, Municipal Economics and Construction Legislation, Communal Technical Infrastructure, as well as with several mandatory courses on building land management and real estate valuation.

Within the second-cycle study programs, we offer students contents from municipal and building economics. In cooperation with teachers from other units, we provide students' knowledge on infrastructural systems and real estate management and valuation.

The Institute's members put a lot of effort into lectures and tutorials, as well as supervision or co-supervision for diploma or master theses. Within individual courses we also organise field trips and lectures given by experts from practice.

RESEARCH AND PROFESSIONAL ACTIVITES

In the area of research, in the reported period we focused on the analysis of the professional bases for the definition of the municipal contribution in Slovenia. Our basic assumption was that the professional bases on which the municipal contribution is defined must be consistent with the principles that apply in public finances.

We designed an integrated dynamic model for assessing the capacity of the water supply system in decision-making on the development of settlements at the local level. The model is based on the simulation of construction on undeveloped building lands and the needs of new consumers on these lands for water.

In the field of building land development, we analysed the acquisition of land for construction for public benefit, in connection with the constitutionally guaranteed private property, and found a disregard for the constitutional guarantee of private property and numerous deficiencies in real estate appraisals, which significantly affects the untimely acquisition of land for construction.

In the professional field, we participated within the Association of Court Certified Appraisers and Experts in the Civil Engineering Profession (SICGRAS) in the development of the profession, in the drafting of legal regulations and recommendations, and in the organization of education.

KATEDRA ZA GEOTEHNIKO CHAIR OF GEOTECHNICS

KADER PERSONNEL

PREDSTOJNIK HEAD
izr. prof. dr. **Boštjan Pulko**

NAMESTNIK PREDSTOJNIKA DEPUTY HEAD
doc. dr. Matej Maček

PEDAGOGI TEACHERS
prof. dr. Janko Logar, asist. dr. Barbara Fortuna (od januarja 2023 from January 2023), asist. dr. Jasna Smolar, asist. Aleš Oblak (do marca 2022 until March 2022)

SODELAVCI ASSOCIATES
zaslužni profesor UL prof. dr. Bojan Majes, izr. prof. dr. Vojkan Jovičić, doc. dr. Vladimir Vukadin, mag. Sebastjan Kuder, Manca Hrovat (do septembra 2023 until September 2023), Timotej Jurček

Geotehnika povezuje gradbene objekte s tlemi, obravnava gradnjo v tleh (predori in podzemni deli objektov), gradnjo nasipov in zemeljskih pregrad in je torej povezovalni člen med grajenim in naravnim okoljem. Vse bolj pomembna je geotehnika okolja, ki se ukvarja z območji, degradiranimi zaradi predhodne rabe, in v kontekstu krožnega gospodarstva obravnava možnosti koristne in varne rabe antropogenih materialov, ki nastajajo kot odpadki ali stranski produkti industrije. Ker so tla običajno heterogena in tako glede sestave kot lastnosti ne povsem poznana, je inženirsko delo v geotehniki vselej izziv, saj so odločitve tesno povezane z zavedanjem o tveganjih. Poleg preiskav sestave in lastnosti tal ter računskih modelov obnašanja zemljin je za geotehnično projektiranje ključno tudi poznavanje sodobnih smernic, tehnoloških možnosti ter materialov za izvedbo temeljenja in drugih geotehničnih del.

PEDAGOŠKA DEJAVNOST

Sodelavci Katedre za geotehniko (KGT) na prvi stopnji študijev gradbeništva ter vodarstva in okoljskega inženirstva poučujemo osnove mehanike tal, inženirsko geologijo, temeljenje objektov in zemeljska dela, na drugi stopnji pa napredne vsebine s področja geotehnike za študente na smereh Gradbene konstrukcije, Nizke gradnje in Stavbarstvo ter Geotehnika okolja na magistrskem študiju VOI. Študentje doktorskega študija lahko na KGT izberejo predmete: Modeliranje podzemnih gradenj, Metode izboljšanja temeljnih tal ter Hidrološko in geotehnično raziskovanje zemeljskih plazov.

Sodelavci Katedre za geotehniko so pogosto mentorji študentom pri zaključnih delih. Precejšnji delež zaključnih del vključuje preiskave, izvedene v laboratoriju za mehaniko tal.

ZNANSTVENA IN RAZISKOVALNA DEJAVNOST

Z Biotehniško fakulteto sodelujemo na projektu programa Obzorje 2020 ONEforest, katerega cilj je vzpostaviti večkriterijski sistem podpore odločanju za skupno gospodarjenje z gozdovi za krepitev odpornosti gozdov, uskladitev interesov zainteresiranih strani in zagotavljanje trajnostnih tokov lesa. Katedra za geotehniko se v okviru tega projekta ukvarja s problemom erozije gozdnih tal in zadrževanja vode v rastni prsti v pogojih klimatskih sprememb.

Sodelavci katedre sodelujemo v dveh raziskovalnih projektih ARIS: »Raziskava medsebojno povezanih procesov za trajnostno ravnanje s komunalnim blatom z namenom njegove snovne predelave in recikliranja« in »Vrednotenje hibridne infrastrukture za zmanjševanje ogroženosti pod vplivom podnebnih sprememb«.

V recenziranih znanstvenih revijah smo v sodelovanju s tujimi in domačimi sodelavci objavili 12 člankov, na konferencah smo sodelovali z 19 prispevki, od tega je bilo 5 vabljenih predavanj. Področja objav so raznovrstna: likvifakcija tal, terenske preiskave tal, preiskave za sanacijo plazov, načrtovanje in gradnja predorov, geosintetiki, geotehnična sidra, zaznavanje precejanja vode skozi zemeljske pregrade, zaščita zgodovinskih podzemnih objektov v kamninah. V laboratoriju Katedre za geotehniko smo izvajali

Geotechnics connects buildings with the ground, deals with underground construction (tunnels and underground parts of buildings), construction of embankments and barriers, and is therefore a connecting link between the built and natural environment. Increasingly important is environmental geotechnics, which deals with areas degraded due to previous use and, in the context of circular economy, considers the possibilities of useful and safe use of anthropogenic materials generated as waste or by-products of industry. Because soils are usually heterogeneous and not fully known in terms of their composition and properties, geotechnical engineering is always a challenge, as decisions are closely linked to risk awareness. In addition to studying soil composition and properties and computational models of soil behaviour, knowledge of modern guidelines, technological possibilities and materials for the implementation of foundations and other geotechnical work is also crucial for geotechnical design.

EDUCATIONAL ACTIVITY

Members of the Chair of Geotechnics teach the basics of soil mechanics, engineering geology, building foundations and earthworks at the first cycle of civil engineering, water management and environmental engineering studies, while at the second-cycle studies they teach advanced contents in the fields of geotechnics for the study orientations Structural Engineering, Infrastructural Engineering and Buildings, as well as Environmental Geotechnics at the master study programme Water Science and Environmental Engineering. PhD students can select the following courses offered by our Chair: Modeling of Underground Structures, Ground Improvement Methods, and Hydrologic and Geotechnical Research on Landslides.

Members of the Chair of Geotechnics frequently supervise students' final theses. A large proportion of the final theses involve investigations carried out in the Soil Mechanics Laboratory.

SCIENTIFIC AND RESEARCH ACTIVITIES

We are collaborating with the Biotechnical Faculty in the Horizon 2020 ONEforest project, the goal of which is to establish a multi-criteria decision support system for joint forest management to strengthen the resilience of forests, align the interests of stakeholders and ensure sustainable timber flows. As part of this project, the Chair of Geotechnics is addressing the problem of forest soil erosion and water retention in growing soils under the conditions of climate change.

Members of the Chair participate in two research projects financed by the National Research Agency: “Investigation of Interconnected Processes for Sustainable Management of Sewage Sludge for the Purpose of Its Material Recovery and Recycling” and “Evaluation of Hazard-Mitigating Hybrid Infrastructure under Climate Change Scenarios”.

In cooperation with international and Slovenian colleagues, we published 12 articles in peer-reviewed scientific journals, and participated in conferences with 19 papers, of which 5 were invited lectures. The areas of publication are diverse:

preiskave rastne prsti z dodatki na bazi ksantana za povečanje zadrževalne sposobnosti vode. Drugi večji raziskovalni projekt v laboratoriju so mehanske preiskave vzorcev tal Ljubljanskega barja pri zelo majhnih in majhnih deformacijah z resonančnim testom. Cilj teh meritev, ki jih izvaja mladi raziskovalec Timotej Jurček, je pridobitev podatkov o togosti in dušenju barjanskih zemljin v odvisnosti od velikosti strižnih deformacij.

STROKOVNA DEJAVNOST

Na Katedri za geotehniko verjamemo v nujnost prepletanja in tesne povezave med pedagoškim, strokovnim in raziskovalnim delom. Le na tak način je mogoče zahtevne strokovne probleme prenesti v raziskovalno okolje in rešitve, izhajajoče iz rezultatov raziskav, nazaj v prakso. S takim sodelovanjem je tudi prenos znanj na študente sodoben, povezan s prakso, ponazorjen z ustreznimi praktičnimi primeri in posledično zanimiv ter aktualen. Zato tesno sodelujemo z investitorji večjih infrastrukturnih projektov, s projektanti in izvajalci geotehničnih del. Poslanstvo Katedre za geotehniko je izvajanje temeljnih in naprednih laboratorijskih in terenskih preiskav zemljin, antropogenih materialov ter strokovna podpora z znanjem, izkušnjami in opremo vsem, ki takšno podporo potrebujejo.

Sodelavci KGT aktivno sodelujemo kot člani tehničnih odborov in izdelovalci tehničnih specifikacij za prometno infrastrukturo pri Direkciji za infrastrukturo RS. V letih 2022/23 smo pripravili osnutek tehnične specifikacije za prometno infrastrukturo z naslovom »Minimalne zahteve za načrtovanje in izvedbo preiskav tal in podzemne vode« in sodelovali pri nastajanju tehnične specifikacije »Načrtovanje in uporaba geosintetikov pri gradnji prometnic«.

POMEMBEN DOSEŽEK

V obdobju 2021–2023 smo člani katedre objavili številne izvirne znanstvene članke, ki po kakovosti spadajo v zgornjo polovico baze SCI. Kot pomembnejši dosežek izpostavljamo tematiko članka: Sorze, Valentini, Smolar, Logar, Pegoretti, Dorigato: "Effect of different cellulose fillers on the properties of xanthan-based composites for soil conditioning applications", objavljenega v reviji Materials, saj za našo skupino pomeni obravnavo novega področja.

soil liquefaction, field investigations of soil, investigation for rehabilitation of landslides, tunnel design and construction, geosynthetics, geotechnical anchors, detection of water seepage through earth dams, protection of historical underground structures in rocks. In the Chair of Geotechnics Laboratory we conducted tests on growing soils with xanthan-based additives to increase soil water retention capacity. Another major research project in the laboratory is the mechanical investigation of soil samples from the Ljubljana Marshes at very small and small strains with resonant column testing. The aim of these measurements, carried out by our young researcher Timotej Jurček, is to obtain data on the stiffness and damping of bog soils depending on the magnitude of shear deformations.

PROFESSIONAL ACTIVITY

The members of the Chair of Geotechnics believe in the necessity of an intertwining and close connection between educational, professional and research work. Only in this way can complex professional problems be transferred to the research environment and solutions resulting from research findings be fed back into practice. Through this cooperation, the transfer of knowledge to students is modern, practical, illustrated with relevant practical examples and thus interesting and up-to-date. Therefore, we work closely with investors in major infrastructure projects, designers and contractors of geotechnical works. The mission of the Department of Geotechnics is to conduct basic laboratory or field research of soils, rocks, anthropogenic materials and professional support with knowledge, experience and equipment to all who need such support. We take care of the transfer of new knowledge into operational practice through educational seminars for representatives of investors in municipal and state infrastructure and for representatives of design and construction companies.

Members of the Chair actively participate in technical committees and in preparing Technical Specifications for Traffic Infrastructure at the Infrastructure Directorate of the Republic of Slovenia. In 2022/23, we prepared a draft of technical specification for traffic infrastructure titled "Minimum Requirements for the Design and Execution of Soil and Groundwater Investigations" and participated in the creation of the technical specification "Design and Use of Geosynthetics in Road Construction".

SIGNIFICANT ACHIEVEMENT

In the reporting period 2021–2023 the members of the Chair published numerous scientific articles, belonging in terms of quality to the upper half of the SCI base. An important achievement is the following article: Sorze, Valentini, Smolar, Logar, Pegoretti, Dorigato: "Effect of different cellulose fillers on the properties of xanthan-based composites for soil conditioning applications", published in the journal Materials, as it represents a new field for our group.

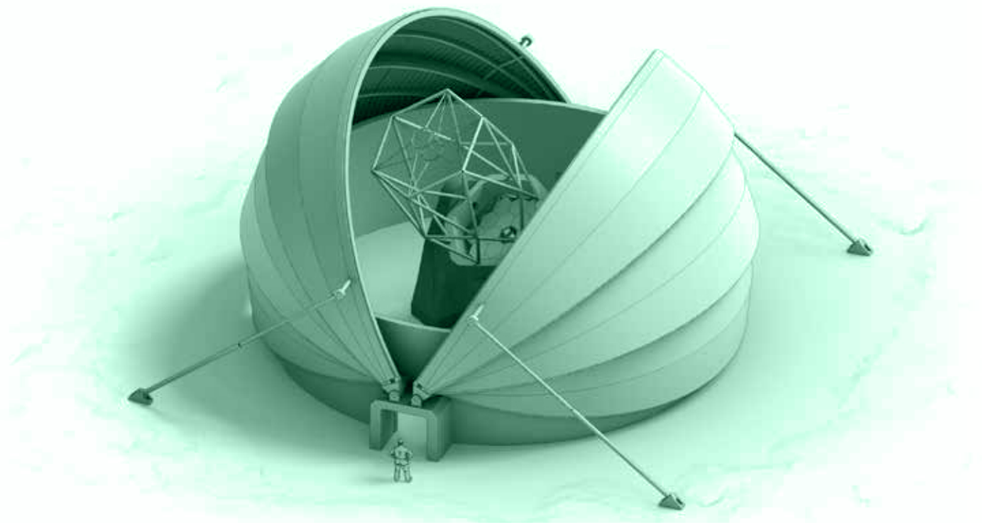
KATEDRA ZA GRADBENO INFORMATIKO CHAIR OF CONSTRUCTION INFORMATICS

KADER PERSONNEL

PREDSTOJNIK HEAD
doc. dr. **Matevž Dolenc**

NAMESTNIK PREDSTOJNIKA DEPUTY HEAD
doc. dr. Tomo Cerovšek

PEDAGOGI TEACHERS
prof. dr. Žiga Turk, izr. prof. dr. Andreja Istenič, doc. dr. Robert Klinc, doc. dr. Jaka Dujc, asist. dr. Tomo Veldin, asist. Luka Gradišar, asist. Blaž Kurent, asist. Tomislav Franković



Katedra za gradbeno informatiko (KGI) se osredotoča na razvoj, posredovanje in uporabo naprednih informacijskih in komunikacijskih rešitev za izboljšanje informacijskih in materialnih procesov v gradbeništvu. Usmerjamo se na tista področja rabe informacijske in komunikacijske tehnologije (IKT) v gradbeništvu, ki odločilno prispevajo k digitalni transformaciji gradbene industrije.

V letih 2022 in 2023 smo nadaljevali delo in usmeritve v informacijsko modeliranje zgradb (angl. BIM), boljše upravljanje s projektnimi informacijami, visokoprepustna računska okolja, inženirske storitve v oblaku, napredne metode interoperabilnosti, procesno modeliranje ter v nove tehnološke, sodelovalne in organizacijske vidike. V zadnjem obdobju pospešeno raziskujemo možnosti inženirske uporabe generativnega načrtovanja, umetne inteligence in strojnega učenja. Za uspešno delo na tako interdisciplinarnih in raznolikih področjih so ključni ljudje, zato smo k sodelovanju pritegnili tudi raziskovalce iz tujine, ki so obogatili prenos znanja in načine dela ter bili vključeni v različne raziskovalne projekte.

PEDAGOŠKA DEJAVNOST

Skrbeli smo za prenos različnih vrst znanj, ki jih ustvarimo v okviru raziskovalnega, aplikativnega in strokovnega dela ter za prenos dobrih praks iz tujine. Predavamo vsebine, ki so povezane s projektno komunikacijo, produktnim in procesnim modeliranjem ter računalniško podprtim načrtovanjem ter rabo IKT v celotnem življenjskem ciklu objektov. Tehnične vsebine dopolnjujemo z organizacijskimi, ekonomskimi, trajnostnimi, družbenimi in sodobnimi pedagoškimi vidiki. Vsebine učnih načrtov smo nadgrajevali z večjim poudarkom na BIM, sočasnem inženirstvu, avtomatski obdelavi podatkov, programiranju, procesnem modeliranju, na znanju podprtem inženirstvu, generičnem načrtovanju, parametrizaciji in trajnostni gradnji. Razvoj smo usmerili tudi v študijske vsebine v povezavi s praktičnim usposabljanjem in razvojem kompetenc študentov v realnih delovnih okoljih. V okviru diplomskih del smo bili mentorji pri temah s področij aplikacij BIM, programiranja inženirskih aplikacij za mobilne naprave, vizualizacij, virtualne in razširjene resničnosti, večmaterialnega trajnostnega projektiranja, modelnih tehnik upravljanja projektov (5D), razvoja modelov za proizvodnjo v merilu (3D tisk) ali dejanski velikosti (CNC) do parametričnih analiz za numerično zahtevne operacije.

RAZISKOVALNA DEJAVNOST

Z raziskovalnim in razvojnim delom prispevamo k razvoju gradbene informatike kot interdisciplinarne znanstvene vede v mednarodnem okolju. V okviru raziskovalne skupine e-Gradbeništvo, katere jedro tvorijo člani KGI, smo nadaljevali z raziskavami informacijskega modeliranja, modelne komunikacije, možnosti za aktualizacijo modelov s senzorji, parametričnih študij visokoprepustnih računskih omrežij, storitev v oblaku ter interneta stvari. Posebno priložnost smo zaznali tudi pri integraciji IKT, predmetov in digitalnih modelov (npr. pametne hiše ali mesta) ter računalništvu v oblaku.

Z delom je uspešno nadaljevala programska skupina eGradbeništvo, ki je bila zaradi nadpovprečne uspešnosti povabljena, da zaprosi

Chair of Construction Informatics (KGI) focuses on the development, exchange and use of advanced information and communication solutions to improve information and material processes in construction. We direct our endeavours to those applications of information and communication technologies (ICT) in civil engineering that significantly contribute to the digital transforamation of construction industry.

In 2022 and 2023 we continued with our work, focusing especially on building information modelling (BIM), better management of project information, high-throughput computing environments, cloud services, advanced interoperability methods, process modelling and new technological, consulting and organisational aspects. Lately, we have been increasingly researching the possibilities of engineering use of generative design, artificial intelligence and machine learning. Successful work within this broad field is based on people. Thus, we invited also foreign researchers to join us in projects, and they enriched the knowledge transfer and the principles of work within the research projects they were involved in.

EDUCATIONAL ACTIVITY

We have worked to transfer the different types of knowledge created in our research, applied and professional work, as well as best practices from abroad. Our lectures convey content related to project communication, product and process modelling, computer-supported design and the use of ICT throughout the life cycle of structures. Technical content is supplemented with organizational, economic, sustainable, social and contemporary pedagogical aspects. The curriculum is upgraded with a stronger focus on BIM, concurrent engineering, automatic data processing, programming, process modelling, knowledge-based engineering, generative design, parameterisation and sustainable construction. We have also focused our development on curricular content linked to practical training and the development of students' competences in real work environments. In graduation theses, we have been supervisors on topics in the fields of BIM applications, programming of engineering applications for mobile devices, visual rendering, virtual and augmented reality, multi-material sustainable design, project management model techniques (5D), scale production model development (3D print) or real-size (CNC), generative design, as well as parametric analyses for numerically demanding operations.

RESEARCH ACTIVITY

Our research and development activities contribute to the development of construction informatics as an interdisciplinary scientific discipline in the international environment. Within the research group e-Construction, which forms the core research of the Chair of Construction Informatics, we continued with research in the field of information modelling, model communication, possibilities for updating models with sensors, parametric studies of high-throughput computing networks, cloud services, Internet of Things, etc. We identified the opportunity in the integration of ICT, objects and digital models (e.g. smart houses or cities), as well as in cloud computing.

The eConstruction programme group continued its work successfully and, due to its above-average performance, was

za povečanje financiranja. Raziskovali in objavljali smo s področja gradbeništva 4.0, umetne inteligence, kibernetske varnosti, digitalnih dvojčkov in digitalnih platform. Slednje bi morale prednosti tehnologij BIM razširiti na sodelovanje preko meja podjetij in projektov. O tem je imel vodja programa prof. Turk tudi vabljena predavanja za The European Federation of Engineering Consultancy Associations (EFAC), na Slovenskih dnevih varnosti ter vabljeni uvodni predavanji na konferencah v Avstraliji in na Kitajskem. Pridobili smo tudi nov večji EU projekt CROSS-REIS (Čezdisciplinarno omrežje za raziskovalno odličnost na področju inovativnih ekosistemov za regenerativno gospodarstvo), pri katerem bomo prispevali vidik grajenega okolja.

V okviru EU projekta BUILDCHAIN sodelujemo pri razvoju računalniškega okolja za digitalno identifikacijo, registracijo, posodabljanje in analizo podatkov, ki se nanašajo na celotni življenjski cikel stavbe (razvija se lastna rešitev za digitalni dnevnik stavbe). Končali smo evropski projekt DynaTTB, ki je raziskoval dinamične karakteristike tipičnih evropskih večnadstropnih lesenih stavb, in predlagali izboljšave pri modeliranju in načrtovanju novih tovrstnih stavb. Zaključili smo slovensko-madžarski projekt ARIS DataBridge na temo priprave podatkovnih in kalibriranih fizikalnih modelov mostov za ugotavljanje njihovega stanja (med drugim smo pripravili podatkovni model viadukta Ravbarkomanda). Člani katedre sodelujemo še pri dveh projektih ARIS, ki se ukvarjata z raziskovanjem degradacije skalnih sten zaradi vremenskih vplivov ter z zasnovo gibkih zložljivih struktur.

STROKOVNA DEJAVNOST

Sodelovali smo v kompetenčnem centru, pri aplikativnih projektih in drugih oblikah sodelovanja z industrijo tako, da neposredno v prispevamo k dvigu tehnološke ravni. Poseben poudarek namenjamo odprtemu pristopu BIM in uporabi nevtralnih eksternih shem, klasifikacijam, standardizaciji procesov in postopnemu uvajanju v slovensko industrijo. Pri širjenju znanja in publicističnega dela sodelujemo kot recenzenti pri vodilnih revijah, promoviramo odprt dostop do znanja. Nadaljevalo se je tudi snemanje oddaj podkasta BIMpogovori, v katerih z gosti iz prakse razglabljamo o tehnologiji BIM in IKT v gradbeništvu. V začetku 2023 smo v sodelovanju s Katedro za operativno gradbeništvo začeli z izvedbo strokovnega usposabljanja buildingSMART – modul Temeljna znanja. Strokovno usposabljanje organizacije buildingSMART je mednarodni program, ki zagotavlja referenčno merilo na svetovni ravni za zagotavljanje kompetenc za proces openBIM©.

POMEMBEN DOSEŽEK

Mladi raziskovalec Luka Gradišar je sodeloval z Liverpool John Moores University pri zasnovi Novega robotskega teleskopa, v kateri je bil uporabljen proces generativnega načrtovanja v kombinaciji s strojnim učenjem. Pri zasnovi konstrukcije teleskopa s premično streho je bilo treba sočasno upoštevati različne konfiguracije strehe. Uporaba razvite integrirane metode je omogočila razvoj učinkovitejše konstrukcije, ki je imela 19 % manjšo maso v primerjavi z izvirno idejno zasnovo.

invited to apply for an increase in funding. We have researched and published in the areas of Construction 4.0, Artificial Intelligence, Cyber Security, Digital Twins and Digital Platforms, the latter of which should extend the benefits of BIM technologies to collaboration across company and project boundaries. The programme leader Prof. Turk has also given invited lectures on this topic for The European Federation of Engineering Consultancy Associations (EFAC), at the Slovenian Safety Days, and invited keynote lectures at conferences in Australia and China. We have also been awarded a new major EU project CROSS-REIS (Cross Disciplinary Network for Research Excellence in Regenerative Economy Innovation Eco-Systems), to which we will contribute a built environment perspective.

In the framework of the EU BUILDCHAIN project, we are involved in the development of a computing environment for the digital identification, registration, updating and analysis of data relating to the entire life cycle of a building (our own digital building log solution is being developed). We have completed the European DynaTTB project, which investigated the dynamic characteristics of typical European multi-storey timber buildings and proposed improvements for the modelling and design of new buildings of this type. We have completed the Slovenian-Hungarian ARIS DataBridge project on the preparation of data and calibrated physical models of bridges to determine their condition (including a data model of the Ravbarkomanda viaduct). Members of the Chair are also involved in two ARIS projects on the degradation of rock walls due to weathering and on the design of flexible folding structures.

PROFESSIONAL ACTIVITY

We took part in the development of a research competence centre, in applied projects and in other types of collaboration with the industry, directly contributing to raising the level of technology. Special emphasis is placed on the open BIM and the use of neutral external schemes, classifications, process standardisation and step-by-step implementation in the Slovenian industry. In the framework of knowledge transfer and publishing, we are active as reviewers for leading scientific journals, and we promote open access to knowledge. We also continued to record podcasts BIMpogovori (BIMtalks), in which we discuss BIM and ICT technologies in civil engineering with guests from practice. In early 2023, in cooperation with the Chair of Construction Management, we launched the professional training buildingSMART - Foundation. The buildingSMART Professional Training is an international programme that provides a global benchmark for delivering competencies for the openBIM© process.

SIGNIFICANT ACHIEVEMENT

Young researcher Luka Gradišar worked with Liverpool John Moores University to design a new robotic telescope using a generative design process combined with machine learning. The design of the telescope structure with a moving roof had to take into account different roof configurations simultaneously. The application of the developed integrated method allowed the development of a more efficient structure with 19 % less mass compared to the original conceptual design.

KATEDRA ZA KONSTRUKCIJE IN POTRESNO INŽENIRSTVO CHAIR OF STRUCTURAL AND EARTHQUAKE ENGINEERING

KADER PERSONNEL

PREDSTOJNICA HEAD
prof. dr. **Tatjana Isaković**

NAMESTNIK PREDSTOJNICE DEPUTY HEAD
prof. dr. Matjaž Dolšek

PEDAGOGI TEACHERS
doc. dr. Anže Babič, prof. dr. Boštjan Brank, doc. dr. Matija Gams

SODELAVCI ASSOCIATES
Mario Farič, Neja Fazarinc, asist. dr. Aleš Jamšek, Antonio Janevski, asist. dr. Nuša Lazar Sinkovič, Danijel Kirn, Nemanja Krtinić, Gordan Praštalo, Veronika Pučnik, asist. dr. Jure Snoj, Jure Starc, Milena Tomić, dr. Elizabeth Luz Vaquez Munoz, asist. dr. Blaž Zoubek, doc. dr. Jure Žižmond

Na Katedri za konstrukcije in potresno inženirstvo (KKPI) se ukvarjamo z različnimi vidiki projektiranja gradbenih konstrukcij, predvsem s poglavitno funkcijo, ki jo ta postopek mora zagotoviti, to je zagotavljanje stabilnosti in varnosti gradbenih konstrukcij pri različnih vplivih, s posebnim poudarkom na potresni obtežbi, ter s študijami ocene potresne odpornosti in potresnega tveganja grajenega okolja.

PEDAGOŠKA DEJAVNOST

Na KKPI predavamo predmete na vseh stopnjah študija in različnih smereh. Predmeti se nanašajo na različna področja, tesno povezana z našim raziskovalnim in strokovnim delom: dinamika konstrukcij in potresno inženirstvo, projektiranje in nelinearna analiza stavb in mostov na potresnih področjih, zanesljivost konstrukcij v potresnem inženirstvu, analiza ploskovnih in lupinastih konstrukcij, metoda končnih elementov, interdisciplinarni projektni študij računalniško podprtega projektiranja konstrukcij itd.

Naši študijski programi so jasno opredeljeni in izpolnjujejo najvišje standarde. Učne vsebine nenehno razvijamo in izpopolnjujemo ter tako študente seznanjamo z najnovejšimi dosežki na področjih, ki jih obravnavajo naša predavanja. Pri tem uporabljamo najsodobnejše tehnike in orodja za poučevanje. Med prvimi smo vpeljali interdisciplinarni projektno orientirani študij, podprt z najsodobnejšimi orodji informacijske tehnologije. Vsako leto omogočamo najboljšim študentom, da se kot mladi raziskovalci, ki jih financira ARRS, vključijo v raziskovalno delo na različnih projektih.

RAZISKOVALNA IN STROKOVNA DEJAVNOST

Na KKPI se ukvarjamo z raziskavami in razvojem naprednih metodologij za analizo in projektiranje konstrukcij, še posebej smo aktivni na področju potresnega inženirstva. Ponašamo se z dolgoletnim uspešnim sodelovanjem z najbolj uglednimi inštitucijami na svetu, kot so npr. ENS Cachan, Univerza v Tokiu, Univerza v Stanfordu, UC Berkeley, UC Los Angeles, E-Defense center in laboratorij ELSA v Ispri, in podjetji, kot so npr. Électricité de France, Computers & Structures Inc., GEN energija in Nuklearna elektrarna Krško.

Glavna področja našega raziskovanja so sodobne metode za analizo, projektiranje in oceno potresnega tveganja najbolj kompleksnih vrst konstrukcij ter razvoj teoretičnih osnov in aplikativnih metod in orodij za potresno zaščito konstrukcij. Temeljne raziskave so vedno bile osnova za nadaljnje aplikativne študije, ki so botrovale številnim družbeno pomembnim dosežkom. Dosedanje raziskave in ekspertize so bistveno pripomogle k povečanju potresne varnosti številnih pomembnih objektov (nuklearne elektrarne, viadukti, nakupovalna središča) in običajnih konstrukcij (stanovanjske stavbe in industrijski objekti).

V letih 2022–2023 smo sodelovali v različnih evropskih in nacionalnih raziskovalnih ter strokovnih projektih. V okviru projekta METIS (H2020-EUROATOM) sodelujemo pri razvoju metod in orodij za oceno potresnega tveganja nukleark. Aktivno smo sodelovali pri projektu BORIS (UCPM-2020), kjer smo razvili metodologijo za

Members of the Chair of Structural and Earthquake Engineering (KKPI) are dealing with various aspects of structural design, in particular with the main function this procedure has to ensure, i.e. stability and safety of structures, with special emphasis on earthquake load, and with studies to assess seismic safety and seismic risk of the built environment.

EDUCATIONAL ACTIVITY

Members of the Chair provide courses at all levels of study at different thematic areas. The courses deal with various areas that are tightly linked to our research and professional work: dynamics of structures and earthquake engineering, design and non-linear analysis of buildings and bridges in seismic areas, reliability analysis in earthquake engineering, analysis of slab and shell structures, finite element analysis, interdisciplinary IT supported design of structures, etc.

Our study programs are clearly focused and they meet the highest standards. The courses' curricula are constantly upgraded to provide the students the information of the recent advances in the field. Innovative and up-to-date teaching methods and tools are used. We were among the pioneers who introduced the multidisciplinary project based IT supported study of design of structures.
Annually the best students are given the opportunity to be involved in various research projects as postgraduate students, who are funded by the Slovenian Research Agency.

SCIENTIFIC AND RESEARCH ACTIVITIES

Members of the Chair are involved in research in the field of advanced methodologies for structural analysis and design, in particular in the field of earthquake engineering. A strong collaboration network has been established with the most eminent institutions worldwide, e.g. ENS Cachan, University of Tokyo, Stanford University, UC Berkeley, UC Los Angeles, E-Defense center and ELSA Laboratory in Ispra, and companies such as Électricité de France, Computers & Structures Inc., GEN energija, and Krško Nuclear Power Plant.

The main thematic focus areas of the research are advanced analysis, design techniques, and assessment of seismic risk for the most complex structures, as well as the development of the theoretical background, applied analysis and tools for seismic protection of structures. The fundamental research is typically conducted to provide the basis for further applied studies, the results of which are placed to the service of society. Previous research and expert reports have contributed significantly to improving the seismic safety of many important facilities (nuclear power plants, viaducts, shopping malls) and conventional structures (residential and industrial buildings).

In 2022–2023, we participated in various European and national research and expert projects. Within the project METIS (H2020-EUROATOM) we participate in the development of methods and tools for assessing the seismic risk of nuclear power plants. We actively participated in the BORIS project (UCPM-2020), in which we developed a methodology for assessing seismic and flood risk in cross-border areas, which allows the assessment of risk with an average annual loss or average annual cost of renovation of the building stock. In this way, we transferred knowledge

oceno tveganja zaradi potresov in poplav na čezmejnih območjih, ki omogoča ovrednotenje tveganja s povprečno letno izgubo oz. povprečnim letnim stroškom obnove stavbnega fonda. Na ta način smo znanja s področja analize potresnega tveganja prenesli na področje ocene poplavnega tveganja. Projekt je bil prepoznan s strani EK in je bil predstavljen na letnem seminarju DRMKC v Bruslju.

Po povabilu smo sodelovali pri raziskavah potresnega odziva desetetažnih stavb, ki so bile preizkušene v naravnem merilu na največji potresni mizi na svetu, E-Defense na Japonskem. Konec leta 2023 je bila objavljena posebna številka osrednje evropske revije na področju potresnega inženirstva Bulletin of Earthquake Engineering, v kateri so predstavljene te raziskave in pri kateri smo bili vodilni gostujoči uredniki. Uspešno smo sodelovali pri vnaprejšnji napovedi cikličnega odziva armiranobetonskih stenastih jeder, ki so bila testirana v velikem merilu na UCLouvain v Belgiji. Sodelujemo pri treh evropskih projektih HORIZONT ERIES, v okviru katerih bodo na potresni mizi preizkušena torzijsko obremenjena armiranobetonska stenasta jedra, udarci preklade v opornike armiranobetonskih mostov in inovativni načini varovanja opečnih polnil v armiranobetonskih konstrukcijah.

Na evropskem projektu smo s partnerji iz Italije in Slovenije razvijali in raziskovali protipotresno utrjevanje starih kamnitih in opečnih stavb s kompozitnimi materiali in posebnimi načini sidranja oblog na zid, ki omogočajo nanos oblog za utrditev le z ene strani zidov.

Na povabilo NEK smo v sklopu projekta podaljšanja obratovalne dobe NEK nudili strokovno podporo pri vprašanjih s področja potresne varnosti, ki so jih izpostavili deležniki iz Slovenije, Hrvaške, Avstrije, Italije, Madžarske in Nemčije. Sodelovali smo tudi pri presoji analize potresne ranljivosti za različne objekte v NEK. Poleg tega smo vključeni v projekt verifikacije izračunov za verjetnostno analizo potresne nevarnosti obstoječega in novega bloka Nuklearne elektrarne Krško ter vodimo mednarodno revizijo te študije.

Bili smo recenzenti člankov v uglednih mednarodnih revijah. Sodelovali smo pri recenzijah in revizijah različnih pomembnih projektov in pri projektih ocene potresne odpornosti obstoječih objektov. Dejavno sodelujemo pri razvoju in implementaciji standardov v projektantsko prakso, še zlasti pri pripravi nove generacije Evrokodov. Svoje dosežke in ekspertize smo na povabilo različnih medijskih hiš širili med občinstvo.

POMEMBNA DOSEŽKA

Tatjana Isaković je bila izbrana za izredno članico Inženirske akademije Slovenije.

Matjaž Dolšek je prejel Zlato plaketo Univerze v Ljubljani.

from the field of seismic risk analysis to the field of flood risk assessment. The project was recognised by EC and was presented at the DRMKC annual seminar in Brussels.

By invitation, we participated in research on the seismic response of full-scale ten-storey buildings, tested at the world's largest shaking table, E-Defense, in Japan. At the end of 2023, a special issue of a major European journal in the field of earthquake engineering, Bulletin of Earthquake Engineering, was published, in which this research was presented and for which we were the lead guest editors. We succeeded in predicting in advance the cyclic response of reinforced concrete wall cores tested on a large scale at UCLouvain, Belgium. We participate in three HORIZON ERIES European projects, within the scope of which reinforced concrete core walls subjected to torsion, impacts of cantilevers on reinforced concrete bridge abutments, and innovative ways of protecting brick infills in reinforced concrete structures will be tested at the shaking table.

Within the framework of a European project, we developed and studied earthquake-resistant strengthening systems of old stone and brick buildings using composite materials and special methods for their anchoring allowing their attachment to only one side of the walls.

At the invitation of the Krško Nuclear Power Plant (NEK), we provided professional support on earthquake safety issues as part of the project to extend the operating life of NEK, addressed by stakeholders from Slovenia, Croatia, Austria, Italy, Hungary, and Germany. We also participated in assessing the seismic vulnerability analysis for various facilities in the NEK. We are also involved in a project of verification of calculations for the probabilistic analysis of the seismic hazard of the existing and new units of the Krško Nuclear Power Plant, and we lead the international audit of this study.

We were reviewers of articles in prestigious international journals. We participated in reviews and audits of various important projects and in projects to assess the seismic resistance of existing buildings. We are actively involved in the development and implementation of standards in design practice, in particular in the preparation of the new generation of Eurocodes. At the invitation of various media companies, we pass on our services and experience to the public.

SIGNIFICANT ACHIEVEMENTS

Tatjana Isaković was selected as an Extraordinary Member of the Slovenian Chamber of Engineers.

Matjaž Dolšek received the Golden Plaque of the University of Ljubljana.

KATEDRA ZA MASIVNE IN LESENE KONSTRUKCIJE CHAIR OF CONCRETE AND MASONRY STRUCTURES

KADER PERSONNEL

PREDSTOJNIK HEAD
doc. dr. **Jože Lopatič**

NAMESTNIK PREDSTOJNIKA DEPUTY HEAD
izr. prof. dr. Sebastjan Bratina

PEDAGOGA TEACHERS
doc. dr. Drago Saje, asist. dr. Jerneja Kolšek

SODELAVEC ASSOCIATE
Igor Valjavec (do julija 2022 until July 2022)

Katedra za gradbeno informatiko (KGI) se osredotoča na razvoj, posredovanje in uporabo naprednih informacijskih in komunikacijskih rešitev za izboljšanje informacijskih in materialnih procesov v gradbeništvu. Usmerjamo se na tista področja rabe informacijske in komunikacijske tehnologije (IKT) v gradbeništvu, ki odločilno prispevajo k digitalni transformaciji gradbene industrije.

PEDAGOŠKA DEJAVNOST

V okviru predmetov, ki jih pedagoško pokriva Katedra za masivne in lesene konstrukcije, se študentje seznanijo z obnašanjem nearmiranih, armiranih in prednapetih betonskih konstrukcij ter sovprežnih, zidanih in lesenih konstrukcij, spoznajo postopke za njihovo dimenzioniranje; ko obvladajo te osnove, se naučijo še smotrnega snovanja, modeliranja, analize ter konstruiranja elementov nosilnih sistemov konstrukcij.

Slušatelji v različnih študijskih programih lahko sodelujejo pri naslednjih predmetih: Betonske konstrukcije, Masivne konstrukcije, Lesene konstrukcije, Projektiranje gradbenih konstrukcij, Osnove lesenih in jeklenih konstrukcij, Osnove betonskih in zidanih konstrukcij, Masivne stavbe, Masivni mostovi, Projektiranje nosilnih konstrukcij stavb, Izbrana poglavja iz masivnih konstrukcij, Inženirske lesene konstrukcije in Seminar iz projektiranja masivnih konstrukcij. Del predmetov je iz nabora izbirnih posameznih predmetov, nekaj jih je možno izbrati v okviru izbire modulov, del predmetov pa je za posamezne študijske programe obvezen. Praviloma se predmeti izvajajo v obliki predavanj, ki jih dopolnjujejo laboratorijske in seminarske vaje ali seminarji z obraavnavo praktičnih primerov. Izjema pri tem je predmet Seminar iz projektiranja masivnih konstrukcij, pri katerem se študentje učijo snovanja in projektiranja masivnih stavb in mostov, kjer delo poteka v obliki seminarja in vaj. Strokovne ekskurzije dopolnjujejo učni proces. V okviru pedagoškega procesa obiskujemo aktualna gradbišča, obrate za proizvodnjo surovin betonskih mešanic, obrate za izdelavo betonskih ali lesenih prefabriciranih proizvodov ter obrate za izdelavo elementov montažnih betonskih ali lesenih objektov.

RAZISKOVALNA IN STROKOVNA DEJAVNOST

Raziskave mehanskih in reoloških lastnosti betona glede na sestavo betonske mešanice: Cilj trenutnih preiskav je razvoj primernih receptur betonov visoke trdnosti, izdelanih iz domačih materialov. Ukvarjamo se tudi z razvojem in raziskovanjem lastnosti mikroarmiranih betonov. Razvijamo nove vrste betonov, ki so ali trajnejši, kjer je to ključna zahteva, in ali trdnejši pri zahtevi po velikih tlačnih nosilnostih. Dobro poznavanje mehanskih in reoloških lastnosti betona je podlaga za nelinearno analizo armiranih in prednapetih betonskih konstrukcij.

Izdelava teoretičnih podlag in programske opreme za realistično nelinearno analizo obnašanja armiranih in prednapetih betonskih konstrukcij, sovprežnih in lesenih konstrukcij: Pri tem obravnavamo odziv konstrukcij na zunanje vplive pri običajnih projektnih stanjih in povišani temperaturi v razmerah požara. V analizi zajamemo

The Chair of Concrete, Masonry and Timber Structures (KMLK) is active in research, professional and educational work covering the wider area of building structures. Our main focus is on reinforced and prestressed concrete structures, composite, masonry and timber structures. Structures made of all these materials share the same material and geometric nonlinearity as well as rheological properties that affect their behaviour considerably. Reinforced and prestressed concretes represent »composite material«, which is extremely non-homogeneous and consists of very diversified materials, each of them behaving extremely nonlinearly.

EDUCATIONAL ACTIVITY

With the courses taught by the members of the Chair, we transfer to our students the knowledge about the behaviour of non-reinforced, reinforced and prestressed concrete structures as well as composite, masonry and timber structures. Students learn about the procedures for their design, and once they master these bases, they also learn about proper conceptual design, modelling, analysis and design of load-carrying structural elements.

In different study programmes, students are offered the following courses: Concrete Structures, Concrete and Masonry Structures, Timber Structures, Design of Building Structures, Introduction to Timber and Steel Structures, Introduction to Concrete and Masonry Structures, Concrete Buildings, Concrete Bridges, Design of Load-Bearing Structures of Buildings, Selected Chapters from Concrete and Masonry Structures, Engineering Timber Structures and Seminar from the Design of Concrete and Masonry Structures. Some courses are offered also as elective content, some of them are available within modules, while others are obligatory for specific study programmes. As a rule, the courses are provided in the form of lectures, complemented by laboratory and seminar tutorials or seminars dealing with practical cases. An exception is the course Seminar from the Design of Concrete and Masonry Structures, where students learn conceptual design and design of concrete buildings and bridges in the form of seminars and tutorials. The teaching process is complemented by expert field trips. We visit current building sites, production plants for concrete mix ingredients, production plants for prefabricated concrete and timber products and production plants for prefabricated elements used in concrete or timber structures.

RESEARCH AND PROFESSIONAL ACTIVITES

Research of mechanical and rheological properties of concrete related to the concrete mix composition: The aim of the latest investigations is the development of adequate mixing proportions for high-strength concretes made of local materials. We also develop and investigate the properties of micro-reinforced concretes. We are developing new types of concrete that are more durable, when this is a key demand, and or stiffer when high compressive strength is required. Good knowledge of mechanical and rheological concrete properties is an important basis for the elaboration of nonlinear analysis of reinforced and prestressed concrete structures.

Elaboration of theoretic bases and software for realistic nonlinear analysis of the behaviour of reinforced and prestressed concrete structures, composite and timber

materialno in geometrijsko nelinearnost, reologijo materialov, vpliv postopnosti gradnje, vpliv lokalizacije deformacij in materialno mehčanje. Na področju požarnih analiz razvijamo poleg naprednejših modelov odziva konstrukcij tudi naprednejše modele razvoja (nastanka in širjenja) požarov. Razvita lastna programska oprema omogoča reševanje najzahtevnejših konkretnih problemov iz prakse. Razviti modeli in oprema prav tako omogočajo tudi kritično presojanje stopnje varnosti in ekonomske učinkovitosti konstrukcij, projektiranih po poenostavljenih postopkih, kot jih predlagajo standardi in smernice za projektiranje, ki se uporabljajo v inženirski praksi.

Izvajamo laboratorijske preiskave obnašanja nosilnih elementov iz armiranega in prednapetega betona ter sestavljenih lesenih elementov z vključenimi kovinskimi ali nekovinskimi ojačitvami. Že kar nekaj časa se posvečamo tudi preiskavam obnašanja betonskih elementov, ojačanih z nekovinsko armaturo, predvsem obnašanju stika med bazaltno armaturo in betonom. Opravljamo laboratorijske in terenske preiskave odziva konstrukcijskih elementov na mehanske obtežbe ali vplive okolja, vključno z rednimi obremenilnimi preizkušnjami različnih premostitvenih objektov, kot so mostovi, viadukti, nadvozi in podvozi, pred predajo objektov v uporabo. Sodelovanje s podjetji iz gospodarstva pri razvoju inovativnih armiranih in prednapetih betonskih, sovprežnih in lesenih konstrukcijskih elementov in sistemov je stalnica našega delovanja.

POMEMBNI DOSEŽKI

Člani katedre so v letih 2021 do 2023 kot avtorji ali soavtorji objavili več člankov v uglednih mednarodnih in domačih revijah. V letu 2022 so člani katedre prevzeli tudi večji del bremena pri uspešni organizaciji 43. Zborovanja gradbenih konstruktorjev Slovenije z izjemno udeležbo. Zborovanje gradbenih konstruktorjev je eno najstarejših in najpomembnejših tovrstnih srečanj pri nas.

structures: Within this area we investigate the structural response to external influences in cases of normal design conditions and in cases of elevated temperatures during fire. The analysis includes material and geometric nonlinearity, rheology of materials, the influence of gradual construction, the influence of localized deformations and material softening. In the field of fire analysis, in addition to advanced models for the response of structures, we also develop advanced models of fire development (origin and spread). The software we have developed makes it possible to solve the most challenging real-world problems. The developed models and equipment also enable a critical assessment of the safety level and economic efficiency of structures designed according to simplified procedures as proposed by the standards and design guidelines used in engineering practice.

We perform laboratory tests on the behaviour of load-bearing elements made of reinforced and prestressed concrete as well as composite timber elements with incorporated metallic or non-metallic reinforcements. For some time now, we have also been focusing on the study of the behaviour of concrete elements with non-metallic reinforcement, in particular the behaviour of the contact between basalt reinforcement and concrete. We perform laboratory and field investigations of the response of structural elements to mechanical loads or environmental influences, including regular stress tests of various bridging structures, such as bridges, viaducts, overpasses and underpasses, before the facilities are handed over for use. Cooperation with business companies in the development of innovative reinforced and prestressed concrete, composite and timber structural elements and systems is a constant in our work.

SIGNIFICANT ACHIEVEMENTS

In the years 2021 to 2023, the members of the Chair published several articles in reputable international and national journals. In 2022, the members of the Chair also took on most of the burden in successfully organizing the 43rd Assembly of Structural Engineers of Slovenia with exceptional participation. The Assembly of Structural Engineers is one of the oldest and most important associations of its kind in Slovenia.

KATEDRA ZA MATEMATIKO IN FIZIKO CHAIR OF MATHEMATICS AND PHYSICS

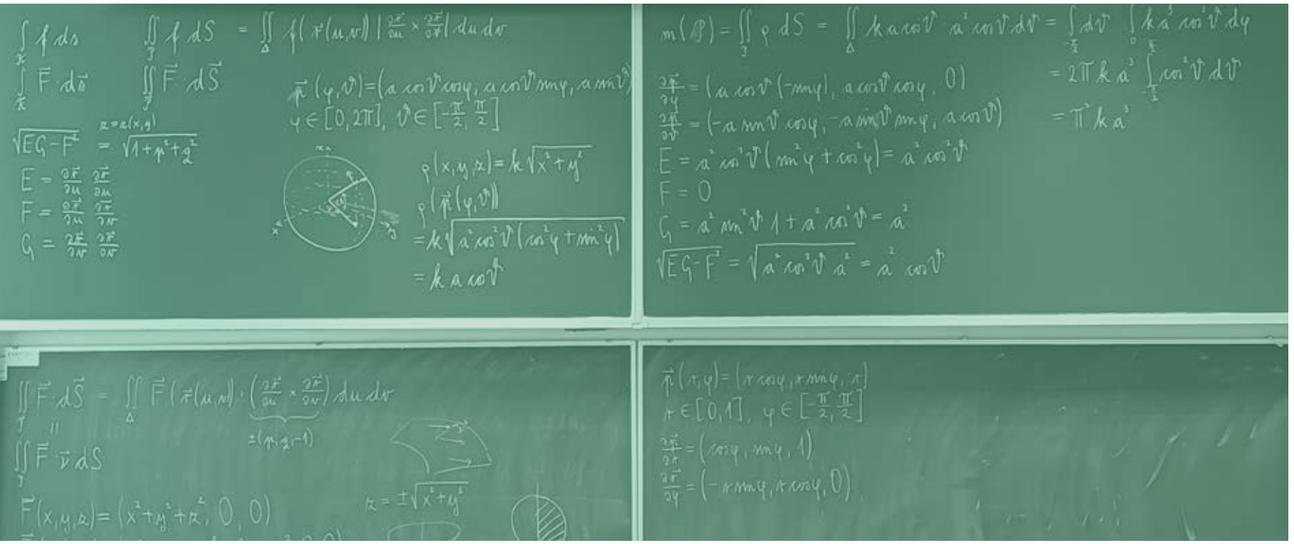
KADER PERSONNEL

PREDSTOJNIK HEAD
prof. dr. **Gašper Jaklič**

NAMESTNIK PREDSTOJNIKA DEPUTY HEAD
doc. dr. Jure Kokalj

PEDAGOGI TEACHERS
prof. dr. Zvonko Jagličić, asist. dr. Martin Jesenko, izr. prof. dr. Marjeta Kramar Fijavž, izr. prof. dr. Ganna Kudryavtseva (do marca 2023 until March 2023), asist. dr. Marjeta Škapin Rugelj, doc. dr. Nik Stopar (od februarja 2023 from February 2023)

SODELAVKA ASSOCIATE
mag. Mojca Premuš



Za razumevanje naravnih pojavov je nujno poznavanje matematike in fizike, zato sta ti dve področji ključni za inženirski študij. Predstavljata jezik za formulacijo inženirskih problemov ter hkrati zagotavljata osnovno orodje za njihovo reševanje. Pomembni sta tudi za raziskovalno delo na katerem koli področju tehnike.

PEDAGOŠKA DEJAVNOST

Člani Katedre za matematiko in fiziko (KMF) pokrivamo potrebe strokovnih predmetov po znanju iz matematike in statistike ter splošne fizike na študiju gradbeništva, geodezije in okoljskega inženirstva ter gradbene fizike na študijih gradbeništva in stavbarstva. Sodelujemo na vseh treh stopnjah študija. Predmeti na prvi stopnji potekajo klasično s predavanji in seminarskimi vajami v manjših skupinah.

Pri splošni fiziki je poudarek na demonstracijskih poskusih. Na drugi stopnji delo dopolnjujejo tudi projektne in seminarske naloge, po možnosti z uporabo računalniških orodij. Študij na tretji stopnji je bolj individualno zasnovan, prilagojen željam in potrebam študentov.

Sodelujemo tudi kot mentorji oziroma somentorji pri zaključnih delih. V zadnjih letih smo sodelovali pri pedagoškem delu na Fakulteti za matematiko in fiziko ter na Fakulteti za strojništvo.

RAZISKOVALNA IN STROKOVNA DEJAVNOST

Člani KMF smo po izobrazbi in habilitacijah učitelji, asistenti in strokovni sodelavci s področij matematike in fizike. Sodelujemo pri raziskovalnih projektih na UL FGG in na drugih fakultetah ljubljanske univerze ter inštitutih: Inštitutu za matematiko, fiziko in mehaniko (IMFM), Institutu Jožef Stefan (IJS) in Inštitutu Andrej Marušič.

Raziskovalno delujemo na različnih področjih, kot so numerična matematika, teorija operatorjev, algebra, statistika, linearna algebra in variacijski račun. V okviru numerične matematike se ukvarjamo s teorijo aproksimacije in z računalniško podprtim geometrijskim načrtovanjem (CAGD). Študiramo probleme interpolacije in aproksimacije s polinomskimi in racionalnimi krivuljami ter zlepki. Z operatorskimi polgrupami obravnavamo rešitve sistemov parcialnih diferencialnih enačb in jih uporabljamo za modeliranje različnih procesov na omrežjih ter v teoriji upravljanja. Z metodami iz variacijskega računa modeliramo in analiziramo probleme iz elastičnosti, plastičnosti in viskoplastičnosti. Na področju statistike se ukvarjamo s kopulami in kvazi-kopulami, ki se uporabljajo za modeliranje odvisnosti med slučajnimi spremenljivkami. Trenutno vodimo COST akcijo Matematični modeli za medsebojno dinamiko v omrežjih (2019–2024). Sodelujemo tudi z drugimi raziskovalnimi skupinami na fakulteti, predvsem pri razvoju in implementaciji različnih statističnih in numeričnih metod. Kot primer omenimo sodelovanje pri modeliranju prometnih tokov ali pri upravljanju vodovodnih sistemov.

Prav tako sodelujemo pri neporušnih preiskavah in raziskavah s področja gradbene fizike. Vodili smo projekt ARRS Senzorske tehnologije pri kontroli posegov v objekte kulturne dediščine.

Knowledge of mathematics and physics is indispensable for understanding natural phenomena. For this reason, these two areas are of key importance for the engineering studies. They are the language for the formulation of engineering problems and at the same time provide the basic tool for their solving. They are also important for the research work in any field of engineering.

EDUCATIONAL ACTIVITY

Members of the Chair of Mathematics and Physics (KMF) provide for the basic knowledge from mathematics, statistics and general physics in the study programmes of civil engineering, geodesy, environmental engineering, as well as building physics at the studies of civil engineering and buildings. We are engaged in the teaching process of all three cycles of studies. The courses in the first and second cycles are taught in the classical manner by lectures and seminar tutorials in small groups.
In general physics, the emphasis is on demonstration experiments. At the second-cycle studies the teaching is supplemented by project and seminar tasks by using computer tools. The third-cycle study is designed with a higher level of individual work and is adapted to the students' wishes and needs.
We also cooperate as supervisors or co-supervisors in final theses. In recent years, we have participated in educational work at the Faculty of Mathematics and Physics and at the Faculty of Mechanical Engineering.

SCIENTIFIC AND RESEARCH ACTIVITIES

The Chair members are teachers, assistants and professional associates with habilitation in mathematics and physics.
We cooperate in research projects at the Faculty of Civil and Geodetic Engineering as well as at other faculties of the University of Ljubljana and with institutes: Institute of Mathematics, Physics and Mechanics (IMFM), Jožef Stefan Institute (IJS), Institute Andrej Marušič.

We are active in research of numerical mathematics, operator theory, algebra, linear algebra and calculus of variations. Within numerical mathematics, we are engaged in the approximation theory and computer-aided geometric design (CAGD). We study interpolation and approximation problems with polynomial and rational curves and splines. Using operator semi-groups we search for solutions of systems of partial differential equations and use them for modelling various processes in networks and in control theory. By employing methods from calculus of variations, we model and analyse problems from elasticity, plasticity and viscoplasticity theory. In the field of statistics, we deal with copulas and quasi-copulas, which are used to model dependencies between random variables. We chair the COST Action: Mathematical Models for Interacting Dynamics on Networks (2019–2024). We also collaborate with other research groups at our faculty, mainly in the development and implementation of various statistical and numerical methods. As an example, we cooperate in the modelling of traffic flows, in controlling water distribution networks or modelling functional regions.

We are involved in the field of non-destructive testing in civil engineering and building physics, too. We coordinated a

S sodelavci s Fakultete za elektrotehniko UL, Mednarodne podiplomske šole Jožefa Stefana, IJS in IMFM smo razvijali numerične metode in senzorje za spremljanje konstrukcijskih in nekonstrukcijskih posegov v objekte kulturne dediščine.

Člani katedre sodelujemo v strokovnih komisijah za tekmovanja srednješolcev in študentov v znanju matematike.

Eksperimentalno raziskujemo magnetne lastnosti številnih novih materialov za uporabo v medicini, zmogljivejših baterijah in informacijski tehnologiji, npr. molekularne magnete za shranjevanje podatkov. Preko numeričnih simulacij večdelčnih kvantnih sistemov raziskujemo elektronski transport v sistemih z močno koreliranimi elektroni, med katere spadajo tudi visokotemperaturni superprevodniki.

Proučujemo nabojno in toplotno difuzijo in tudi termoelektrično sklopitev med njima ter njen vpliv na interpretacijo meritev v eksperimentih s hladnimi atomi.

POMEMBNI DOSEŽKI

Marjeta Kramar Fijavž je bila izvoljena za predsednico Znanstvenega sveta IMFM z mandatom 2023–2027. Postala je tudi članica stalnega odbora za ženske v matematiki pri Evropskem matematičnem društvu (EMS) z mandatom 2022–2025.

Člani katedre so izpeljali 15 projektov RSF (priprava učnega gradiva, video lekcij in kvizov za matematične in fizikalne predmete).

Sodelovali smo pri raziskavah magnetnih lastnosti spojine, ki se obnaša kakor spinska tekočina. Rezultate raziskav smo s kolegi z Instituta Jožef Stefan in tujine (Indija, Francija, Velika Britanija in ZDA) objavili v reviji Nature Materials.

national research project Sensor Technologies in Diagnostics and Monitoring of Cultural Heritage Buildings. In cooperation with researchers from Faculty of Electrical Engineering, Jožef Stefan International Postgraduate School, IJS, and IMFM, we developed experimental methods and sensors for monitoring structural and non-structural injections in cultural heritage buildings.

Members of the Chair take part in expert commissions for competitions for secondary school pupils and university students in mathematics.

We experimentally investigate the magnetic properties of many new materials for the use in medicine, more powerful batteries and information technology, e.g. molecular magnets for data storage. Through numerical simulations of multi-particle quantum systems, we investigate electron transport in systems with strongly correlated electrons, including high-temperature superconductors.

We study charge and thermal diffusion as well as thermoelectric coupling between them and their influence on the interpretation of measurements in experiments with cold atoms.

SIGNIFICANT ACHIEVEMENTS

Marjeta Kramar Fijavž was elected President of the Scientific Council of the IMFM with a term of office from 2023 to 2027. She also became a member of the Standing Committee for Women in Mathematics of the European Mathematical Society (EMS) with a term of office from 2022 to 2025. Members of the Chair have carried out 15 projects funded under the University of Ljubljana's Development Pillar (RSF) (preparation of teaching materials, video courses and quizzes for mathematics and physics).

We participated in research into the magnetic properties of a compound that behaves like a spin liquid. Together with colleagues from the Jožef Stefan Institute and from abroad (India, France, Great Britain and the USA), we published the results of our research in the journal Nature Materials.

KATEDRA ZA MEHANIKO CHAIR OF MECHANICS

KADER PERSONNEL

PREDSTOJNIK HEAD
prof. dr. **Dejan Zupan**

NAMESTNIK PREDSTOJNIKA DEPUTY HEAD
izr. prof. dr. Tomaž Hozjan

PEDAGOGI TEACHERS
doc. dr. Peter Češarek, viš. pred. dr. Rado Flajs, prof. dr. Igor Planinc, prof. dr. Goran Turk

RAZISKOVALCI RESEARCHERS
Sudhanva Kusuma Chandrashekhara, doc. dr. Bojan Čas, Barbara Fortuna, Doron Hekič, Žiga Krofl, doc. dr. Anita Ogrin, doc. dr. Robert Pečenko, Mitja Plos, Tamara Šuligoj

SODELAVCI ASSOCIATES
doc. dr. Sabina Huč, prof. dr. Simon Schnabl, doc. dr. Gregor Trtnik, Gregor Udovč, znan. sod. dr. Eva Zupan

Katedra za mehaniko (KM) je ena najstarejših pedagoško raziskovalnih enot FGG, saj pod različnimi imeni deluje vse od ustanovitve Tehniške fakultete leta 1919.

PEDAGOŠKA DEJAVNOST

Katedra skrbi za pouk temeljnih predmetov s področja mehanike konstrukcij, numeričnih metod v mehaniki, statističnih metod in zanesljivosti konstrukcij na vseh dodiplomskih in podiplomskih študijskih programih FGG ter za predmete s področja požarne varnosti konstrukcij. V študijskih letih 2021/22 in 2022/23 smo organizirali tekmovanji iz znanja za srednješolce in objavili poročila z

Chair of Mechanics (KM) is one of the Faculty's oldest educational and research units; under different names, it has been active from the very foundation of the Technical Faculty in 1919.

EDUCATIONAL ACTIVITY

Members of the chair have wide experiences in teaching various courses in the field of structural mechanics, numerical methods in mechanics, fire safety, statistics and reliability of structures for undergraduate and postgraduate students. In academic years 2021/22 and 2022/23 they organized knowledge competitions among secondary school pupils and published reports with solutions to the competition tasks. During this time, members of the chair supervised 27 diploma theses, 20 master theses and one

rešitvami tekmovalnih nalog. V tem obdobju smo bili člani skupine mentorji ali somentorji pri 27 diplomskih delih, pri 20 magistrskih delih in pri eni doktorski disertaciji. V pedagoško delo vključujemo sodobne metode poučevanja, kot so odprtokodni avtorski programi in modeli konstrukcij in konstrukcijskih segmentov, natisnjeni s 3D tiskalnikom.

RAZISKOVALNA DEJAVNOST

Člani KM se ukvarjamo s preučevanjem zahtevnih problemov s področja konstrukcij. Razvijamo sodobne računske metode za analizo napetostnega in deformacijskega stanja vseh vrst inženirskih konstrukcij. Pri našem delu se tesno prepletata in dopolnjujeta teoretično in eksperimentalno delo. Področja dela naše katedre so široka, vendar medsebojno tesno povezana. Zanimajo nas problemi gibanja sistemov teles, nelinearne statične ion dinamične analize prostorskih linijskih konstrukcij, stabilnostni problemi vseh vrst kompozitnih konstrukcij, ki so sestavljene z delno povezanimi sloji, problemi, povezani z zahtevnimi kemijskimi, hidrološkimi, toplotnimi in mehanskimi procesi v poroznih materialih v normalnih pogojih in pri povišanih temperaturah med požarom, modeliranje nelinearnega obnašanja vseh vrst materialov s poudarkom na mehčanju in eksplozijskem luščenju betona ter uporaba statističnih metod v teoriji konstrukcij. Za analizo obnašanja konstrukcij razvijamo verificirane in validirane računske metode in pripadajoče računalniške programe. Ti so namenjeni načrtovanju najzahtevnejših inženirskih konstrukcij, kot je na primer načrtovanje nosilne konstrukcije predora med najintenzivnejšim požarom. Velik del naših raziskav predstavlja tudi eksperimentalno delo. Veliko pozornosti posvečamo implementaciji sodobnih neporušnih metod za določanje materialnih lastnosti armiranobetonskih konstrukcij med požarom in po požaru. Z ultrazvočnimi metodami raziskujemo lastnosti svežih in strjenih betonov, s porušnimi in neporušnimi eksperimentalnimi metodami pa razvijamo avtomatiziran postopek za razvrščanje iglavcev in listavcev.

STROKOVNA DEJAVNOST

Člani Katedre za mehaniko aktivno sodelujejo z gospodarstvom v obliki tehničnega svetovanja, recenziranj in revidiranj načrtov s področja gradbenih konstrukcij, sodnih ter izvedenskih mnenj ter ekspertiz. Člani katedre so tako v obdobju 2021–23 vodili izdelavo oziroma sodelovali pri revizijah in izvedeniških mnenjih številnih projektov, med njimi tudi dveh viaduktov in mostu za DARS d.d., šestih premostitvenih objektov za Direkcijo za infrastrukturo RS, turistične brvi Stari grad–Miklavški hrib za Občino Celje.

POMEMBEN DOSEŽEK

V obdobju 2021–2023 smo člani katedre objavili številne izvirne znanstvene članke, med njimi 16 člankov v revijah, ki po kakovosti spadajo v zgornjo polovico baze SCI. Izpostavimo članek »Thickness of zero-strength layer in timber beam exposed to fuel-controlled parametric fires« avtorjev Huč, Hozjan in Pečenko, ki je bil objavljen v ugledni mednarodni reviji Wood Science and Technology in spada v kategorijo izjemnih dosežkov (A'').

doctoral dissertation. Our educational work incorporates modern teaching methods such as open-source authoring software and 3D-printed models of structures and building sections.

RESEARCH ACTIVITY

Members of Chair deal with the study of challenging problems in the field of structural engineering. We develop modern calculation methods for analysing the stress and strain state of all types of engineering structures. In our work, theoretical and experimental work are closely intertwined and complement each other. The areas of work of our Chair are wide-ranging but closely interlinked. We are interested in problems of motion of body systems, nonlinear static and dynamic analysis of spatial linear structures, stability problems of all types of composite structures consisting of partially connected layers, problems related to challenging chemical, hydrological, thermal and mechanical processes in porous materials under normal conditions and at elevated temperatures during fire, modelling of nonlinear behaviour of all types of materials, with emphasis on softening and explosive spalling of concrete, and the application of statistical methods in structural theory. To analyse the behaviour of structures, we develop tested and validated calculation methods and corresponding computer software. They are intended for the design of the most demanding engineering structures, such as the design of the supporting structure of a tunnel in the event of a major fire. A large part of our research is also experimental work. We pay a lot of attention to the use of modern non-destructive testing methods to determine the material properties of reinforced concrete structures during and after a fire. We use ultrasound methods to investigate the properties of fresh and hardened concrete, and we develop an automated procedure for classifying coniferous and deciduous trees using destructive and non-destructive test methods.

PROFESSIONAL ACTIVITIES

Members of the Chair of Mechanics work actively with the industry in the form of technical advice, reviews and revisions of designs in the field of building structures, judicial and expert opinions and expert reports. In the period 2021–23, members of the Chair were in charge of the construction of numerous projects or participated in inspections and expert opinions, including two viaducts and a bridge for DARS d.d., several bridging facilities for the Slovenian Infrastructure Agency, the Stari Grad-Miklavški Hrib tourist footbridge for the Municipality of Celje.

SIGNIFICANT ACHIEVEMENT

In the period 2021–2023 we published several original scientific papers, including 16 articles in indexed journals of the upper half of the SCI database. Among them the paper "Thickness of zero-strength layer in timber beam exposed to fuel-controlled parametric fires" by the authors Huč, Hozjan and Pečenko, which was published in a renowned international journal Wood Science and Technology and belongs to the category of exceptional achievements, is the most highly rated.

KATEDRA ZA METALNE KONSTRUKCIJE CHAIR OF METAL STRUCTURES

KADER PERSONNEL

PREDSTOJNIK HEAD
prof. dr. **Jože Korelc**

NAMESTNIK PREDSTOJNIKA DEPUTY HEAD
izr. prof. dr. Primož Može

PEDAGOGA TEACHERS
viš. pred. Leon Hladnik, doc. dr. Sara Piculin

SODELAVEC ASSOCIATE
Peter Kočman

Katedra za metalne konstrukcije (KMK) je vodilna slovenska pedagoška in raziskovalna enota s področja jeklenih in sovprežnih konstrukcij ter metod nelinearne analize konstrukcij. Predstojnik katedre prof. dr. Jože Korelc je nosilec pedagoškega in raziskovalnega dela na področju metod nelinearnega modeliranja konstrukcij. Nosilec pedagoškega in raziskovalnega dela na področju metalnih konstrukcij je izr. prof. dr. Primož Može. Katedra aktivno vključuje v svoje delo zunanjega sodelavca, viš. pred. Leona Hladnika, in s tem zagotavlja povezanost teorije s prakso. Pedagoško in raziskovalno delo katedre podpirata asistentka doc. dr. Sara Piculin ter mladi raziskovalec Peter Kočman.

PEDAGOŠKA DEJAVNOST

Katedra je nosilec vseh predmetov s področja jeklenih in sovprežnih konstrukcij na visokošolskih in univerzitetnih študijih UL FGG. Pedagogi s KMK se s študenti srečamo v višjih letnikih študija, kjer je snov, z izjemo osnovnih predmetov, podana preko projektnega dela. S tem ustvarimo individualen, sproščen odnos študent–pedagog, kar se izkaže za primeren pristop, saj je več naših študentov dobilo zaposlitev v priznanih mednarodnih projektantskih podjetjih, ki so specializirana za projektiranje jeklenih konstrukcij. Katedra je tudi nosilec predmetov s področja nelinearne numerične analize konstrukcij in trdnin na magistrskem in doktorskem študiju gradbeništva. V zadnjih letih se preko mednarodnih delavnic in seminarjev pedagoško vse bolj uveljavlja tudi na področju mednarodnega tehničnega izobraževanja, saj na katedri razviti pristop k razvoju numeričnih metod študentom omogoča, da se neposredno seznanijo tudi s kompleksnimi nelinearnimi modeli.

RAZISKOVALNA IN STROKOVNA DEJAVNOST

Področje jeklenih in sovprežnih konstrukcij: KMK je vodilna slovenska pedagoška in raziskovalna enota s področja jeklenih in sovprežnih konstrukcij. S svojim raziskovalnim delom je po eni strani močno vpeta v evropski raziskovalni prostor, po drugi strani pa s svojim pedagoškim, razvojnim in strokovnim delom pomembno vpliva na razvoj področja jeklenih in sovprežnih konstrukcij v Sloveniji. Raziskovalno delo na področju jeklenih konstrukcij je močno povezano s sodelovanjem v delovanju tehničnih odborov Evropske konvencije za jeklene konstrukcije (ECCS) in delovnih skupinah evropske organizacije za standardizacijo (CEN TC 250 SC3). Z industrijo KMK sodeluje pri razvoju novih izdelkov in nudi strokovno izobraževanje. KMK kot partner sodeluje tudi na evropskih projektih, ki so financirani pod okriljem Raziskovalne fundacije za premog in jeklo. Na strokovnem področju je KMK kot revident ali svetovalec prisoten pri projektiranju jeklenih objektov v Sloveniji (stavbe, mostovi, rezervoarji, stolpi ...) in tudi v mednarodnem prostoru.

Področje znanstvenega računstva: K povečani splošnosti in zanesljivosti novo razvitih numeričnih postopkov in računalniških programov je v zadnjem desetletju bistveno prispeval interdisciplinarni pristop, kjer se akumulirana znanja s področja računalništva, matematike in mehanike učinkovito združijo s poznavanjem tehnologije. Prof. dr. ing. Jože Korelc je s sodelavci v dveh desetletjih razvil inovativni pristop k avtomatizaciji numeričnega modeliranja temelječega na splošnih simbolno-numeričnih okoljih za tehnično računanje. Razviti programi (AceGen in AceFEM) pa so podprti s strani vodilnega svetovnega proizvajalca splošnih simbolno-numeričnih okolij za tehnično računanje Wolfram Research. Glavna področja dela so: razvoj končnih elementov za simulacije trdnin, kontaktnih problemov ter občutljivostne analize; analiza in optimizacija jeklenih konstrukcij; simulacije povezanih termo-hidro-mehanskih problemov; analiza stohastičnih problemov ter razvoj algoritmov za analizo na več skalah.

POMEMBNI DOSEŽKI

Prof. dr. Jože Korelc je prejel mednarodni nagradi: medaljo O. C. Zienkiewicza za razvoj mehanike na Poljskem in nagrado Computational Mechanics Award, ki jo podeljuje Central European Association of Computational Mechanics.

Poljsko združenja za numerično mehaniko podeljuje medaljo O. C. Zienkiewicza tujim znanstvenikom s posebnimi zaslugami za razvoj mehanike na Poljskem. Medalja je poimenovana po mednarodnem znanstveniku poljskega rodu prof. Olgierdu C. Zienkiewiczu (1921–2009), ki velja za enega od začetnikov razvoja metode končnih elementov. Prof. Korelc je medaljo prejel na kongresu Poljskega združenja za numerično mehaniko v Świnoujściu, kjer je imel ob tej priložnosti tudi uvodno plenarno predavanje.

Central European Association of Computational Mechanics (CEACM) je mednarodna organizacija, ki združuje nacionalne organizacije s področja numerične mehanike sedmih srednjeevropskih držav: Avstrije, Bosne in Hercegovine, Češke, Hrvaške, Madžarske, Slovaške in Slovenije. Združenje podeljuje Computational Mechanics Award posameznikom, ki so s svojim raziskovalnim delom na področju numerične mehanike prispevali k reševanju ne samo tradicionalnih problemov mehanike, ampak tudi problemov s širšega področja znanosti. Prof. Korelc je mednarodni nagradi prejel za razvoj simbolnih metod v mehaniki in programskih sistemov AceGen in AceFEM.

Chair for Metal Structures (KMK) is the leading Slovenian educational and research unit engaged in steel and composite structures and non-linear analysis of structures. The Chair is managed by Prof. Dr. Jože Korelc, in charge of education and research in the area of nonlinear modelling of structures. In the area of metal structures, Assoc. Prof. Dr. Primož Može is responsible for the Chair's educational and research work. Actively involved in the Chair's research and education is external partner, Sen. Lect. Leon Hladnik, who makes sure the Chair connects theory to practice. The teaching and research work of the department is supported by Assist. Prof. Dr. Sara Piculin and young researcher Peter Kočman.

EDUCATIONAL ACTIVITY

The Chair is in charge of all the courses dealing with steel and composite structures in the higher education professional as well as academic studies at the faculty. As teachers, we meet students in higher years of their studies, where the teaching material is presented through project work, with the exception of basic courses. In this way, we offer a personal, relaxed relationship between the student and the teacher, which proves to be the appropriate approach, because a growing number of our students find jobs in renowned international design companies specialised in the design of steel structures. The Chair is also responsible for the courses from the area of nonlinear numerical analysis of structures and solids at the master and doctoral study of Civil Engineering. In the last few years, we have also been engaged in the field of international technical education in the form of international workshops and seminars, because the approach to the development of numerical methods that we developed enables students to learn also about complex nonlinear models.

RESEARCH AND PROFESSIONAL ACTIVITES

The area of steel and composite structures: Chair for Metal Structures is the leading Slovenian educational and research unit engaged in steel and composite structures. With our research work we are on the one hand strongly connected to the European research area, while on the other we importantly affect with our educational, research and professional activity the development of steel and composite structures in Slovenia. The research activity in the area of steel structures is closely linked to the participation of the Chair members in technical committees of the European Convention for Constructional Steelwork (ECCS) and in workgroups of the European Standardisation Organisation (CEN TC 250 SC3). The Chair cooperates with the industry in the development of new products and offers professional education. As partner the Chair cooperates also in European projects financed by the Research Foundation for Coal and Steel. In the professional area, the Chair members work as reviewers and consultants for the design of steel structures in Slovenia (buildings, bridges, reservoirs, towers, etc.) as well as internationally.

The area of scientific computing: Owing to the interdisciplinary approach in scientific computing, with the accumulated knowledge from computer science, mathematics and mechanics effectively combined with the knowledge of technology, the newly developed numerical procedures and the resulting software programs have gained on generality, reliability and interdisciplinarity. In the last two decades Prof. Dr. Ing. Jože Korelc and his co-workers have developed an innovative approach to automatic generation of numerical models based on general symbolic-numeric computational environments. The developed software programs (AceGen and AceFEM) are supported by the world's leading manufacturer of symbolic-numeric environments for technical computation, Wolfram Research. The main areas of work are: development of finite elements for the simulation of solids, contact problems and sensitivity analysis; analysis and optimisation of steel structures; simulations of coupled thermal-hydro-mechanical problems; analysis of stochastic problems and development of algorithms for multi-scale analysis.

SIGNIFICANT ACHIEVEMENTS

Prof. Dr. Jože Korelc received the international O. C. Zienkiewicz Medal for the development of mechanics in Poland and the Computational Mechanics Award, awarded by the Central European Association of Computational Mechanics.

The Polish Association of Computational Mechanics awards the O. C. Zienkiewicz Medal to foreign scientists who have made outstanding contributions to the development of mechanics in Poland. The medal is named after the international scientist of Polish descent, Prof. Olgierd C. Zienkiewicz (1921–2009), who is considered one of the pioneers in the development of the finite element method. Prof. Korelc received the medal at the Congress of the Polish Association of Computational Mechanics in Świnoujście, where he also gave an introductory plenary lecture on this occasion.

Central European Association of Computational Mechanics (CEACM) is an international organization that unites national organizations in the field of computational mechanics of seven Central European countries: Austria, Bosnia and Herzegovina, Czech Republic, Croatia, Hungary, Slovakia and Slovenia. The association presents the Computational Mechanics Award to individuals whose research work in the field of computational mechanics has contributed to solving not only traditional problems in mechanics, but also problems from the broader fields of science. Prof. Korelc received international awards for the development of symbolic methods in mechanics and the AceGen and AceFEM software systems.

KATEDRA ZA OPERATIVNO GRADBENIŠTVO CHAIR OF CONSTRUCTION MANAGEMENT

KADER PERSONNEL

PREDSTOJNIK HEAD
doc. dr. **Aleksander Srdić** (2021/22), doc. dr. **Robert Klinc** (2022/23)

NAMESTNICA PREDSTOJNIKA DEPUTY HEAD
prof. dr. Jana Šelih

SODELAVEC ASSOCIATE
viš. pred. dr. Matej Kušar

Gradbeništvo je zaradi fizične narave dela ter izdelkov, ki imajo velik vpliv v prostoru, edinstvena panoga z izrazitim vplivom na vsakdanje življenje ljudi. V zadnjem času se industrija grajenega okolja sooča s prehodom od fizičnih poslovnih modelov k informacijskim in digitalnim izdelkom, podatkom ter intelektualnim poslovnim modelom. Vedno bolj pogosta je uporaba informacijskega modeliranja gradenj (BIM), kamor nas usmerja tudi aktualna gradbena zakonodaja. Vendar je digitalna le tehnološka plast nad tem, kar v gradbeni industriji zagotavljamo že stoletja, spreminja se le tehnologija za zagotavljanje teh funkcij.

V skladu s spremembami v družbi in sami gradbeni industriji smo se tudi na Katedri za operativno gradbeništvo še bolj usmerili v učinkovito rabo orodij, podprtih z IKT. Osredotočamo se na uporabo teh orodij za izvajanje vseh smiselno povezanih in usklajenih aktivnosti v gradbenih projektih, ki vodijo k racionalni, pravočasni in kakovostni izvedbi del. Pri tem se trudimo obdržati neodvisen in pragmatičen pristop.

Katedra za operativno gradbeništvo (KOG) je v obdobju med študijskima letoma 2021/22 ter 2022/23 doživela precejšnje kadrovske spremembe. Katedri se je pridružil dr. Robert Klinc, ki je s študijskim letom 2022/23 prevzel tudi mesto predstojnika katedre. Namestnica predstojnika, prof. dr. Jana Šelih, se je v študijskem letu 2022/23 upokojila. Del pedagoških obveznosti sta prevzela dr. Darja Šemrov ter dr. Bojan Čas.

PEDAGOŠKA DEJAVNOST

Sodelavci KOG poučujejo predmete, ki študentom na I. in II. stopnji študija gradbeništva ter vodarstva in okoljskega gradbeništva omogočajo, da pridobijo temeljna in poglobljena znanja o različnih vidikih operativnega gradbeništva ter gradbeništva v splošnem.

Na I. stopnji študija študenti osvojijo osnove organizacije in poslovanja gradbenega podjetja, dela na gradbišču, zagotavljanja kakovosti, planiranja in vodenja projektov ter tehnologije. Našteta znanja spoznajo v okviru predmetov Organizacija gradbenih del in poslovanje, Tehnologija (programa Gradbeništvo in Okoljsko gradbeništvo), Organizacija in vodenje gradbenih del, Zagotavljanje in kontrola kakovosti, Planiranje in vodenje projektov, Tehnološki procesi ter Osnove gradbene ekonomike (program Operativno gradbeništvo).

Na II. stopnji študija študentje nadgradijo teoretično in praktično znanje o operativnem planiranju in spremljanju projektov (predmet Operativno planiranje in spremljanje projektov), upravljanju organizacij, organizacijski pripravi del in vodenju projektov (predmet Vodenje projektov) ter vseh vidikih zagotavljanja in kontrole kakovosti (predmet Zagotavljanje in kontrola kakovosti).

Študente redno povezujemo tudi s prakso in z njimi redno obiskujemo gradbišča. V obravnavanem obdobju so študenti obiskali gradbišča Spektra in Tobačna mesto v Ljubljani, predora Karavanke, HE Brežice ter druga. Ob tem so sodelavci katedre kot mentorji ali somentorji v obravnavanem obdobju sodelovali pri več kot 20 zaključnih (diplomskih in magistrskih) delih študentov UL FGG.

Due to the physical nature of the work and the products that have a major impact on space, civil engineering is a unique industry that has a significant impact on people's daily lives. Recently, the built environment industry has been facing a transition from physical business models to information and digital products, data and intellectual business models. The use of Building Information Modelling (BIM) is becoming more and more common, which is also indicated by current building legislation. However, digitalization is just a technological layer on top of what we have been providing in the construction industry for centuries, only the technology to provide these functions is changing.

In line with the changes in society and in the construction industry itself, we at the Chair of Construction Management are focused even more strongly on the effective use of ICT-supported tools. We focus on the use of these tools for the implementation of all meaningfully interconnected and coordinated activities in construction projects, leading to a rational, timely and high-quality execution of the work. We try to maintain an independent and pragmatic approach.

There were significant personnel changes at the Chair of Construction Management (KOG) in the period between the academic years 2021/22 and 2022/23. Dr. Robert Klinc joined the Chair and assumed the position of Head of Chair in the academic year 2022/23. The Deputy Head, Prof. Dr. Jana Šelih, retired with effect from the academic year 2022/23. Part of the educational responsibilities were taken over by Dr. Darja Šemrov and Dr. Bojan Čas.

EDUCATIONAL ACTIVITY

Members of the Chair teach courses that enable first- and second-cycle students of Civil Engineering and Water Science and Environmental Engineering to acquire basic and in-depth knowledge of various aspects of construction management and civil engineering in general.

In the first-cycle study, students master the basics of the organization and operation of a construction company, work on a construction site, quality assurance, project planning and control as well as technology. This knowledge is acquired within courses Organization and Management of Construction Works, Technology (programmes Civil Engineering and Environmental Engineering), Organisation and Management of Construction Works, Quality Assurance and Quality Control, Project Planning and Management, Technological Processes and Fundamentals of Economics in Civil Engineering (programme Construction Management).

In the second-cycle studies, students upgrade their theoretical and practical knowledge in the planning and monitoring of projects (course Operative Planning and Monitoring of Projects), in the management of organizations, in organizational work preparation and in project management (subject Project Management) as well as in all aspects of quality assurance and quality control (subject Quality Assurance and Quality Control).

We also regularly bring students together with the industry and visit construction sites with them on a regular basis. During the reporting period, our students visited the Spektra and Tobačna mesto construction sites in Ljubljana, the

Katedra sodeluje tudi pri izvedbi mednarodnega magistrskega študijskega programa BIM A+, ki se osredotoča na informacijsko modeliranje v gradbeništvu (BIM).

ZNANSTVENA IN RAZISKOVALNA DEJAVNOST

Raziskovalno in strokovno delo sodelavcev KOG se osredotoča na učinkovito vodenje gradbenih projektov. Pri tem raziskujemo in razvijamo metode in tehnike, ki omogočajo, da se gradbeni projekti izvajajo brez nepotrebnih zastojev in odstopanja od načrtov. Prav tako sodelujemo tudi pri reševanju nesoglasij med deležniki gradbenih projektov in pri izbiri ustreznih metod naročanja. Pri delu zagovarjamo celovit pristop k obravnavi grajenega okolja, vključno s fazo uporabe in vzdrževanja gradbenih objektov.

Posebno pozornost namenjamo vzdrževanju in prenovi cestne infrastrukture, pri čemer uporabljamo večkriterijske metode odločanja in optimizacijske tehnike.

Aktivno se vključujemo v raziskovalno delo v okviru programske skupine E-Gradbeništvo, v okviru katere smo v obravnavanem obdobju izvajali znanstvena in raziskovalna dela s področja kibernetske varnosti ter informacijskega modeliranja gradenj. Digitalizacija gradbeništva namreč povečuje tveganja informacijske varnosti in zasebnosti v vseh fazah gradnje, še posebej pa v informacijsko intenzivnih fazah, kot so projektiranje, obratovanje ter vzdrževanje stavb in inženirskih gradenj. V zadnjem obdobju smo pričeli z raziskavami na področju umetne inteligence ter z uporabo teh metod pri spremljanju projektov.

S prof. dr. Žigo Turkom, vodjo programske skupine E-Gradbeništvo, sodelujemo tudi pri bilateralnem projektu Slovenija–Kitajska, v okviru katerega vpeljujemo in definiramo raziskovalni okvir Gradbeništva 4.0 ter gradimo na skupnem razumevanju digitalnih vsebin. Kot marsikaj v tem obdobju se je tudi tukaj zaradi epidemije covid-19 delo upočasnilo, saj so bile poti med celinama precej časa zaprte.

STROKOVNA DEJAVNOST

Sodelavci KOG strokovno delujemo na več področjih. Udeležujemo se znanstvenih in strokovnih kongresov doma in v tujini ter se tako povezujemo s strokovnjaki iz prakse. Smo recenzenti in člani uredniških odborov več znanstvenih in strokovnih konferenc, sodelujemo pa tudi v uredništvu mednarodne revije ITcon.

V okviru strokovne dejavnosti smo sodelavci katedre člani več strokovnih združenj, med njimi: EuroStruct, IALCCE, PIARC, Slovensko društvo za potresno inženirstvo, IZS, SICGRAS ter siBIM.

Katedra je vključena v strokovno oziroma svetovalno delo za DARS. Sem sodijo predvsem letni izračuni stroškovne upravičenosti višine cestnin za tovorna vozila na osnovi lastno razvite metodologije ter stroškovne ocene in analize posameznih projektov, za katere je v veliki meri zadolžen dr. Aleksander Srdić. Dr. Aleksander Srdić je obenem član nadzornega sveta in predsednik investicijske komisije podjetja 2TDK, ki trenutno gradi največji infrastrukturni projekt v državi. Dr. Matej Kušar je razvil in vzdržuje sistem za upravljanje s

Karavanke tunnel, the Brežice hydropower plant, and others. At the same time, members of the Chair participated as supervisors or co-supervisors in more than 20 final (diploma and master) theses by UL FGG students.

The Chair is also involved in the implementation of the international BIM A+ international master study programme, which focuses on building information modelling (BIM).

SCIENTIFIC AND RESEARCH ACTIVITES

The research and professional work of the Chair's staff focuses on the efficient management of construction projects. Thus, we research and develop methods and techniques that make it possible to carry out construction projects without unnecessary delays and deviations from the plan. We are also involved in settling disagreements between the parties involved in construction projects and in selecting suitable procurement methods. In our work, we advocate a comprehensive approach to the built environment, including the use and maintenance phase of the built structures.

We pay special attention to the maintenance and renovation of road infrastructure, using multi-criteria decision-making methods and optimization techniques.

We are actively involved in research work within the E-Civil Engineering core research group, within which we conducted scientific and research work in the field of cybersecurity and construction information modelling during the reporting period. The digitalization of civil engineering increases the risks of information security and data protection in all construction phases, especially in information-intensive phases such as design, operation and maintenance of buildings and engineering works. In the last period, we have started research in the field of artificial intelligence and the application of these methods in monitoring projects.

With Prof. Dr. Žiga Turk, head of the E-Civil Engineering core research group, we are also participating in the bilateral project Slovenia-China, in which we are introducing and defining the research framework Construction 4.0 and building on a common understanding of digital content. As with many things during this period, work slowed down due to the Covid-19 epidemic, as the routes between the continents were closed for an extended period.

PROFESSIONAL ACTIVITY

Members of the Chair work professionally in several areas. We participate in scientific and professional congresses in Slovenia and abroad and thus establish contacts with experts from the field. We are reviewers and members of the editorial boards of several scientific and professional conferences and also participate in the editorial board of the international journal ITcon.

As part of our professional activities, we are members of several professional associations, including: EuroStruct, IALCCE, PIARC, Slovenian Earthquake Engineering Society, Slovenian Chamber of Engineers, SICGRAS and siBIM.

The Chair is involved in professional and consultancy work for the Slovenian Motorway Company (DARS). This includes, above all, the annual cost-effectiveness calculation for the

premostitvenimi objekti za naročnika DARS in DRSI.

Dr. Bojan Čas je izdelal oziroma sodeloval pri izdelavi več strokovno izvedeniških mnenj za naročnike s področja državnih infrastrukturnih projektov, kot je Strokovno mnenje o ustreznosti vključenega obsega BVO v razpisu Rekonstrukcija ceste in objektov na odseku 0038 0638 Slovenske Konjice–Dramlje, ki je bilo izdelano za DARS.

Dr. Robert Klinc je postal vodja skupine za certificiranje slovenske izpostave buildingSMART, ki deluje v okviru strokovnega združenja siBIM. Povezano s tem je UL FGG v letu 2022 začela ponujati strokovna izobraževanja informacijskega modeliranja gradenj na nivoju temeljnih znanj, ki jih skupaj s sodelavcem, dr. Matevžem Dolencem (KGI), izvaja dr. Klinc. Oba omenjena še naprej pripravljata oddaje podkasta BIMpogovori, v katerih z gosti iz prakse razglabljajo o tehnologiji BIM in IKT v gradbeništvu, namenjen pa je tako strokovni kot tudi širši javnosti.

POMEMBEN DOSEŽEK

V obravnavanem obdobju je izstopal članek z naslovom Construction 4.0–digital transformation of one of the oldest industries, objavljen v reviji Economic and Business Review. V njem doc. dr. Robert Klinc in prof. dr. Žiga Turk pojasnita ideje, ki stojijo za Industrijo 4.0 ter analizirata potenciale v gradbeništvu. Članek, objavljen leta 2019, je med največkrat branimi v objavljeni reviji, kar se odraža tudi v več kot 100 citatih.

amount of truck tolls based on a methodology developed in-house, as well as cost evaluation and analysis of individual projects, for which Dr. Aleksander Srdić is largely responsible. Dr. Aleksander Srdić is also a member of the Supervisory Board and Chairman of the Investment Committee of the company 2TDK, which is currently building the country's largest infrastructure project. Dr. Matej Kušar has developed and maintains a system for managing bridging facilities for the clients DARS and DRSI.

Dr. Bojan Čas prepared or participated in the preparation of several expert opinions for clients in the field of state infrastructure projects, such as the Expert Opinion on the adequacy of the scope of BVO in the tender for reconstruction of the road and buildings on section 0038 0638 Slovenske Konjice-Dramlje, prepared for DARS.

Dr. Robert Klinc was appointed head of the certification group of the Slovenian branch of buildingSMART, which operates within the professional association siBIM. In this context, in 2022 UL FGG started offering professional training in building information modelling at the basic skills level, which Dr. Klinc is delivering, together with his colleague, Dr. Matevž Dolenc. They both continue to prepare the BIMconversations podcast, in which they discuss BIM and ICT technology in construction with guests from the field, which is aimed at both professionals and the general public.

IMPORTANT ACHIEVEMENT

In the reported period, we published a prominent article titled Construction 4.0–Digital Transformation of One of the Oldest Industries, published in the journal Economic and Business Review. In it Assist. Prof. Dr. Robert Klinc and Prof. Dr. Žiga Turk explain the ideas behind Industry 4.0 and analyse the potential in the construction industry. The article, published in 2019, is one of the most read in the journal, which is also reflected in more than 100 citations.

KATEDRA ZA PREIZKUŠANJE MATERIALOV IN KONSTRUKCIJ CHAIR OF TESTING IN MATERIALS AND STRUCTURES

KADER PERSONNEL

PREDSTOJNIK HEAD
prof. dr. **Vlatko Bosiljkov**

NAMESTNICA PREDSTOJNIKA DEPUTY HEAD
doc. dr. Petra Štukovnik

PEDAGOGA TEACHERS
prof. dr. Violeta Bokan Bosiljkov, doc. dr. David Antolinc

RAZISKOVALCA RESEARCHERS
asist. dr. Andreja Padovnik, asist. Tilen Turk

SODELAVEC ASSOCIATE
Franci Čepon

Katedra za preskušanje materialov in konstrukcij (KPMK) je bila ustanovljena leta 1995 ob razdružitvi Fakultete za arhitekturo, gradbeništvo in geodezijo (FAGG) ter ustanovitvi Fakultete za gradbeništvo in geodezijo (FGG) ter že od same ustanovitve s svojim pedagoškim in raziskovalnim delom močno vpliva na širjenje znanja o gradbenih materialih in preizkuševalnih metodah tako med študenti kot strokovnjaki v gradbeni praksi.

V pokoronskem obdobju smo člani katedre KPMK nadaljevali s pedagoškim, raziskovalnim in strokovnim delom na širokem interdisciplinarnem področju. Nadaljevalo se je tudi plodno sodelovanje z različnimi gospodarskimi subjekti s področja gradbeništva in zaščite kulturne dediščine. Sodelavci katedre prihajamo iz različnih poklicnih profilov in tako je katedra dobro usklajena s širokim interdisciplinarnim področjem, ki ga pokriva.

PEDAGOŠKA DEJAVNOST

V šolskih letih 2021/22 in 2022/23 smo člani katedre izvajali predavanja in vodili vaje pri več predmetih na dodiplomskih in magistrskih študijih na FGG.

Dodiplomski študiji:
— Gradiva [Gradbeništvo (UN); Vodarstvo in okoljsko inženirstvo (UN); Operativno gradbeništvo (VS)]
— Gospodarjenje s sekundarnimi in odpadnimi snovmi [Vodarstvo in okoljsko inženirstvo (UN)]
— Gospodarjenje z odpadnimi snovmi [Vodarstvo in okoljsko inženirstvo (UN)]
— Prenova stavb [Gradbeništvo (UN)]
— Stavbarstvo I [Gradbeništvo (UN)]

Magistrski študij:
— Konstrukcijska gradbena fizika [Stavbarstvo]
— Napredna gradiva [Gradbeništvo]
— Prenova in preizkušanje konstrukcij [Gradbeništvo]
— Zidane konstrukcije [Gradbeništvo]
— Repair and Testing of structures [Erasmus študij].

Sodelujemo pri izvedbi predmeta Prenova in analiza trajnosti s pristopom BIM v okviru študija BIM A+ (magisterij po magisteriju).

Prof. Vlatko Bosiljkov je predaval na Univerzi v Newcastlu (NSW), Avstralija.

V šolskih letih 2021/22 in 2022/23 smo bili mentorji ali somentorji pri štirih diplomskih nalogah prve. stopnje, 10 magistrskih nalogah in pri eni doktorski disertaciji.

ZNANSTVENA IN RAZISKOVALNA DEJAVNOST

Raziskovalno delo članov KPMK poteka v okviru raziskovalnega programa P2-0185 Potresno inženirstvo ter nacionalnih in evropskih projektov.

Gradbeništvo je panoga, ki je v gradbenih proizvodih sposobna uporabiti veliko sekundarnih surovin in s tem izvajati politiko EU

The Chair of Testing in Materials and Structures was founded in 1995 through the split of the Faculty of Architecture, Civil and Geodetic Engineering (FAGG) and the foundation of the Faculty of Civil and Geodetic Engineering (FGG). Since its foundation, its educational and research work has had a strong influence on the dissemination of knowledge about building materials and testing methods among both students and civil engineering professionals.

In the post-Covid period, the Chair members continued their teaching, research and professional activities in a broad interdisciplinary field. Fruitful cooperation with various economic entities in the field of construction and the protection of cultural heritage also continued. The Chair members come from different professional profiles, so that the Chair is well attuned to the broad interdisciplinary field it covers.

EDUCATIONAL ACTIVITY

In the academic years 2021/22 and 2022/23, the Chair members gave lectures and led tutorials in several undergraduate and graduate courses at UL FGG.

Undergraduate study:
— Construction and Building Materials [Civil Engineering (UN); Water Science and Environmental Engineering (UN); Construction Management (HE)]
— Secondary and Waste Materials Management [Water Science and Environmental Engineering (UN)]
— Waste Management [Water Science and Environmental Engineering (UN)]
— Building Renovation [Civil Engineering (UN)]
— Buildings I [Civil Engineering (UN)]

Master study:
— Structural Building Physics [Buildings]
— Advanced Construction and Building Materials [Civil Engineering]
— Repair and Testing of Structures [Civil Engineering]
— Masonry Structures [Civil Engineering]
— Repair and Testing of Structures [Erasmus study].

We participate in the implementation of the course BIM Based Rehabilitation and Sustainability Analysis within the BIM A+ study (master after master).

Prof. Vlatko Bosiljkov gave lectures at the University in Newcastle (NSW), Australia.

In the academic years 2021/22 and 2022/23, we supervised or co-supervised four first-cycle diploma theses, 10 master theses and one doctoral dissertation.

SCIENTIFIC AND RESEARCH ACTIVITES

The research work of the Chair members takes place within the core research group P2-0185 Earthquake Engineering as well as in national and European projects.

Civil engineering is an industry that is able to use a lot of secondary raw materials in construction products and thus implement the EU policy to protect natural resources. As part of the research of doctoral student Tilen Turk, we are intensively investigating the durability of concrete exposed

glede varovanja naravnih virov. V okviru raziskav doktorskega študenta Tilna Turka intenzivno preučujemo obstojnost betona, podvrženega alkalno-dolomitni reakciji. Spremljamo vpliv rekristalizacije agregata in kemijskih reakcij v vezivu na spremembo mehanskih in fizikalnih lastnosti betona. Hkrati preučujemo tudi vpliv kontaminiranega recikliranega agregata na potek vezanja in strjevanja betonskih mešanic, s pomočjo različnih analitskih tehnik.

Nadaljujemo z raziskovalnim delom na področju izvenravninskega obnašanja nekonstrukcijskih elementov zidovine. Rezultati raziskovalnega dela pomembno pripomorejo k načrtovanju vzdrževalnih ukrepov javnega stavbnega fonda RS.

Izvedli smo raziskovalne naloge na temo sten iz butane zemljine, vplivov različnih toplotnoizolacijskih sistemov z notranje strani zidanih sten objektov kulturne dediščine, vpliv temperature na obnašanje lameliranega stekla pod obremenitvijo ter razvoja steklenega upogibnega nosilca, armiranega s steklenimi vlakni.

Od 1. 7. 2022 poteka pilotni projekt »Dodajalne digitalne tehnologije za gradnjo kompozitnih elementov«, katerega vodja je prof. dr. Violeta Bokan Bosiljkov. Projekt poteka v sklopu projekta ULTRA, ki ima 11 pilotov (UL za trajnostno družbo – ULTRA). V sklopu projekta, ki naslavlja izzive zelenega in digitalnega prehoda na različnih študijskih področjih kot tudi reševanje družbenih in gospodarskih izzivov, povezanih z zeleno in digitalno preobrazbo družbe in gospodarstva, se bodo vpeljale sodobne prakse (3D tisk) na študijsko področje.

Na katedri je v šolskih letih 2021/22 in 2022/23 potekalo tudi več študentskih projektov, v sklopu razpisov Projektov za trajnostni razvoj in Projektno delo za pridobitev praktičnih izkušenj in znanj študentov v delovnem okolju 2022/23.

STROKOVNA DEJAVNOST

Od 21. do 23. septembra 2022 je v Ljubljani potekala mednarodna konferenca 6th Historic Mortars Conference. Organizacijo konference je v celoti prevzela katedra pod uredništvom prof. dr. Violete Bokan Bosiljkov.

Skupaj z Društvom restavratorjev Slovenije smo organizirali strokovno delavnico z naslovom Vpliv vrste apna, agregata in dodatkov na lastnosti apnenih malt in ometov. Organizacijo dogodka sta prevzeli asist. dr. Andreja Padovnik in doc. dr. Petra Štukovnik.

Doc. dr. David Antolinc je izvedel tudi izobraževanje za pooblaščene inženirje na IZS na temo konstrukcijskega stekla z naslovom »Uporaba konstrukcijskega stekla v gradbeništvu«.

Prof. dr. Vlatko Bosiljkov je na področju problematike ocene poškodovanosti stavb fonda UL in utrjevanja elementov stavbne dediščine po potresu v Petrinji (Hrvaška) podal več strokovnih mnenj za različne objekte.

Prof.dr. Vlatko Bosiljkov je bil med drugim nosilec več strokovnih nalog, med katerimi lahko izpostavimo obsežne materialne in

to the alkali-dolomite reaction. We monitor the effects of the recrystallisation of aggregates and chemical reactions in the binder on the changes in the mechanical and physical properties of concrete. At the same time, we are using various analytical techniques to investigate the influence of contaminated recycled aggregates on the bonding and setting of concrete mixtures.

We are continuing our research into the out-of-plane behaviour of non-structural masonry elements. The results of the research work contribute significantly to the planning of maintenance measures for the public building stock of the Republic of Slovenia.

We conducted research on the topic of rammed earth walls, on the effects of different thermal insulation systems on the inside of masonry walls of cultural heritage structures, on the influence of temperature on the behaviour of laminated glass under load and on the development of a glass fibre reinforced glass bending beam.

The pilot project "Digital feeding technologies for the design of composite elements", led by Prof. Dr. Violeta Bokan Bosiljkov, started on July 1, 2022. The project is part of the ULTRA project with 11 pilot projects (University of Ljubljana for a sustainable society – ULTRA). The project, which addresses the challenges of green and digital transition in various fields of study as well as solving social and economic challenges related to the green and digital transformation of society and the economy, introduces modern practices (3D printing) into higher education study.

In the academic years 2021/22 and 2022/23, several student projects were also carried out at the Chair as part of the calls for Projects on Sustainable Development and Project Work to Acquire Practical Experience and Knowledge for Students in Working Environment 2022/23.

PROFESSIONAL ACTIVITY

Between 21–23 September 2022, the 6th International Historic Mortars Conference took place in Ljubljana. The conference was organized entirely by the Chair under the direction of Prof. Dr. Violeta Bokan Bosiljkov.

Together with the Slovenian Society for Conservation-Restoration, we organized a professional workshop titled The Influence of Lime Type, Aggregates and Additives on the Properties of Lime Mortars and Plasters. The event was organised by Asst. Prof. Dr. Andreja Padovnik and Assoc. Prof. Dr. Petra Štukovnik.

Asst. Prof. Dr. David Antolinc also conducted a training course at the Chamber of Engineers for licensed engineers on the subject of structural glass entitled "Use of Structural Glass in Construction".

Prof. Dr. Vlatko Bosiljkov prepared several expert opinions for various buildings in the field of damage assessment of UL stock buildings and consolidation of building heritage elements after the earthquake in Petrinja (Croatia).

Prof. Dr. Vlatko Bosiljkov was the holder of several professional assignments, including extensive material and structural research with proposals for structural rehabilitation of

konstrukcijske raziskave s predlogi za konstrukcijsko sanacijo na objektu Rimski zid v Ljubljani (naročnik MOL), analizo obnašanja in stanja konstrukcije industrijskega dimnika ARGO v Izoli ter preiskave in izdelave strokovnih mnenj za več objektov (naročniki: GGD, Vodovod kanalizacija, ČN Celje, Bankart d.o.o., Final Pasarič, d.o.o., Mapei in dr.).

Nadaljujemo plodno sodelovanje z industrijo, na primer s podjetji Wienerberger, Schiedel GmbH, Mapei d.o.o., VARIS Lendava d.o.o., ISOKON d.o.o., FILC d.o.o. Za Univerzo v Ljubljani izdelujemo ocene stanja in predloge utrjevanja ter izvajamo monitoring več objektov (Stavba rektorata UL, Veterinarska fakulteta, Akademija za glasbo, Fakulteta za farmacijo idr.).

V letih 2021–2023 nadaljujemo z dejavnostjo pri oblikovanju domače in evropske zakonodaje s področja gradbeništva. Sodelujemo pri pripravi Evrokodov EC8-1, EC8-3 in EC6. Spremljamo razvoj nastajajočega Evrokoda 10 oz. tehnične specifikacije EN 19100 za konstrukcijsko steklo. Aktivni smo tudi v tehničnih odborih SIST (TC BBB, TC AGR in TC CAA) in v Združenju za beton Slovenije, kjer je predsednica prof. dr. Violeta Bokan Bosiljkov. Aktivno sodelujemo tudi v odborih RILEM.

POMEMBNI DOSEŽKI

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the Roman Wall in Ljubljana (client MOL), analysis of the behaviour and structural condition of the ARGO industrial chimney in Izola, as well as investigations and expert reports for several facilities (clients: GGD, Vodovod kanalizacija, Purifying Plant Celje, Bankart d.o.o., Final Pasarič, d.o.o., Mapei, and others).

We continue fruitful cooperation with the industry, especially with the companies Wienerberger, Schiedel GmbH, Mapei d.o.o., VARIS Lendava d.o.o., ISOKON d.o.o., FILC d.o.o. For the University of Ljubljana, we prepare assessments and proposals for strengthening and monitoring several buildings (UL Rectorate Building, Faculty of Veterinary Medicine, Academy of Music, Faculty of Pharmacy, etc.).

In 2021–2023, we continued our activities in the formulation of national and European legislation in the field of construction. We are involved in the development of Eurocodes EC8-1, EC8-3, and EC6. We are following the development of the emerging Eurocode 10 or EN 19100 technical specifications for structural glass. We are also active in the technical committees of SIST (TC BBB, TC AGR and TC CAA) and in the Slovenian Concrete Association, which is chaired by Prof. Dr. Violeta Bokan Bosiljkov. We also actively participate in RILEM committees.

SIGNIFICANT ACHIEVEMENTS

BOKAN BOSIL]KOV, Violeta (Editor), PADOVNIK, Andreja (Editor), TURK, Tilen (Editor). Conservation and restoration of historic mortars and masonry structures: HMC 2022. Cham: Springer, 2023. XXVI, 623 str., ilustr. RILEM book series, Vol. 42. ISBN 978-3-031-31471-1. ISSN 2211-0844. https: link.springer.com book 10.1007 978-3-031-31472-8. [COBISS.SI-ID 155691523]-

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KATEDRA ZA STAVBE IN KONSTRUKCIJSKE ELEMENTE CHAIR OF BUILDINGS AND CONSTRUCTIONAL COMPLEXES

KADER PERSONNEL

PREDSTOJNIK HEAD
izr. prof. dr. **Mitja Košir**

NAMESTNICA PREDSTOJNIKA DEPUTY HEAD
izr. prof. dr. Mateja Dovjak

PEDAGOG TEACHER
doc. dr. Luka Pajek

RAZISKOVALCI RESEARCHERS
asist. David Božiček, asist. dr. Jaka Potočnik, asist. dr. Nataša Šprah

Katedra za stavbe in konstrukcijske elemente (KSKE) je bila ustanovljena leta 1980 na Konstrukcijski smeri Oddelka za gradbeništvo Fakultete za arhitekturo, gradbeništvo in geodezijo, njeni zametki pa segajo v leto 1921, ko je Inštitutu za gradbeno inženirstvo Oddelka za gradbeništvo pripadal predmet Visoke gradnje. Ustanovitev katedre je predstavljal odgovor na izzive energijske krize v sedemdesetih letih 20. stoletja. V tem obdobju so se v gradbeništvu začeli pojavljati novi materiali in nove zasnove stavbnih ovojev, vse bolj pomembno pa je postajalo tudi razumevanje povezav med stavbo, uporabniki in okoljem.

Danes smo člani KSKE raziskovalno in strokovno aktivni na področjih, povezanih z energijsko učinkovitostjo in okoljskim vplivom stavb, svetlobnim okoljem, bioklimatskim načrtovanjem, prilagajanjem stavb podnebnim spremembam ter s skrbjo za zdravo bivalno in delovno okolje. Raziskovalna dejavnost se odraža tudi v našem pedagoškem udejstvovanju, kjer sodelujemo pri študijskem procesu na prvostopenjskih študijih Gradbeništvo in Operativno gradbeništvo, drugostopenjskem študiju Stavbarstvo ter tretjestopenjskem študiju Grajeno okolje. Poleg poučevanja na Fakulteti za gradbeništvo in geodezijo izvajamo tudi tri predmete na Zdravstveni fakulteti Univerze v Ljubljani.

PEDAGOŠKA DEJAVNOST

Člani KSKE se pedagoško osredotočamo na področja, povezana z načrtovanjem in delovanjem stavbnih ovojev ter posledično oblikovanja notranjega okolja v stavbah. Pri predmetih, ki jih poučujemo, obravnavamo teme, povezane s splošnim načrtovanjem stavb, gradbeno-fizikalnim odzivom stavbnih ovojev, energijsko učinkovitostjo stavb, podnebno prilagoditvijo stavb, lastnostmi notranjega toplotnega in svetlobnega okolja ter okoljskimi vplivi stavb.

V šolskih letih 2021/22 in 2022/23 smo pedagogi KSKE 32-krat sodelovali kot mentorji in somentorji pri zaključnih delih na prvi in drugi stopnji študija ter trikrat pri doktoratih. Leta 2022 sta doktorski naziv prejela tudi naša sodelavca, dr. Jaka Potočnik za nalogo *Vpliv optičnih lastnosti površin notranjega okolja stavb na cirkadiani potencial dnevne svetlobe* in dr. Luka Pajek za nalogo *Energijska učinkovitost enostanovanjskih bioklimatskih stavb glede na podnebne spremembe*.

ZNANSTVENA IN RAZISKOVALNA DEJAVNOST

Znanstvenoraziskovalno se udejstvujemo predvsem na področjih, povezanih s/z: cirkadianimi lastnostmi dnevne svetlobe, ocenjevanjem okoljskih vplivov stavb, prilagajanjem podnebnim spremembam, energijsko učinkovitostjo stavb ter notranjim okoljem z gledišča vzajemnega odnosa med okoljem, stavbo in uporabniki. Dognanja na izpostavljenih področjih so bila v obravnavanem obdobju objavljena v 14 izvirnih, 2 preglednih znanstvenih člankih ter 15 prispevkih na mednarodnih znanstvenih konferencah. Uspešno smo zaključili bilateralni projekt z Univerzo v Črni gori ter nadaljevali z delom na projektu *Izračun letnega cirkadianega potenciala v stavbah z uporabo tehnik strojnega učenja*.

The Chair of Buildings and Constructional Complexes was established in 1980 at the Department of Civil Engineering of the Faculty of Architecture, Civil and Geodetic Engineering. However, its beginnings date back to 1921, when the Institute of Civil Engineering of the Department of Civil Engineering started offering the course Buildings. The establishment of the Chair was a response to the challenges of the energy crisis in the 1970s. During this time, new materials and new building envelope designs emerged in the construction industry, and an understanding of the relationship between the building, its users, and the environment became increasingly important.

Today, the Chair members are active in research and have expertise in areas related to the energy efficiency and environmental impact of buildings, lighting, bioclimatic design, adaptation of buildings to climate change and care for a healthy living and working environment. The research activity is also reflected in our educational activity, where we participate in the study process of the first-cycle studies of Civil Engineering and Construction Management, the second-cycle study of Civil Engineering and the third-cycle study of Built Environment. In addition to teaching at the Faculty of Civil and Geodetic Engineering, we also teach three courses at the Faculty of Health of the University of Ljubljana.

EDUCATIONAL ACTIVITY

The Chair members focus their teaching on areas related to the design and operation of building envelopes and, consequently, the design of building interiors. In the courses we teach, we deal with topics related to the general design of buildings, the physical behaviour of building envelopes, the energy efficiency of buildings, the climate adaptation of buildings, the characteristics of the internal thermal and lighting environment and the environmental impact of buildings.

In the academic years 2021/22 and 2022/23, our teaching staff supervised and co-supervised 32 final theses in the first- and second-cycle study and three doctoral theses. In 2022 two of our members were awarded a PhD degree, Dr. Jaka Potočnik for his thesis *Influence of Indoor Surface Optical Properties on the Circadian Potential of Daylight in Buildings, and Dr. Luka Pajek for his thesis Energy Efficiency of Single-Family Bioclimatic Buildings in Relation to Climate Change.*

SCIENTIFIC AND RESEARCH ACTIVITIES

We conduct scientific research mainly in the following areas: circadian properties of daylight, assessment of the environmental impact of buildings, adaptation to climate change, energy efficiency of buildings and the internal environment from the point of view of the mutual relationship between the environment, the building, and the users. The results in the highlighted areas were published in 14 original scientific articles, 2 review articles as well as 15 papers at international scientific conferences during the reporting period. We successfully completed the bilateral project with the University of Montenegro and continued work on the project *Calculation of Yearly Circadian Potential in Buildings Using Deep Learning Techniques (YCPdeep)*.

Januarja 2023 je bila izvedena mednarodna delavnica *Interactions between physical parameters, chemical pollutants, and microbes in the built environment* v soorganizaciji med UL FGG in Hiroshima University. Sodelovali pa smo pri organizaciji in izvedbi mednarodne znanstvene konference, 10*th Congress of the Alps Adria Acoustics Association*. Predsednica konference je bila dr. Mateja Dovjak.

STROKOVNA DEJAVNOST

Strokovno se udejstvujemo na področju svetovanja o energijsko učinkoviti in trajnostni gradnji ter gradbeni akustiki, ukvarjamo pa se tudi z izdelavo študij osončenosti in osvetljenosti stavb. Od tega bi izpostavili predvsem analizo ogljičnega odtisa stanovanjske soseske Rakova Jelša II ter sodelovanje s podjetjem Adria Home d.o.o. pri razvoju stavbnega ovoja mobilnih hiš. V letu 2023 smo pristopili k pripravi Smernic za nizko-ogljične stavbe slovenskih stanovanjskih skladov za Zbornico za poslovanje z nepremičninami. Redno sodelujemo tudi pri pripravi in sprejemanju novih standardov na področju toplotnega odziva in osvetljevanja stavb.

POMEMBNI DOSEŽKI

V obdobju med letoma 2021 in 2023 so znanstvene publikacije članov KSKE prejele 378 čistih citatov v bazi WoS in 465 čistih citatov v bazi Scopus. Med objavami bi kot pomemben dosežek izpostavili članek *Parametric study of an active-passive system for cooling application in buildings improved with free cooling for enhanced solidification* (soavtorica dr. Mateja Dovjak), objavljen v reviji Sustainable cities and society (faktor vpliva: 11,7).

Uspešni smo bili tudi na področju pridobivanja znanstvenoraziskovalnih projektov, saj smo s strani ARRS prejeli financiranje za slovenski del projekta *Študija toplotnih lastnosti in zmanjšanja vseživljenjskega vpliva alternativnih hibridnih eko-nanomaterialov v okolju z nizkim tlakom*, ki ga izvajamo skupaj s partnerji s Tehniške univerze v Brnu. Poleg navedenega smo bili uspešni tudi na razpisih za bilateralno sodelovanje, in sicer z Univerzo v Črni gori (*Zmogljivost stanovanjskih stavb v Črni gori za obvladovanje pregrevanja zaradi podnebnih sprememb*) in z Univerzo v Hirošimi (*Vloga okoljskih parametrov na strukturo mikrobnih združb v stavbah v Sloveniji in na Japonskem*).

In January 2023 an international workshop *Interactions between Physical Parameters, Chemical Pollutants, and Microbes in the Built Environment*, was organised by UL FGG in cooperation with Hiroshima University. We participated in the organization and implementation of the international scientific conference, the 10th *Congress of the Alps Adria Acoustics Association*. The chairperson of the conference was Dr. Mateja Dovjak.

PROFESSIONAL ACTIVITY

We are experts in the field of consulting for energy-efficient and sustainable construction and building acoustics, and we also deal with the preparation of solar and lighting studies for buildings. We would particularly like to highlight the analysis of the carbon footprint of the Rakova Jelša II residential area and the cooperation with the company Adria Home d.o.o. in the development of the building envelope for mobile homes. In 2023, we began developing low-carbon building guidelines for the Slovenian Housing Fund for the Chamber of Real Estate Industry. We also regularly participate in the development and adoption of new standards in the field of thermal performance and lighting in buildings.

SIGNIFICANT ACHIEVEMENTS

In the period between 2021 and 2023, the scientific publications of KSKE members were cited in the WoS database with 378 pure citations and in the Scopus database with 465 pure citations. Among the publications, the article *Parametric Study of an Active-Passive System for Cooling Application in Buildings Improved with Free Cooling for Enhanced Solidification* (co-author: Dr. Mateja Dovjak), which was published in the journal Sustainable Cities and Society (Impact Factor: 11.7), should be highlighted.

We were also successful in acquiring scientific research projects, as we received funding from the National Research Agency for the Slovenian part of the project *Study of Thermal Properties and Reduced Life Cycle Impact of Alternative Hybrid Eco-Nanomaterials under Low Pressure*, which we are carrying out together with partners from the Technical University of Brno. In addition, we were also successful in tenders for bilateral cooperation between the University of Montenegro (*The Capacity of Montenegrin Residential Buildings to Resist Climate-Change-Induced Overheating*) and the University of Hiroshima (*Role of Environmental Parameters on Microbial Community Structure in Buildings in Slovenia and Japan*).

PROMETNOTEHNIŠKI INŠTITUT TRAFFIC TECHNICAL INSTITUTE

KADER PERSONNEL

PREDSTOJNIK HEAD
doc. dr. **Peter Lipar**

NAMESTNIK PREDSTOJNIKA DEPUTY HEAD
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PEDAGOGI TEACHERS
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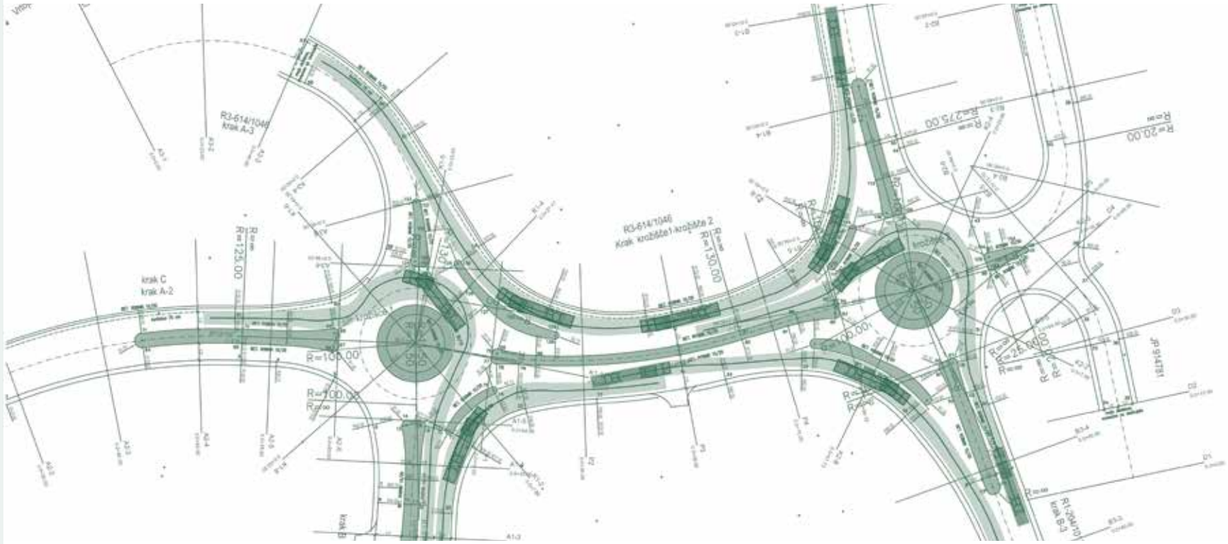
viš. pred. dr. Rok Marsetič, viš. pred. dr. Robert Rijavec, asist. dr. Irena Strnad,
viš. pred. dr. Darja Šemrov

SODELAVCI ASSOCIATES
asist. mag. Simon Detellbach, Barbara Sterle, asist. Luka Trček,
Jure Velkavrh



Gospodarski razvoj in vse večja želja ljudi po mobilnosti vplivata na rast motornega cestnega prometa in s tem povezane probleme, ki jih poznamo pod pojmi »zastoji-stroški-varnost-ogljični odtis«. Sodelavci Prometnotehniškega inštituta (PTI) se zavedamo pomembnosti mobilnosti ter vplivov prometa na okolje, zato želimo s prometnim planiranjem, ustreznim načrtovanjem izgradnje in vzdrževanja infrastrukture ter implementacijo inteligentnih transportnih sistemov izboljšati prometni nivo uslug in tako prispevati k večji prometni varnosti. Prizadevamo si za udejanjanje trajnostne mobilnosti, kjer je to le mogoče.

Vsi sodelavci inštituta se poleg pedagoškega dela, katerega primarna naloga je izobrazba kakovostnih, kompetentnih in zanesljivih kadrov, ukvarjamo tudi s strokovnim in raziskovalnim delom na vseh področjih prometnega inženirstva.

PEDAGOŠKA DEJAVNOST

Cilj predmetov prometnega inženirstva je razumevanje značilnosti cestnega in železniškega prometa, pridobiti znanja o postopkih projektiranja, gradnje in vzdrževanja prometnih infrastruktur ter znanja o napovedovanju in modeliranju prometa. Študentje se spoznajo s sodobnimi informacijskimi in telekomunikacijskimi tehnologijami na področju cestnih in železniških sistemov. Pri vajah se znanje, pridobljeno na predavanjih, povezuje z reševanjem praktičnih primerov in problemov iz vsakodnevne prakse in z ogledom praktičnih primerov na terenu. Študentje skupaj z mentorji kritično vrednotijo in presojajo obstoječe stanje in prakse na področju prometa. Tako se ustvarja prostor, v katerem se študent nauči prepoznati delovanje sistema v vsakodnevni praksi in ga ovrednoti skozi svoje lastne izkušnje.

S pridobljenimi znanji so študentje usposobljeni za opravljanje neposrednih delovnih nalog v inštitucijah, ki se ukvarjajo z raziskavami cestnega in železniškega prometa, na ministrstvu, pristojnem za promet, družbah cestne in železniške dejavnosti, projektantskih organizacijah, gradbenih podjetjih na področju nizkih zgradb ter pri upravljavcih cestne in železniške infrastrukture. Po končanem študiju so študentje usposobljeni za izvajanje in reševanje aktualnih tehničnih, tehnoloških, organizacijskih in drugih problemov v procesih, povezanih s prometnimi storitvami in prometno infrastrukturo.

RAZISKOVALNA IN STROKOVNA DEJAVNOST

Na PTI se ukvarjamo s strokovnim in raziskovalnim delom na vseh področjih prometnega inženirstva. S svojimi raziskavami želimo prispevati k dvigu kakovosti v vseh fazah življenjskega cikla prometnic: od planiranja in projektiranja do gradnje, obratovanja in vzdrževanja. S temeljnimi raziskavami na področju makroskopskih in mikroskopskih transportnih modelov poskušamo izboljšati napovedi rasti prometa, ki so osnova za načrtovanje prometnic. S proučevanjem zaznav voznikov na potek ceste v okolju poskušamo prispevati k projektiranju predvidljivih, varnejših cest in cest, ki odpuščajo napake voznikov. Z razvojem inteligentnih transportnih sistemov želimo povečati varnost in prepustnost infrastrukture. Z zunanjimi partnerji smo razvili številne informacijske rešitve, namenjene učinkovitemu vodenju projektov, ki jih redno posodabljamo, razvijamo in ponujamo celovito podporo končnim uporabnikom. Pomembno področje dela so tudi priprave strokovnih podlag za zakone, pravilnike in predpise.

POMEMBNI DOSEŽKI

V zadnjem obdobju so naši strokovnjaki uspešno izvedli evropski projekt Interreg IT-SL – SI4CARE Social Innovation for integrated health care of Ageing Population of Adrion Region (2021–2023).

Na strokovnem področju je bil in je še inštitut svetovalec DARS-a pri izdelavi projektne dokumentacije in drugih strokovnih gradiv v okviru upravljanja prometa na avtocestah 2021–2023, prav tako izvajamo svetovalne storitve na področju prometne infrastrukture za Mestno občino Ljubljana. V preteklosti, kot tudi še sedaj, sodelujemo na projektu Razvoj, vzdrževanje in podpora IS BCP DARS 2021-2023 ter Razvoj, vzdrževanje in podpora IS PIS DARS. Izvedli smo tudi »Študijo variant poteka prog javnega potniškega prometa na širšem območju nove avtobusne postaje Ljubljana«, naročnikov LPP in Slovenske železnice. Strokovnjaki s PTI so v tem času sodelovali pri pripravi tehničnih specifikacij »Varnostne ograje in blažilniki trkov«.

Sodelavci inštituta so objavili šest strokovnih in znanstvenih člankov:

- Rijavec Robert, Marsetič Rok, Strnad Irena: Na poti k optimalnemu scenariju integracije TMS, ki temelji na HRM in SWOT analizi;
- Rijavec Robi, Marsetič Rok, Strnad Irena: Učinkovitost prepovedi prehitevanja za težka vozila na štiripasovni avtocesti v različnih vremenskih razmerah;
- Strnad Irena, Marsetič Rok: Metoda numeričnega nadzora spremenljive omejitve hitrosti na osnovi diferencialne evolucije z neravnovesnim prometnim modelom;
- Šemrov Darja, Rijavec Robert, Lipar, Peter: Dimenzioniranje kolesarskih stez na podlagi ocene udobja za kolesarje;
- Žura Marijan: Model ocenjevanja zmogljivosti krožnega križišča ob upoštevanju vedenja voznika na izhodnih in vstopnih krakih;
- Farhad Skandary Ahmed, Dadashzadeh Nima, Žura Marijan: Nova kalibracija modela LUTI z uporabo algoritma diferencialne evolucije.

Economic development and increasing demand for mobility affect the growth of motorized road traffic and the related problems known as »congestion-costs-safety-carbon footprint«. Members of the Traffic Technical Institute (PTI) are aware of the importance of mobility and traffic impacts on the environment. For this reason, we wish to improve the level of traffic surfaces with adequate traffic planning, design for the construction and maintenance of traffic infrastructure and implementation of intelligent transport systems, with the main aim to contribute to better traffic safety. We aspire towards the realisation of sustainable mobility, wherever feasible. In addition to educational work, which is mainly focused on the education of capable, competent and reliable graduates, all Institute members are also engaged in professional work in all areas of traffic engineering.

EDUCATIONAL ACTIVITY

The aim of the courses from traffic engineering is to make students understand the characteristics of road and railway traffic, to provide knowledge on the procedures of design, construction and maintenance of traffic infrastructure and knowledge on the prediction and modelling of traffic. Students learn about modern IT technologies in road and railway systems. Within tutorials the knowledge, provided in lectures, is linked to practical cases and problems from daily practice. Visits to practical cases in the field are organised. Assisted by mentors, students critically assess and evaluate existing situations and practical cases in traffic. This creates a space where students learn to detect how the system operates in daily practice and are able to evaluate it through their own experiences.

With the acquired knowledge students are qualified to perform direct tasks in institutions active in road and railway traffic research, at the ministry for traffic, in road and railway engineering companies, design organisations, construction companies for highway and railway engineering, as well as in road and railway infrastructure administration. When they finish their studies, they are qualified to perform and solve current technical, technological, organizational and other issues in processes related to traffic services and traffic infrastructure.

RESEARCH AND PROFESSIONAL ACTIVITES

Members of the Traffic Technical Institute are engaged in professional and research work in all areas of traffic engineering. With our research work we aim at raising quality in all phases of the traffic infrastructure life cycle: from the planning and design, to construction, operation and maintenance. Our basic research dealing with macroscopic and microscopic transport models aims at improving predictions of traffic growth, which is the foundation for planning traffic infrastructure. By studying drivers' perceptions of road alignment in the environment we try to contribute to the design of predictable, safer and »forgiving« roads. With the development of intelligent transport systems we wish to improve safety and capacity of road infrastructure. In cooperation with our external partners, we have developed numerous IT solutions intended to efficient project management. They are regularly updated, constantly developed and offer a holistic support to final users. An important area of our work is also preparation of professional bases for various acts, rules, and regulations.

SIGNIFICANT ACHIEVEMENTS

Recently, our experts have successfully implemented European project: Interreg IT-SL – SI4CARE Social Inovation for Integrated Health Care of Aging Population of Adrion Region (2021-2023).

In the professional field, the institute was and remains a consultant to DARS in the preparation of project documentation and other professional materials in the framework of motorways traffic management 2021–2023. We also provide consulting services in the field of transport infrastructure for the City of Ljubljana. We have been working on the project Development, Maintenance and Support of IS BCP DARS 2021–2023. For the clients Ljubljana Passenger Transport and Slovenian Railways, we also carried out a "Study of public passenger transport options in the wider area of the new bus station in Ljubljana". During this time, experts of our institute participated in the preparation of the technical specifications "Safety fences and shock absorbers".

Members of our institute published six scientific articles:

- Rijavec Robert, Marsetič Rok, Strnad Irena: Towards Optimal TMS Integration Scenario Based on HRM and SWOT Analysis;
- Rijavec Robi, Marsetič Rok, Strnad Irena: Effectiveness of the Overtaking Ban for Heavy Vehicles on the Four-Lane Divided Highway in Different Weather Conditions;
- Strnad Irena, Marsetič Rok: Differential Evolution Based Numerical Variable Speed Limit Control Method with a Non-Equilibrium Traffic Model;
- Šemrov Darja, Rijavec Robert, Lipar, Peter: Dimensioning of Cycle Lanes Based on the Assessment of Comfort for Cyclists;
- Žura Marijan: Roundabout Capacity Estimation Model Considering Driver Behaviour on the Exiting and Entry Flows;
- Farhad Skandary Ahmed, Dadashzadeh Nima, Žura Marijan: A Novel LUTI Model Calibration Using Differential Evolution Algorithm.

KONSTRUKCIJSKO PROMETNI LABORATORIJ STRUCTURAL AND TRAFFIC LABORATORY

KADER PERSONNEL

PREDSTOJNIK HEAD
prof. dr. **Vlatko Bosiljkov**

PEDAGOGI TEACHERS
prof. dr. Tatjana Isaković, doc. dr. Jože Lopatič, izr. prof. dr. Primož Može, prof. dr. Goran Turk

Konstrukcijsko prometni laboratorij (KPL) na Oddelku za gradbeništvo predstavlja skupno infrastrukturo za zadovoljevanje potreb naslednjih pedagoško raziskovalnih enot (PRE): KMLK, KMK, KPMK, KKPI, KM, KSKE, KMTal, PTI, KGI in KMF. Organi vodenja in upravljanja KPL sta kolegij KPL in predstojnik KPL.

KPL je prvenstveno namenjen praktičnemu izvajanju pedagoškega, znanstvenega, raziskovalnega in strokovnega dela PRE. Pri tem imajo prednost zlasti tiste raziskave temeljnega in aplikativnega značaja, ki podpirajo dodiplomski in podiplomski študij, še posebej magistrske in doktorske naloge. V KPL se odvijajo tudi razvojne in strokovne naloge z namenom po izpopolnjevanju kadrov, vzdrževanju stika z gradbeno prakso in krepitvi materialne podlage, zlasti v pogledu nabave in modernizacije laboratorijske opreme. Po možnosti naj bi zaradi vzgoje kadrov tudi pri takšnih nalogah sodelovali študenti oziroma diplomanti na različnih ravneh izobraževanja.

Stavba KPL je bil zgrajena leta 1984 in financirana v okviru posebne izobraževalne skupnosti za gradbeništvo Slovenije. Z zgraditvijo laboratorija so se bistveno izboljšali pogoji za eksperimentalno delo na fakulteti. Večji del stavbe KPL zavzema univerzalni preizkusni prostor, namenjen materialnim in mehanskim preiskavam konstrukcijskih elementov ter eksperimentalni podpori predavanj in vaj. Sodobna merilna in preskusna oprema omogoča postavitev zahtevnejših preskuševališč s statično in kvazi dinamično obremenitvijo. Hala je opremljena z mostnim dvigalom, ki omogoča manipulacijo večjih vzorcev.

Structural and Traffic Laboratory at the Department of Civil Engineering (KPL) represents the common infrastructure intended to serve the needs of the following educational and research units: Chair of Concrete, Masonry and Timber Structures, Chair for Metal Structures, Chair of Testing in Materials and Structures, Chair of Structural and Earthquake Engineering, Chair of Mechanics, Chair of Buildings and Constructional Complexes, Chair of Soil Mechanics with Laboratory, Traffic Technical Institute, Chair of Construction IT and Chair of Mathematics and Physics. The laboratory is managed by the Laboratory Board and Head of Laboratory.

The laboratory is intended first and foremost for practical implementation of the educational, scientific, research and professional activities of the educational and research units. Advantage is given especially to basic and applied research supporting undergraduate and graduate studies, especially master and doctoral theses. The laboratory is also used for development and professional tasks with the purpose to provide personal qualification, maintain contacts with the construction industry and to strengthen our material assets, especially regarding the acquisition and modernisation of laboratory equipment. In order to provide qualification to our students and graduates at different levels of education, we encourage their cooperation in such tasks.

The laboratory building was finished in 1984 and was financed within the educational community for civil engineering in Slovenia. With this laboratory the conditions for experimental work at the faculty improved considerably. The largest part of the

PREIZKUSNA IN MERILNA OPREMA

Opremljanje laboratorija poteka postopoma in tako se zdaj, po več kot 30 letih njegovega obstoja, lahko ponašamo z opremo, ki omogoča izvedbo najrazličnejših vrst sodobnih eksperimentalnih preiskav. Pomembnejša preizkusna oprema je naslednja:

— preizkuševalna ploščad z modularnim vpenjalnim sistemom,
— univerzalna statična preizkusna stroja kapacitete 5000 kN in 50 kN,
— Instron dinamični preizkusni stroj s kapaciteto 1000 kN,
— Roell/Amsler dinamični preizkusni stroj kapacitete 100 kN,
— servohidravlični preizkusni sistem z dvema dvosmernima batoma kapacitete 250 kN,
— ločeni hidravlični črpalki s pretokoma 76 in 18 l/min,
— ConTec reometer,
— protitočni mešalec,
— standardiziran mešalec za malte in paste,
— reakcijska stena za vnos horizontalne obtežbe do 1000 kN,
— dva vpenjalna okvirja z nosilnostjo 3000 kN.

Od pomembnejše kalibrirane merilne opreme pa se uporablja:

— merilniki pomika, pospeška, sile, deformacij,
— večkanalni sistemi za zajemanje podatkov (HBM, Dewetron in Dewesoft),
— optični sistem za zajem polja pomikov.

PEDAGOŠKA, RAZISKOVALNA IN STROKOVNA DEJAVNOST

V KPL se izvaja eksperimentalni del vaj pri več predmetih. Na prvi stopnji se z delom v laboratoriju študenti srečajo pri predmetih Gradiva, Stavbarstvo I, Gradbena fizika, na drugi stopnji pa z zahtevnejšim eksperimentalnim delom pri predmetu Prenova in preskušanje konstrukcij izvajajo in numerično analizirajo bolj zahtevne preiskave. Poleg tega vedno več študentov v KPL opravi tudi eksperimentalni del diplomskih in magistrskih del.

Raziskovalna dejavnost je v KPL poteka v sklopu preiskav za številne nacionalne in evropske projekte ter doktorskih disertacijah.

Poleg pedagoške in raziskovalne dejavnosti se KPL v želji po čim večjem sodelovanju z gospodarstvom prizadeva za izvedbo eksperimentalnih preiskav, pridobljenih iz gospodarstva. To omogoča za laboratorij neprekinjen stik s smernicami razvoja v gospodarstvu in uporabo strokovnega znanja pri reševanju razvojnih problemov, s katerimi se gospodarstvo sooča.

POMEMBNEJŠE OBJAVE LABORATORIJSKIH RAZISKAV

Na podlagi raziskovalnega dela v laboratoriju je bilo objavljenih več znanstvenih prispevkov, nekateri izmed njih so našteti spodaj:

GATTESCO, Natalino, BOEM, Ingrid, RIZZI, Emanuele, DUDINE, Allen, GAMS, Matija. Cyclic tests on two-leaf rubble stone masonry spandrels strengthened with CRM coating on one or both sides. Engineering structures. [Online ed.]. 2023, vol. 296, [article no.] 116965, str. 1-16, ilustr. ISSN 1873-7323. DOI: 10.1016/j.engstruct.2023.116965.

laboratory consists of a universal testing area intended for material and mechanical tests of structural elements and experimental support for lectures and tutorials. Modern measuring and testing equipment allows us to prepare demanding test setups with static and quasi dynamic loading. The hall is equipped with a crane that allows manipulation of larger specimens.

TESTING AND MEASURING EQUIPMENT

The laboratory has been equipped in stages. Thus, in more than 30 years of its existence, equipment has been acquired that allows the implementation of various types of modern experimental investigations. Some important pieces of equipment are as follows:

— strong floor with a modular system for positioning of steel structural elements,
— universal static testing systems with capacities of 5000 kN and 50 kN,
— Instron dynamic testing system with a capacity of 1000 kN,
— Roell/Amsler dynamic testing system with a capacity of 100 kN,
— two servo hydraulic actuators, each with a capacity of 250 kN,
— separate hydraulic pumps with the rate of flow of 76 and 18 l/min,
— rheometer ConTec Viscometer 5,
— concrete pan mixer,
— Hobart mixer for mortars and pastes,
— reaction wall with up to 1000 kN of bearing capacity in horizontal direction,
— two vertical frames with 3000 kN of bearing capacity.

Important calibrated measuring equipment includes:

— displacement, acceleration, force and deformation meters,
— multi-channel systems for data acquisition (HBM, Dewetron and Dewesoft),
— an optic system for the acquisition of the displacement field at static tests (software equipment for image editing was developed at UL FGG).

EDUCATIONAL, RESEARCH AND PROFESSIONAL ACTIVITIES

The laboratory provides for the experimental part of tutorials for several courses. At the first cycle studies students are introduced to laboratory work within the courses Materials, Buildings I, Building Physics. At the second cycle, they learn about demanding experimental work within the course Renovation and Testing of Structures, where they perform and numerically analyse demanding tests. An increasing number of students also use the laboratory for their experimental work within diploma and master theses.

Research activity is represented in the laboratory within investigations for numerous national and European projects (e. g. RFCS OUTBURST, Tigr4Smart) and doctoral theses.

With the aim to provide the best possible service to economy, the laboratory is actively involved in experimental tests for the needs of the construction industry. In this way we make sure to stay in touch with the economic development guidelines and use our expert knowledge in solving current development issues of the industry.

GATTESCO, Natalino, RIZZI, Emanuele, BOEM, Ingrid, FACCONI, Luca, MINELLI, Fausto, DUDINE, Allen, GAMS, Matija. Full-scale cyclic tests on a stone masonry building to investigate the effectiveness of a one-side application of the composite reinforced mortar system. Engineering structures. [Online ed.]. 2023, vol. 296, [article no.] 116967, str. 1-17, ilustr. ISSN 1873-7323. DOI: 10.1016/j.engstruct.2023.116967.

LLANA, Daniel F., ÍÑIGUEZ-GONZÁLEZ, Guillermo, PLOS, Mitja, TURK, Goran. Grading of recovered Norway spruce (Picea abies) timber for structural purposes. Construction & building materials. [Print ed.]. 2023, vol. 398, art. 132440, str. 1-10, ilustr. ISSN 0950-0618. DOI: 10.1016/j.conbuildmat.2023.132440.

PLOS, Mitja, FORTUNA, Barbara, ŠULIGOJ, Tamara, TURK, Goran. From visual grading and dynamic modulus of european beech (fagus sylvatica) logs to tensile strength of boards. Forests. [Online ed.]. jan. 2022, vol. 13, iss. 1, [18] f., ilustr. ISSN 1999-4907. DOI: 10.3390/f13010077. [COBISS.SI-ID 92687363]

KLUN, Martin, ANTOLINC, David, BOSIL]KOV, Vlatko. Out-of-plane experimental study of strengthening slender non-structural masonry walls. Applied sciences. 2021, vol. 11, iss. 19, str. 1-24, ilustr. ISSN 2076-3417. DOI: 10.3390/app11199098.

ANTOLINC, David, ELERŠIČ FILIPIČ, Kristina. Recycling of nonwoven polyethylene terephthalate textile into thermal and acoustic insulation for more sustainable buildings. Polymers. sept. 2021, vol. 13, iss. 18/3090, str. 1-15, ilustr. ISSN 2073-4360., DOI: 10.3390/polym13183090.

SIGNIFICANT RELEASES OF RESEARCH WORK IN THE LABORATORY

On the basis of research work in the laboratory, several scientific contributions were published, some of the latest ones are listed below:

GATTESCO, Natalino, BOEM, Ingrid, RIZZI, Emanuele, DUDINE, Allen, GAMS, Matija. Cyclic tests on two-leaf rubble stone masonry spandrels strengthened with CRM coating on one or both sides. Engineering structures. [Online ed.]. 2023, vol. 296, [article no.] 116965, str. 1-16, ilustr. ISSN 1873-7323. DOI: 10.1016/j.engstruct.2023.116965.

GATTESCO, Natalino, RIZZI, Emanuele, BOEM, Ingrid, FACCONI, Luca, MINELLI, Fausto, DUDINE, Allen, GAMS, Matija. Full-scale cyclic tests on a stone masonry building to investigate the effectiveness of a one-side application of the composite reinforced mortar system. Engineering structures. [Online ed.]. 2023, vol. 296, [article no.] 116967, str. 1-17, ilustr. ISSN 1873-7323. DOI: 10.1016/j.engstruct.2023.116967.

LLANA, Daniel F., ÍÑIGUEZ-GONZÁLEZ, Guillermo, PLOS, Mitja, TURK, Goran. Grading of recovered Norway spruce (Picea abies) timber for structural purposes. Construction & building materials. [Print ed.]. 2023, vol. 398, art. 132440, str. 1-10, ilustr. ISSN 0950-0618. DOI: 10.1016/j.conbuildmat.2023.132440.

PLOS, Mitja, FORTUNA, Barbara, ŠULIGOJ, Tamara, TURK, Goran. From visual grading and dynamic modulus of european beech (fagus sylvatica) logs to tensile strength of boards. Forests. [Online ed.]. jan. 2022, vol. 13, iss. 1, [18] f., ilustr. ISSN 1999-4907. DOI: 10.3390/f13010077. [COBISS.SI-ID 92687363]

KLUN, Martin, ANTOLINC, David, BOSIL]KOV, Vlatko. Out-of-plane experimental study of strengthening slender non-structural masonry walls. Applied sciences. 2021, vol. 11, iss. 19, str. 1-24, ilustr. ISSN 2076-3417. DOI: 10.3390/app11199098.

ANTOLINC, David, ELERŠIČ FILIPIČ, Kristina. Recycling of nonwoven polyethylene terephthalate textile into thermal and acoustic insulation for more sustainable buildings. Polymers. sept. 2021, vol. 13, iss. 18/3090, str. 1-15, ilustr. ISSN 2073-4360., DOI: 10.3390/polym13183090.

INŠTITUT ZA KONSTRUKCIJE, POTRESNO INŽENIRSTVO IN RAČUNALNIŠTVO INSTITUTE OF STRUCTURAL ENGINEERING, EARTHQUAKE ENGINEERING AND CONSTRUCTION IT

KADER PERSONNEL

PREDSTOJNICA HEAD
prof. dr. **Tatjana Isaković**

NAMESTNIK PREDSTOJNICE DEPUTY HEAD
prof. dr. Žiga Turk

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doc. dr. Anže Babič, prof. dr. Boštjan Brank, doc. dr. Tomo Cerovšek, prof. doc. dr. Matevž Dolenc, dr. Matjaž Dolšek, doc. dr. Jaka Dujc, Mario Farič, Neja Fazarinc, doc. dr. Matija Gams, asist. Luka Gradišar, izr. prof. dr. Andreja Istenič, dr. Aleš Jamšek, asist. Antonio Janevski, Danijel Kirn, doc. dr. Robert Klinc, asist. Nemanja Krtinić, asist. Nina Kumer, asist. Blaž Kurent, asist. dr. Marko Lavrenčič, asist. dr. Nuša Lazar Sinković, Dejan Papič, Gordan Praštalo, Veronika Pučnik, asist. dr. Jure Snoj, prof. dr. Vlado Stankovski, asist. Milena Tomić, Jure Starc, dr. Elizabeth Luz Vaquez Munoz, Andrej Vitek, doc. dr. Jure Žižmond, asist. dr. Blaž Zoubek.

Inštitut za konstrukcije, potresno inženirstvo in računalništvo (IKPIR) je bil ustanovljen leta 1971 z imenom Računski center FAGG kot interni inštitut fakultete za potrebe pedagoškega, znanstvenoraziskovalnega in strokovnega dela. Leta 1980 se je preimenoval v Inštitut za konstrukcije, potresno inženirstvo in računalništvo, kar je odsevalo novo vsebino in obseg dejavnosti inštituta na treh poglavitnih področjih. Razvil se je v najmočnejšo pedagoško-raziskovalno enoto na fakulteti, tako po številu sodelavcev kot tudi po številu opravljenih raziskovalnih projektov in objavljenih del. Na področjih svojega delovanja je z razvojnim, raziskovalnim in pedagoškim delom bistveno vplival na razvoj gradbene stroke doma in na nekaterih področjih pomembno prispeval tudi k razvoju v svetu. Opravil je pionirsko delo pri uvajanju računalniške analize konstrukcij in gradbene informatike v širšem pomenu besede v Sloveniji ter se uvrstil v svetovni vrh na področju potresnega inženirstva. IKPIR sodi med pomembna evropska raziskovalna središča gradbene informatike.

Sedanji in že upokojeni sodelavci so ves čas imeli ali imajo pomembne zadolžitve v organih F(A)GG in Univerze v Ljubljani (E. Prelog je bil rektor univerze, P. Fajfar in J. Duhovnik sta bila dekana fakultete, Ž. Turk je prodekan za razvojno področje in M. Dolšek prodekan za raziskovalno in mednarodno področje), ARRS in njenih predhodnic, IZS, ZDGITS, SIST, SAZU in v različnih mednarodnih organizacijah.

Od leta 2001 v sklopu IKPIR-a delujeta dve katedri, Katedra za konstrukcije in potresno inženirstvo (KKPI) ter Katedra za gradbeno informatiko (KGI).

PEDAGOŠKA DEJAVNOST

Učitelji IKPIR-a izvajamo na dodiplomskem in podiplomskem študiju gradbeništva predavanja, vaje in seminarje s področij statike in dinamike konstrukcij, potresnega inženirstva, armiranobetonskih konstrukcij, računalništva, inženirske komunikacije, digitalnega načrtovanja in gradbene informatike. Na podlagi izkušenj iz sodelovanja z Univerzo Stanford uvajamo projektni in interdisciplinarni študij. V letih 2022–2023 smo bili mentorji pri številnih doktorskih in magistrskih nalogah in študentom z različnih tujih univerz. Na IKPIR-u se že leta formalno in neformalno usposabljajo številni tuji raziskovalci iz Hrvaške, Irana, Italije, Kitajske, Mehike, Romunije, Srbije, ZDA in nekdanje Sovjetske zveze. Kot predavatelji smo sodelovali tudi pri dodiplomskem in podiplomskem študiju na različnih tujih univerzah.

V preteklem obdobju je na KGI v okviru programa ERASMUS+ potekal zelo uspešen evropski magistrski študij BIM A+ (angl. European Master in Building Information Modelling), ki se izvaja skupaj z Univerzo v Minhu in Politehniko iz Milana. Program predstavlja odziv na vse večje potrebe trga EU po storitvah BIM, ki predstavlja prihodnost projektiranja in digitalizacije procesa graditve.

The Institute of Structural Engineering, Earthquake Engineering and Construction IT (IKPIR) was established in 1971 as a computer centre of the former FAGG, an internal institute in the service of teaching, scientific research and professional activities. In 1980, it changed its name to the current one, reflecting the new content and scope of the Institute's activities in three main areas of work. It has developed into the strongest teaching and research unit at the Faculty, both in terms of the number of employees as well as the number of completed research projects and published works. In its fields of activity, it has had a significant influence on the development of the construction industry in Slovenia through the development, research and teaching work, and has, in some areas, also made a significant contribution to development worldwide. It has pioneered the introduction of computer analysis of structures and construction IT in the broader sense of the word in Slovenia and is among the world leaders in the field of earthquake engineering. IKPIR is one of the most important European research centres for construction IT.

Current and retired colleagues held and still hold important positions in the bodies of the F(A)GG and the University of Ljubljana (E. Prelog was the Rector of the University, P. Fajfar and J. Duhovnik were the Deans of the Faculty, Ž. Turk is Vice-Dean for Development and M. Dolšek Vice-Dean for Research and International Affairs), the Slovenian Research Agency and its predecessor organisations, the Slovenian Chamber of Engineers, the Union of Associations of Slovenian Civil Engineers and Technicians, the Slovenian Institute for Standardisation, the Slovenian Academy of Sciences and Arts, and various international organisations.

Since 2001, there have been two chairs within IKPIR: the Chair of Structural and Earthquake Engineering and the Chair of Construction IT.

EDUCATIONAL ACTIVITY

The lecturers at IKPIR conduct lectures, tutorials and seminars in the fields of structural analysis and structural dynamics, earthquake engineering, reinforced concrete structures, computer science, engineering communication, digital design and construction IT as part of undergraduate and postgraduate studies in civil engineering. Based on the experience gained from our collaboration with Stanford University, we are introducing project-based and interdisciplinary studies. In 2022–2023, we supervised numerous doctoral and master theses, not only for full-time students of UL FGG, but also for foreign students from various universities. For years, IKPIR has formally and informally trained numerous foreign researchers from Croatia, Iran, Italy, China, Mexico, Romania, Serbia, the USA and the former Soviet Union. As lecturers, we have also participated in undergraduate and postgraduate studies at various foreign universities.

Recently, the Chair of Construction IT, together with the University of Minho and the Polytechnic of Milan, has been running a very successful European Master Programme in Building Information Modelling (BIM A+) as part of the ERASMUS+ programme. The programme is a response to the growing demand of the EU market for BIM services,

RAZISKOVALNA IN STROKOVNA DEJAVNOST

Tudi v letih 2022–2023 smo na IKPIR-u zelo aktivno delovali na razvoju gradbene stroke v Sloveniji in v širšem mednarodnem okolju. K temu smo prispevali s svojim raznolikim in zelo uspešnim raziskovalnim delom, s prenosom rezultatov teh raziskav v prakso ter s svojim strokovnim delom.

Raziskave, ki jih izvajamo na IKPIR-u, pokrivajo vsa poglavitna področja njegovega delovanja. Raziskovalci, zaposleni na KKPI, se ukvarjajo z razvojem naprednih metodologij za analizo in projektiranje konstrukcij. Še posebej so aktivni na področju potresnega inženirstva, kjer med drugim razvijajo tudi metode za analizo potresnega tveganja grajenega okolja in inovativne sisteme za potresno zaščito gradbenih konstrukcij. Raziskovalci na KGI se ukvarjajo z raziskavami na področju rabe informacijskih in komunikacijskih tehnologij v gradbeništvu – z računalniško integrirano graditvijo, konceptualnim in informacijskim modeliranjem, računskimi in sodelovalnimi infrastrukturami ter z gradbeništvom 4.0. Proučujejo tudi tehnične, organizacijske, ekonomske, sociološke, pedagoške in druge vidike rabe informacijske tehnologije.

Naše raziskave potekajo v okviru dveh programskih skupin, Potresno inženirstvo in E-gradbeništvo, ter v okviru številnih mednarodnih in domačih raziskovalnih projektov. Programska skupina Potresno inženirstvo je bila v preteklem obdobju med najbolje ocenjenimi v Sloveniji.

V letih 2022–2023 smo rezultate svojih raziskav predstavili v številnih znanstvenih in strokovnih člankih v najbolj uglednih mednarodnih revijah, na različnih mednarodnih in domačih srečanjih in delavnicah ter v okviru vabljenih predavanj na različnih univerzah po celem svetu. Člani IKPIR-a so tudi uredniki uglednih mednarodnih znanstvenih revij.

Zelo tesno sodelujemo z različnimi domačimi in tujimi podjetji ter z Evropsko federacijo gradbene industrije. Sodelavci na KKPI so v letih 2022–2023 dejavno sodelovali pri pripravi novih skupnih evropskih standardov kot člani delovnih skupin TC250 in SIST. Sodelavci na KGI zelo aktivno delujejo na področju uvajanja BIM-a v projektantsko prakso in na njegovi standardizaciji.

V preteklem obdobju smo sodelovali pri recenzijah in revizijah večjega števila pomembnih projektov, med katerimi je treba poudariti tiste, povezane z nuklearno elektrarno v Krškem.

Več informacij o zgodovini in dejavnosti Inštituta je na voljo na prenovljeni spletni strani na naslovu: https://www.ikpir.fgg.uni-lj.si/.

which represent the future of design and digitalisation of the construction process.

RESEARCH AND PROFESSIONAL ACTIVITES

In the period 2022–2023, our researchers were also very active in the development of the construction industry in Slovenia and in the wider international environment. We contributed to this with our diverse and very successful research work, the transfer of research results into practice and our professional work.

The research carried out at IKPIR covers all important areas of its activities. The researchers from the Chair of Structural and Earthquake Engineering work on the development of advanced methods for the analysis and design of structures. They are particularly active in the field of earthquake engineering, where they develop methods for analysing the seismic risk of the built environment and innovative systems for the earthquake protection of buildings. The researchers of the Chair of Construction IT conduct research in the field of the use of information and communication technologies in construction - with computer-integrated construction, conceptual and information modelling, computer-aided and collaborative infrastructures and Construction 4.0. They also study technical, organisational, economic, sociological, educational and other aspects of the use of information technology.

Our research is carried out in two core programme groups, Earthquake Engineering and E-Construction, and in numerous international and national research projects. The programme group Earthquake Engineering has been one of the best-rated in Slovenia.

In 2022–2023, we presented the results of our research in numerous scientific and professional articles in the most prestigious international journals, at various international and national conferences and workshops, and as invited lectures at various universities around the world. The members of IKPIR are also editors in prestigious international scientific journals.

We work very closely with various Slovenian and foreign companies and with the European Construction Industry Federation. In 2022–2023, the members of the Chair of Structural and Earthquake Engineering were actively involved in the development of new common European standards as members of the TC250 and SIST working groups. The members of the Chair of Construction IT are very active in the field of introducing BIM into design practice and its standardisation.

In the reported period, we participated in the reviews and audits of numerous important projects, of which those related to the Nuclear Power Plant in Krško stand out.

More information on the history and activities of the Institute is available at: https://www.ikpir.fgg.uni-lj.si/.

ODDELEK ZA GEODEZIJO
DEPARTMENT OF GEODETIC ENGINEERING

prof. dr. **Anka Lisec**
predstojnica Oddelka za geodezijo Head of the Department of Geodetic Engineering

UL FGG z Oddelkom za geodezijo je edina ustanova v Sloveniji, ki izvaja študijske programe s področja geodezije in geoinformatike. Delo je organizirano na petih katedrah:
— Katedra za geodezijo,
— Katedra za geoinformatiko in katastre nepremičnin,
— Katedra za kartografijo, fotogrametrijo in daljinsko zaznavanje,
— Katedra za matematično in fizikalno geodezijo ter navigacijo in
— Katedra za prostorsko planiranje.

Na oddelku je zaposlenih 41 sodelavcev, od tega 23 učiteljev, osem asistentov, štirje tehnični in strokovni sodelavci, šest raziskovalcev in mladih raziskovalcev.

UL FGG with its Department of Geodetic Engineering is the only institution in Slovenia providing study programmes from the area of geodesy and geoinformatics. The work is organised in five chairs:
— Chair of Geodesy,
— Chair of Geoinformatics and Real Estate Cadastres,
— Chair of Cartography, Photogrammetry and Remote Sensing,
— Chair of Mathematical and Physical Geodesy and Navigation, and
— Chair of Spatial Planning.

The Department consists of 41 members, of those 23 teachers, 8 assistants, 4 technical and professional associates, 6 researchers and young researchers.

Izvajamo dva študijska programa prve stopnje:
— univerzitetni študijski program Geodezija in geoinformatika,
— visokošolski strokovni študijski program Tehnično upravljanje nepremičnin

in dva študijska programa druge stopnje:
— magistrski študijski program Geodezija in geoinformatika,
— magistrski študijski program Prostorsko načrtovanje.

Temeljne naloge tradicionalne geodezije so geodetska izmera, pridobivanje, analiziranje in upravljanje prostorskih podatkov. V preteklosti je bila zmogljivost tehnologij za zajem in obdelavo prostorskih podatkov omejena. V zadnjih letih je geodezijo močno zaznamoval pojav tehnologij za množičen zajem prostorskih podatkov. Z razvojem informacijske tehnologije se je geodeziji pridružila geoinformatika, ki se ukvarja s prostorskimi podatkovnimi bazami, analiziranjem, modeliranjem in vizualizacijo prostorskih podatkov ter posredovanjem prostorskih podatkov in informacij.

Ena od nalog geodezije je tudi upravljanje podatkov o nepremičninah v okviru uradnih evidenc državne geodetske službe, kot so katastri, ter upravljanje nepremičnin. Nepremičninski podatki skupaj s topografskimi in drugimi prostorskimi podatki podpirajo raznolike odločitve v prostoru. Prostorsko načrtovanje ter upravljanje nepremičnin je tradicionalno eno od področij, ki ima svoje mesto na Oddelku za geodezijo.

Nove tehnologije za pridobivanje in obdelavo prostorskih podatkov ter njihovo analitiko in vizualizacijo prispevajo k večji množici prostorskih podatkov, digitalne tehnologije pa so močno razširile tudi uporabnosti prostorskih podatkov in informacij. Slednji so skupaj s celotno infrastrukturo za pridobivanje in uporabo geoprostorskih informacij postali eni izmed temeljev delovanja naše družbe. Vse večja potreba po ustreznih prostorskih informacijah in tehnološki razvoj ponujata izjemne priložnosti za strokovnjake na področjih geodezije, geoifnormatike, prostorske analitike ter upravljanja grajenega in naravnega okolja.

Diplomanti naših študijskih programov pridobijo bogata znanja s področij geodezije, geoinformatike, upravljanja nepremičnin in prostorskega načrtovanja. V prostoru delujejo in se srečujejo številne stroke, zato je pomembno njihovo interdisciplinarno delo, v katerem so lahko uspešni le široko izobraženi in razgledani strokovnjaki.

PEDAGOŠKA DEJAVNOST

Pedagoško delo na Oddelku za geodezijo s svojo vsebino pokriva široko področje geoprostorske znanosti: od geodetske

We implement two first-cycle study programmes:
— academic study programme Geodesy and Geoinformation,
— higher education professional study programme Technical Real Estate Management

and two second-cycle study programmes:
— master study programme Geodesy and Geoinformation,
— master study programme Spatial Planning.

The basic tasks of geodesy are the acquisition and management of spatial data. In the past, the capacity of technologies to capture and process spatial data was limited. In recent years, geodesy has been strongly influenced by the emergence of technologies for the mass acquisition of spatial data. With the development of information technology, geodesy was joined by geoinformatics, which deals with spatial databases, the analysis, modelling and visualization of spatial data and the transfer of spatial data and information.

The tasks of geodesy also include the management of real estate data in the official records of the state geodetic service, e.g. in cadastres, and real estate management. Real estate data together with topographical and other spatial data support diverse spatial decisions. Spatial planning and real estate management are traditionally the areas that have their place in the Department of Geodetic Engineering.

New technologies for the acquisition and processing of spatial data, as well as their analysis and visualization, contribute to a greater amount of spatial data, and digital technologies have also greatly expanded the usefulness of spatial data and information. The latter, together with the entire infrastructure for the acquisition and use of geoinformation, have become one of the foundations of activities in our society. The increasing demand for relevant spatial information and technological development offer exceptional opportunities for experts in geodesy, geoinformatics, spatial analytics and management of the built and natural environment.

Graduates of our study programmes acquire a wealth of knowledge in the fields of geodesy, geoinformatics, real estate management and spatial planning. Many professions work and meet in space, which is why their interdisciplinary work is important, in which only broadly trained and knowledgeable experts can be successful.

EDUCATIONAL ACTIVITY

The educational work at the Department of Geodetic Engineering covers a wide range of geospatial sciences: from geodetic measurements and other forms of spatial

izmere ter drugih oblik zajemanja prostorskih podatkov s senzorji na satelitskih, letalskih in terestričnih platformah, preko obdelave in analize podatkov v sodobnih geoprostorskih informacijskih sistemih, do njihove uporabe v obliki lokacijskih storitev ter v podporo prostorskim odločitvam, vključno s prostorskim načrtovanjem. Študijski programi sledijo razvoju stroke in znanosti v svetu, posebna pozornost pa je namenjena tudi potrebam v Sloveniji in širši regiji.

Geodezija se v svoji osnovi ukvarja z izmero in metričnim opazovanjem Zemlje ter objektov in pojavov na njenem površju. Sem spadata tudi inženirska geodezija s preciznim opazovanjem naravnega in grajenega okolja ter zemljemerstvo s pomembnim področjem izmere in upravljanja zemljišč oziroma nepremičnin. Med kompetencami, ki se jih pričakuje od bodočih inženirjev našega oddelka, velja izpostaviti tudi prostorsko informatiko. Posledično se pri pedagoškem delu ne srečujemo le z inženirskimi znanji, kot so geodetska izmera, kartografija, fotogrametrija, daljinsko zaznavanje in geoinformatika, pomembna področja so tudi osnove gradbeništva, prostorsko načrtovanje, pravo, organizacija del in ekonomika. Geodetska dejavnost je namreč povezana s spremljanjem pojavov v prostoru ter predstavlja pomemben del načrtovanja in izvajanja posegov v prostor.

Posebno pozornost v pedagoškem procesu namenjamo novim tehnologijam, s katerimi se srečujemo v geodeziji in geoinformatiki. Pri tem izpostavljamo predvsem nove senzorje in tehnologije za pridobivanje prostorskih podatkov, računalniške tehnologije in informacijsko-komunikacijske rešitve za zmogljivo obdelavo, integracijo in analitiko množice podatkov ter učinkovito posredovanje informacij uporabnikom. V naših študijskih programih je tem vsebinam namenjena ustrezna pozornost.

Cilj študijskih programov na Oddelku za geodezijo je vzgoja strokovnjakov na področjih geodezije, geoinformatike, upravljanja nepremičnin ter prostorskega načrtovanja. Študij je organiziran na način, da se prepletajo teoretične vsebine s praktičnimi vajami, vključno s terenskim delom, projektnim delom, strokovnimi obiski in delavnicami. Tako se študenti pri večini strokovnih predmetov spoznavajo tudi s strojno opremo in programskimi rešitvami, ki jih bodo uporabljali kasneje v praksi. Naš cilj je izobraziti kadre, ki se bodo sposobni spoprijeti z različnimi strokovnimi izzivi, s katerimi se bodo lahko srečali v svojem poklicnem življenju.

V pedagoški proces vključujemo predavatelje iz gospodarstva in javne uprave ter organiziramo strokovne ekskurzije v

data acquisition using sensors on satellites, aircraft and terrestrial platforms, to data processing and analysis in modern geoinformatics systems, to their use in the form of positioning services and in support of spatial decisions, including spatial planning. The study programmes follow the development of the profession and science in the world, paying special attention to the needs in Slovenia and the wider region.

Geodesy is essentially concerned with the measurement and metric observation of the Earth and the objects and phenomena on its surface. This also includes engineering geodesy with the precise observation of the natural and built environment and surveying with the important area of measuring and managing land or real estate. Spatial informatics is also one of the skills expected of future engineers graduating from our department. Thus, in our educational work, we not only encounter engineering skills such as geodetic surveying, cartography, photogrammetry, remote sensing and geoinformatics, important areas also include the fundamentals of civil engineering, spatial planning, law, work organization and economics. Geodetic activity is related to the monitoring of phenomena in space and is an important part of the planning and implementation of interventions in space.

In the educational process, we pay particular attention to the new technologies in geodesy and geoinformatics. In particular, we would like to highlight the new sensors and technologies for acquiring spatial data, computer technologies and information and communication solutions for the efficient processing, integration and analysis of large amounts of data and the efficient provision of information to users. Our study programmes reflect these contents to a sufficient degree.

The aim of the study programs at the Department of Geodetic Engineering is to educate experts in the fields of geodesy, geoinformatics, real estate management and spatial planning. The study is organized in such a way that theoretical content is interwoven with practical exercises, including field work, project work, expert visits and workshops. Thus, in most professional courses, students also learn about hardware and software solutions that they will later use in practice. Our aim is to educate professionals who will be able to cope with the various professional challenges they may face during their career.

We involve lecturers from business and public administration in the teaching process and organise professional excursions in Slovenia and abroad. We enable students to participate in research and

Sloveniji in tujini. Študentom omogočamo sodelovanje pri raziskovalnem in strokovnem delu, kjer spodbujamo tudi sodelovanje z institucijami doma in v tujini. UL FGG je vključena v mednarodne programe študijskih izmenjav in praktičnega usposabljanja, predvsem v okviru evropskega programa ERASMUS. Na ta način spodbujamo internacionalizacijo študija. Izkušnje in kompetence, ki jih študenti pridobijo na izmenjavah v tujini, so pomembne pri nadaljnji karierni poti študentov.

Na Oddelku za geodezijo imamo na študijskih programih prve stopnje vpisanih okrog 140 študentov in na študijskih programih druge stopnje približno 90 študentov. Študentom je na razpolago sodobna geodetska in geoinformacijska merska, računalniška in programska oprema. Za promocijo stroke sodelavci Oddelka za geodezijo pripravljamo tematska predavanja za srednje šole ter sodelujemo pri številnih drugih promocijskih dogodkih.

ZNANSTVENORAZISKOVALNA DEJAVNOST

Na Oddelku za geodezijo želimo vzpostaviti okolje za najnaprednejše raziskave na področjih obdelave, povezovanja in uporabe prostorskih podatkov ter na področju naprednih prostorskih informacijskih rešitev. Znanstvenoraziskovalno delo poteka v okviru treh raziskovalnih programov: »Geoinformacijska infrastruktura in trajnostni prostorski razvoj Slovenije«, »Opazovanje Zemlje in geoinformatika« in »Dinamična zemlja«, v katera so vključeni raziskovalci Oddelka za geodezijo ter Inštituta za komunalno gospodarstvo z Oddelka za gradbeništvo.

Raziskovalno delo je usmerjeno na aktualna razvojna področja sodobne geodezije, geoinformatike, opazovanja Zemlje, kartografije, fotogrametrije, katastrov nepremičnin, vrednotenja nepremičnin, komunalnega inženirstva in prostorskega načrtovanja. Na področju geodezije in pozicioniranja je posebna pozornost namenjena geodetskim referenčnim koordinatnim sistemom, ki med drugim vključuje vzpostavitev, razvoj in vzdrževanje državnega koordinatnega sistema. S tem so povezane raziskave za razvoj metod, algoritmov in programske opreme za določanje položaja v globalnih navigacijskih satelitskih sistemih, modeliranje težnostnega polja Zemlje, spremljanje in modeliranje geokinematičnega dogajanja na ozemlju Slovenije, razvoj metod natančne geodetske izmere za potrebe geodetskega monitoringa naravnega in grajenega okolja, razvoj metod izmere in obdelave podatkov za sisteme nepremičninske administracije ter v podporo načrtovanju in razvoju prostora.

Hiter razvoj senzorjev za zajem prostorskih podatkov,

professional work, and we also promote cooperation with national and international institutions. UL FGG is involved in international study exchange and training programmes, mainly as part of the European ERASMUS programme. In this way, we promote the internationalisation of studies. The experience and competences that students acquire during their time abroad are important for their future careers.

At the Department of Geodetic Engineering, we have about 140 students enrolled in the first-cycle study programmes and about 90 in second-cycle study programmes. Students have access to modern geodetic and geoinformation measuring equipment, computers and software. To promote the profession, colleagues from the Department of Geodetic Engineering prepare themed presentations for secondary schools and take part in many other promotional events.

SCIENTIFIC-RESEARCH ACTIVITY

At the Department of Geodetic Engineering, we aim to create an environment for the most advanced research in the fields of spatial data processing, integration and utilisation, as well as in the field of advanced spatial information solutions. Scientific and research work takes place within three core research programmes, i.e.: »Geoinformational Infrastructure and Sustainable Spatial Development of Slovenia«, »Earth Observation and Geoinformatics« and »Dynamic Earth«, which includes researchers from the Department of Geodetic Engineering and Institute of Municipal Economics from the Department of Civil Engineering.

The research work focuses on current areas of development in modern geodesy, geoinformatics, Earth observation, cartography, photogrammetry, real estate cadastre, real estate valuation, municipal engineering, and spatial planning. In the field of geodesy and positioning, special attention is paid to geodetic reference coordinate systems, including the establishment, development and maintenance of the national coordinate system. Related to this is research for the development of methods, algorithms and software for positioning in global satellite navigation systems, modelling of the Earth's gravitational field, monitoring and modelling of geokinematic events on the territory of Slovenia, development of precise geodetic measurement methods for the needs of geodetic monitoring of the natural and built environment, development of measurement and data processing methods for real estate management systems and to support spatial planning and development.

The rapid development of sensors for spatial data acquisition, new platforms for massive spatial data

nove platforme za množičen zajem prostorskih podatkov, naraščajoče število satelitov za opazovanje Zemlje in odprt dostop do raznolikih prostorskih podatkov so povzročili pravo revolucijo na področju opazovanja Zemlje in geoinformatike. Te tehnologije postajajo vsakodnevno orodje v številnih študijah in uporabniških rešitvah na raznolikih področjih: od arheologije, biologije in ekologije, preko geografije, meteorologije, geologije, upravljanja z nesrečami in tveganji, do kmetijstva in gozdarstva. V preteklih letih smo na Oddelku za geodezijo močno povečali raziskovalne dejavnosti na omenjenih področjih. Nove raziskovalne izzive prinaša vse večja kompleksnost naravnega in grajenega okolja, ki zahteva nove pristope na področju modeliranja in vizualizacije prostorskih podatkov. 3D/4D-prostorsko modeliranje je postalo ena vodilnih raziskovalnih tem na področju geodezije in geoinformatike na mednarodni ravni.

Poleg dela v okviru raziskovalnih programov izvajamo domače, evropske in mednarodne raziskovalne in razvojne projekte, v katere vključujemo mlade raziskovalce in uspešne študente. Večina projektov je izredno interdisciplinarnih, kjer sodelujemo z raziskovalci domačih in tujih institucij. Izsledke raziskovalnega in razvojnega dela predstavljamo na domačih in tujih znanstvenih in strokovnih konferencah, objavljamo v mednarodno uveljavljenih revijah, kjer sodelujemo tudi kot člani uredniških odborov in recenzenti. Pri glasilu Zveze geodetov Slovenije, Geodetskem vestniku, objavljamo in delujemo kot uredniki in recenzenti.

STROKOVNA DEJAVNOST

Pri reševanju razvojnih in strokovnih problemov sodelujemo z različnimi institucijami, med drugimi z Geodetsko upravo RS, Geodetskim inštitutom Slovenije, ministrstvi in lokalnimi skupnostmi. Sodelujemo tudi z gospodarskimi družbami in institucijami, ki razvijajo rešitve na širših področjih geodezije, geoinformatike in prostorskega načrtovanja. Dejavni smo pri strokovnih združenjih s področja geodezije in prostorskega načrtovanja, kot so Inženirska zbornica Slovenije, Zbornica za arhitekturo in prostor, Gospodarsko interesno združenje izvajalcev geodetskih storitev ter Zveza geodetov Slovenije. Na mednarodni ravni smo dejavno vključeni v mednarodna in evropska združenja, kot so FIG, ISPRS, IAG, ICA, OGC, EuroSDR, ESA in EALD. S strokovnim delom in povezovanjem v mednarodne mreže pomembno prispevamo tudi k pedagoškemu delu in raziskovalni dejavnosti, saj na ta način lažje usmerjamo usposabljanja in razvojno delo s potrebami družbe.

acquisition, the growing number of Earth observation satellites and open access to diverse spatial data have triggered a real revolution in the field of Earth observation and geoinformatics. These technologies are becoming an everyday tool in many studies and user solutions in diverse fields: from archaeology, biology and ecology to geography, meteorology, geology, disaster and risk management, agriculture, and forestry. In recent years, the Department of Geodetic Engineering has greatly expanded its research activities in the above-mentioned areas. The increasing complexity of the natural and built environment poses new challenges for research, which require new approaches in modelling and visualization of spatial data. 3D/4D spatial modelling has become one of the leading research topics in geodesy and geoinformatics at the international level.

In addition to our work in research programmes, we carry out national, European and international research and development projects in which we involve young researchers and successful students. Most of the projects are highly interdisciplinary, and we collaborate with researchers from domestic and foreign institutions. We present the results of our research and development work at scientific and professional conferences in Slovenia and abroad and publish them in internationally recognized journals, in which we also participate as members of editorial boards and reviewers. We publish and work as editors and reviewers for the journal of the Association of Surveyors of Slovenia, Geodetski vestnik.

PROFESSIONAL ACTIVITY

In solving development and professional problems, we cooperate with various institutions, including the Geodetic Administration of the Republic of Slovenia, the Geodetic Institute of Slovenia, ministries, and local communities. We also cooperate with commercial companies and institutions that develop solutions in the wider fields of geodesy, geoinformatics and spatial planning. We are active in professional organisations in the field of geodesy and spatial planning, such as the Chamber of Engineers of Slovenia, the Chamber of Architecture and Spatial Planning of Slovenia, the Association of Economic Interests of Geodetic Service Providers and the Association of Surveyors of Slovenia. Internationally, we are actively involved in international and European associations such as FIG, ISPRS, IAG, ICA, OGC, EuroSDR, ESA and EALD. Through our professional work and our involvement in international networks, we also make an important contribution to educational work and research activities, as this enables us to better align our training and development work with the needs of society.

VISOKOŠOLSKI STROKOVNI ŠTUDIJSKI PROGRAM PRVE STOPNJE TEHNIČNO UPRAVLJANJE NEPREMIČNIN FIRST-CYCLE PROFESSIONAL STUDY PROGRAMME TECHNICAL REAL ESTATE MANAGEMENT

SKRBNIK TRUSTEE
doc. dr. **Marjan Čeh**

Visokošolski strokovni študijski program prve stopnje Tehnično upravljanje nepremičnin traja tri leta (šest semestrov) in obsega skupaj 180 kreditnih točk. Študijski program ne vključuje smeri in se izvaja kot redni in izredni študij.

Temeljni cilj študijskega programa je usposobiti strokovnjaka s kakovostnim znanjem in temeljno podlago predvsem uporabniških znanj s področij geodezije in upravljanja nepremičnin.

Pridobljena znanja omogočajo diplomantu hitro in učinkovito vključitev v delo ob zaposlitvi ter predstavljajo podlago za samostojno sledenje razvoju stroke v sklopu vseživljenjskega učenja, izhodišče za študij geodezije in geoinformatike na drugi stopnji, prehajanje med sorodnimi študijskimi programi ter vseevropsko primerljivost dosežene izobrazbe.

Splošne kompetence so sposobnosti opredeljevanja, razumevanja in reševanja aplikativnih problemov na področju geodetskega inženirstva in upravljanja nepremičnin; kritičnega vrednotenja konkretnih rešitev; poklicne strokovne, okoljske in družbene odgovornosti; strokovnega sporazumevanja v pisni in ustni obliki; uporabe izbrane informacijske tehnologije s področij geodezije in upravljanja nepremičnin; povezovanja z drugimi strokami in dela v skupinah s strokovnjaki z različnih področij; vodenja manjšega geodetskega podjetja.

Predmetno-specifične kompetence diplomanta so: poznati vlogo in pomen upravljanja nepremičnin v trajnostno naravnani družbi ob podpori geodezije in geoinformatike; samostojno reševati naloge s področja urejanja podatkov in manj zahtevnih preureditev nepremičnin; razumeti in strokovno uporabljati sodobne geodetske merske postopke v prid nastajanju in vzdrževanju zbirk podatkov; evidentirati meje lastništva in meje drugih pravic na nepremičninah ter upravlja zemljiške informacijske sisteme; evidentirati ter vzdrževati zbirke katastrskih podatkov za potrebe obdavčitve nepremičnin; poznati pomen urbanega in ruralnega prostorskega načrtovanja in določitve rabe zemljišč; sodelovati pri pripravi prostorskih aktov; sodelovati pri načrtovanju, zasnovi in izvedbi nepremičninskih posegov v prostor; izvajati geodetska dela pri detajlni geodetski izmeri v graditvi, katastru in topografiji; razumeti kartografske prikaze prostorskih podatkov; poznati osnove pravnega in upravnega sistem

Professional first-cycle bachelor degree programme Technical Real Estate Management consists of 3 years (6 semesters) and amounts to 180 ECTS points. The study programme does not include orientations. It is carried out as a regular and part-time study.

The basic goal of the programme is to train experts with professional skills and fundamental theoretical and mostly practical knowledge in the fields of geodesy and real estate management. The acquired knowledge enables the graduates to quickly and effectively start work of their first employment. It is the basis for independent lifelong learning within the profession. It is an appropriate basis for the study of geodesy and geoinformation at the second cycle, it enables transition between related study programmes and ensures European comparability of achieved education.

The acquired knowledge enables and represents effective involvement of the graduate in employment, a basis for independent monitoring of the development of the profession in the context of lifelong learning, the starting point for the study of geodesy and geoinformatics at the second level, transition between related study programmes, pan-European comparability.

General competencies are the abilities to define, understand and solve application problems in the fields of geodesy and real estate management; critically evaluate concrete solutions, assume professional, environmental and social responsibility; professionally communicate in written and oral form; use selected information technology in the fields of geodesy and real estate management; network with other professions and work in groups with experts from various fields; run a small surveying company.

Course-specific competencies of the graduate are: knowledge of the role and importance of real estate management in a sustainable society with the support of geodesy and geoinformatics; independent solving of tasks in the field of data editing and less demanding real estate rearrangements; understanding and professional usage of modern geodetic measurement procedures in favour of the creation and maintenance of databases; recording of the boundaries of ownership and the boundaries of other rights to real estate and managing land information systems; evaluating the market value of the real estate; recording and maintaining cadastral databases for real estate taxation; knowing the importance of urban and rural spatial planning and definition of land use; participating in the preparation of spatial documents; participating in the planning, design and implementation of real estate interventions in space; performing geodetic works for detailed geodetic measurements in the construction, cadastre and topography; understanding of cartographic representations of spatial data; knowledge of the basics of the legal and administrative system.

PREDMETNIK CURRICULUM

1. letnik 1st year

Geodezija Surveying • ECTS 8

Infrastrukturni objekti Infrastructural Objects • ECTS 4

Inženirska matematika I Engineering Mathematics I • ECTS 5

Programska orodja v upravljanju nepremičnin Software in Real Estate Management • ECTS 5

Zakonodaja upravljanja nepremičnin Legislation on Real Property Management • ECTS 4

Statistika z elementi informatike Statistics with Elements of Informatics • ECTS 5

Inženirska matematika II Engineering Mathematics II • ECTS 5

Kartografija in topografija Cartography and Topography • ECTS 4

Razvoj in načrtovanje v prostoru Development and Planning in Space • ECTS 4

Terestrična detajlna izmera Terrestrial Detail Surveying • ECTS 4

Analiza opazovanj v geodeziji Analysis of Survey Measurements I • ECTS 5

2. letnik 2nd year

Analiza opazovanj v geodeziji II Analysis of Survey Measurements II • ECTS 4

Obdelava podatkov Data Processing • ECTS 6

Geodezija pri gradnji objektov Geodesy for Building Construction • ECTS 6

Ekonomika in organizacija geodetskih del Economics and Organization of Surveying Work • ECTS 7

Daljinsko zaznavanje in fotogrametrija Remote Sensing and Photogrammetry • ECTS 7

Geodetski instrumenti in metode Geodetic Instruments and Methods • ECTS 6

Geografski informacijski sistemi Geographic Information Systems • ECTS 6

Katastri nepremičnin Real Property Cadastres • ECTS 8

Izbirni predmet I (UL FGG ali zunanji) Elective Course I (UL FGG or external) • ECTS 4

Praktično usposabljanje Practical Training • ECTS 6

3. letnik 3rd year

Upravljanje stavbnih zemljišč in vrednotenje Building Land Management and Valuation • ECTS 5

Metode prostorskih analiz v GIS Methods of Spatial Analyses in GIS • ECTS 5

Satelitsko podprta geodetska izmera Satellite Supported Geodetic Survey • ECTS 6

Referenčni sistemi v geodeziji Reference Systems in Geodesy • ECTS 5

Izbirni predmet II (UL FGG) Elective Course II (UL FGG) • ECTS 4

Izbirni predmet III (UL FGG ali zunanji) Elective Course III (UL FGG or external) • ECTS 5

Podrobno urbanistično načrtovanje Detailed Urban Planning • ECTS 5

Zemljiški management Land Management • ECTS 5

Terensko delo Field Work • ECTS 7

Izbirni predmet IV (UL FGG) Elective Course IV (UL FGG) • ECTS 5

Diplomsko delo Diploma Work • ECTS 8

Izbirni predmeti Elective Courses

Topografska fotogrametrija Topographic Photogrammetry • ECTS 4

Množično vrednotenje nepremičnin v GIS Mass Valuation of Real Properties in GIS • ECTS 4

Standardi v geodeziji in inženirstvu Standards in Geodesy and Engineering • ECTS 4

Meritve povečane natančnosti Measurements of Higher Accuracy • ECTS 5

Lokacijske storitve Location-Based Services • ECTS 5

Stanovanjsko in komunalno gospodarstvo Housing and Municipal Economics • ECTS 4

Varstvo okolja in prostorsko načrtovanje Environmental Protection and Spatial Planning • ECTS 4

Uporabno daljinsko zaznavanje Applied Remote Sensing • ECTS 4

Geodezija v inženirstvu Engineering Surveying • ECTS 5

Agrarne operacije Agrarian Land Operations • ECTS 5

Kartografska reprodukcija Cartographic Reproduction • ECTS 4

UNIVERZITETNI ŠTUDIJSKI PROGRAM PRVE STOPNJE GEODEZIJA IN GEOINFORMATIKA FIRST-CYCLE ACADEMIC STUDY PROGRAMME GEODESY AND GEOINFORMATION

SKRBNIK TRUSTEE
doc. dr. **Polona Pavlovčič Prešeren** (do maja 2022 until May 2022)
doc. dr. **Klemen Kregar** (od maja 2022 from May 2022)

Univerzitetni študijski program prve stopnje Geodezija in geoinformatika traja tri leta (šest semestrov) in obsega skupaj 180 kreditnih točk. Študijski program ne vključuje smeri in se izvaja kot redni in izredni študij.

Temeljni cilji programa je usposobiti strokovnjaka s kakovostnim znanjem in temeljno teoretično ter praktično podlago znanj s področij geodezije in geoinformatike. Diplomant ob zaključku študija pridobi primerno osnovo za učinkovito vključitev v poklic oziroma za nadaljnji raziskovalni študij na istem oziroma sorodnem študijskem programu. Pridobljena znanja diplomantu podajajo širok vpogled v zgodovinski razvoj in trenutno stanje stroke v Sloveniji, Evropi in širše; omogočajo izvedbo in kritično presojo postopkov, vezanih na geodezijo in geoinformatiko; zagotavljajo razvijati in poglabljati profesionalno inženirsko odgovornost ter primerljivost pridobljenih znanj na sorodnih študijskih programih v širši regiji.

Splošne kompetence, ki jih pridobi diplomant: sposobnost samostojnega študija novih tehnologij in metodologij; sposobnost razumevanja temeljnih tujih pojmov s posameznih področij ob uporabi tuje učne literature in zmožnost smiselne uporabe tujih pojmov pri sporazumevanju v slovenskem jeziku; sposobnost uporabe informacijsko-komunikacijske tehnologije s področij geodezije in geoinformatike; sposobnost povezovanja z drugimi strokami in dela v skupinah s strokovnjaki z različnih področij, ter sposobnost vodenja manjših geodetskih podjetij.

Diplomant pridobi naslednje predmetno-specifične kompetence: spozna se z vlogo in pomenom geodezije in geoinformatike v sodobni družbi; samostojno rešuje vse vrste tipičnih geodetskih nalog s področij zajemanja, ocenjevanja kakovosti in uporabnosti geodetskih podatkov; razume in strokovno uporablja sodobne geodetske tehnologije in metodologije za pridobivanje prostorskih podatkov z ustrezno natančnostjo; pozna in pravilno uporablja prostorske podatke glede na njihov pomen, obliko zapisov, kakovost, vire, pridobivanje in zajem prostorskih podatkov; izvaja geodetska dela pri: vzdrževanju osnovnega geodetskega sistema in izmeri; graditvi manj zahtevnih objektov; upravnih postopkih za potrebe evidentiranja nepremičnin; načrtovanju, zasnovi in izvedbi posegov v prostor; vzdrževanju geografskih in kartografskih sistemov ter pripravi kartografskih prikazov prostorskih podatkov; ter aktivno sodeluje z investitorji, projektanti in izvajalci posegov v prostor.

Academic bachelor degree programme Geodesy and Geoinformation consists of three years (six semesters) and amounts to 180 credit points. The study programme does not include individual study orientations.

The basic goal of the programme is to train experts and equip them with professional skills and fundamental theoretical and practical knowledge in the fields of geodesy and geoinformation. Within elective courses, students are given the opportunity to improve their knowledge with related areas according to their interest. The acquired knowledge offers the graduates of the bachelor degree study a broad insight into the historical development and current status of the profession in Slovenia, Europe and beyond; to implement and critically assess procedures related to geodesy and geoinformation; to further develop and strengthen professional engineering responsibility; comparability of the knowledge acquired to similar programmes in the region.

General competences acquired by the graduate: to study new technologies and methodologies independently; to communicate in the native and in foreign languages with a special emphasis on the knowledge of foreign language terminology; to use information and communication technologies in the fields of geodesy and geoinformation; to connect with other professionals in working teams of different experts from various professional fields; to manage a small surveying firm engaged in solving professional problems.

The graduate acquires the following course-specific competences: knowledge of the role and importance of geodesy and geoinformation in modern society; ability to independently solve all kinds of typical surveying tasks in the areas of data capture and quality assessment as well as to make decisions related to the use of spatial information; ability to use modern surveying technologies and methodologies to acquire spatial data with appropriate precision or accuracy; knowledge of spatial data usage according to their importance, form of records, quality, resources, production and recovery; ability to use the measurement results and professional knowledge in maintenance of basic geodetic systems; less complex building construction; administrative procedures to meet the needs of real estate registration; participation in planning, design and implementation of interventions in space; maintenance of geographic and cartographic systems and preparation of cartographic spatial data; cooperation with investors, designers and contractors.

PREDMETNIK CURRICULUM

1. letnik 1st year

Matematika I Mathematics I • ECTS 10
Fizika za geodezijo Physics for Geodesy • ECTS 9
Programska orodja v geodeziji Software Tools in Geodesy • ECTS 5
Programska orodja v upravljanju nepremičnin Software in Real Estate Management • ECTS 5
Uvod v geodezijo Introduction to Geodetic Engineering • ECTS 4
Geodetski računi Geodetic Computations • ECTS 4

Matematika II Mathematics II • ECTS 8
Gradbeništvo in infrastruktura Civil Engineering and Infrastructure • ECTS 4
Statistične metode v geodeziji Statistical Methods in Geodesy • ECTS 4
Izravnalni račun I Adjustment Computations I • ECTS 4
Detajlna izmera Topographic Surveying and Mapping • ECTS 8

2. letnik 2nd year

Izravnalni račun II Adjustment Computations II • ECTS 4
Prostorsko načrtovanje Spatial Planning • ECTS 4
Višja geodezija Geodesy • ECTS 4
Kartografija Cartography • ECTS 8
Geoinformatika I Geoinformatics I • ECTS 6
Osnove obdelave podatkov Introduction to Data Processing • ECTS 4

Fotogrametrija I Photogrammetry I • ECTS 5
Precizna klasična geodetska izmera Precise Classical Geodetic Measurements • ECTS 9
GNSS v geodeziji GNSS in Geodesy • ECTS 8
Uvod v pravo Introduction to Law • ECTS 4
Izbirni predmet I (UL FGG ali zunanji) Elective Course I (UL FGG or external) • ECTS 4

3. letnik 3rd year

Urejanje podeželskega prostora Rural Planning • ECTS 4
Ekonomika in management v geodeziji Economics and Management in Geodesy • ECTS 5
Geodezija v inženirstvu I Engineering Surveying I • ECTS 6
Daljinsko zaznavanje I Remote Sensing I • ECTS 4
Stvarno pravo Property Law • ECTS 4
Izbirni predmet II (UL FGG) Elective Course II (UL FGG) • ECTS 7

Evidence in katastri nepremičnin Real Property Records and Cadastres • ECTS 8
Upravljanje in vrednotenje nepremičnin Real Estate Management and Evaluation • ECTS 6
Izbirni predmet III (UL FGG) Elective Course III (UL FGG) • ECTS 7
Praktično usposabljanje Practical Training • ECTS 4
Diplomsko delo Diploma Work • ECTS 5

Izbirni predmeti Elective Courses

Terensko delo Field Work • ECTS 6
Programiranje Programming • ECTS 4
Standardi v geodeziji in inženirstvu Standards in Geodesy and Engineering • ECTS 4
Hidrografija in toponomija Hydrography and Toponomy • ECTS 4
Merjenje in opisovanje prostora *Measurement and Description of Space • ECTS 4
Osnovne računske metode za inženirje Selected Topics from Geodetic Surveying • ECTS 4
Izbrane vsebine iz geodetske izmere Basic Computing Methods for Engineers • ECTS 4
Bližnjeslikovna fotogrametrija Close Range Photogrammetry • ECTS 4

*predmet je namenjen študentom drugih fakultet *the course is intended for students from other faculties (social sciences, etc.)

MAGISTRSKI ŠTUDIJSKI PROGRAM DRUGE STOPNJE GEODEZIJA IN GEOINFORMATIKA SECOND-CYCLE ACADEMIC STUDY PROGRAMME GEODESY AND GEOINFORMATICS

SKRBNIK TRUSTEE
doc. dr. **Dejan Grigillo**

Magistrski študijski program druge stopnje Geodezija in geoinformatika traja dve leti (štiri semestre) in obsega skupaj 120 kreditnih točk. Študijski program ne vključuje smeri.

Temeljni cilj študijskega programa je izobraziti strokovnjake, sposobne, kreativnega, kritičnega, učinkovitega in tvornega reševanja kompleksnih razvojno-raziskovalnih problemov ter projektno-aplikativnih nalog s področij geodezije in geoinformatike. Program zagotavlja odlične temelje za nadaljevanje študija na tretji stopnji katerekoli naravoslovno-tehnične smeri. Hkrati omogoča pridobitev licence pooblaščenega inženirja s področja geodezije pri Inženirski zbornici Slovenije. Dosežena izobrazba je primerljiva v mednarodnem smislu.

Splošne kompetence, ki se pridobijo s programom, so: splošna razgledanost in poznavanje akademskih področij in znanstvenih metod dela, usposobljenost za prenos in uporabo teoretičnega znanja v prakso, razvijanje visokih profesionalnih in etičnih meril ter poklicne, okoljske in socialne odgovornosti, razvijanje znanstvene pismenosti, javnega nastopanja in sporazumevanja s strankami, posredovanje in podajanje znanja in rezultatov, zmožnost uporabe domačega in tujega strokovnega jezika v pisni in govorni komunikaciji, komunikacije v mednarodnih in nacionalnih znanstvenih krogih, zmožnost uporabe in razvijanja geoinformacijske tehnologije, usposobljenost za vodenje geodetskih podjetij in javnih služb ali agencij s področij geodezije ali prostora.

Predmetno specifične kompetence, ki jih pridobijo diplomanti, so: samostojno reševanje vseh vrst strokovnih in razvojnih nalog s področij geodezije in geoinformatike, razumevanje, uporaba in razvoj sodobnih geodetskih metodologij in tehnologij ter usposobljenost njihovega nadgrajevanja, načrtovanje, organiziranje, vodenje in izvajanje geodetskih del pri vzpostavitvi, vzdrževanju in obnovi osnovnega geodetskega sistema, pri geodetski izmeri, pri graditvi vseh vrst objektov oz. splošno pri izvajanju vseh infrastrukturnih posegov v prostor, pri postopkih katastrskega (pre) urejanja in evidentiranja nepremičnin, na področjih topografije in kartografije, fotogrametrije in daljinskega zaznavanja, pri vzpostavljanju, vzdrževanju in nadgrajevanju geografskih, kartografskih in zemljiških informacijskih sistemov, sodelovanje pri pripravi prostorskih aktov in poznavanje pravnega, upravnega in ekonomskega sistema v točkah, ki so pomembne za geodeta.

The second cycle master study programme Geodesy and Geoinformatics lasts two years (four semesters) and comprises a total of 120 credit points. The study programme does not include orientations.

The basic goal of the study programme is to educate professionals capable of creative, critical, efficient and proactive solving of complex research and development issues and applied project tasks from the areas of geodesy and geoinformatics. The programme ensures excellent foundation for further studies at the third cycle of any natural science and technical programme. At the same time it enables students to obtain a license of Responsible Surveyor by the Slovenian Chamber of Engineers. The study programme provides students comparability of educational attainment also in an international context.

General competences acquired by the graduates are: they become generally well-informed experts with knowledge about academic areas and scientific work methods, ability to transfer and use theoretic knowledge in practice, development of high professional and ethical standards and professional, environmental and social responsibility, development of scientific literacy, skills of public appearance and communication with clients, transfer and presentation of knowledge and results, ability to use domestic and foreign professional language in written and oral communication, communication in international and national scientific circles, ability to use and develop geo-information technology, capacity to manage professional processes in surveying companies, public services or agencies in the fields of geodesy or spatial planning.

Course-specific competences acquired by the graduates: independent solving of all kinds of professional and development tasks in the fields of geodesy and geoinformatics, understanding, applying and developing modern surveying methodologies and technology and ability to upgrade them, planning, organising, managing and carrying out surveying tasks for the establishment, maintenance and restoration of the basic geodetic reference system, planning, organising, executing or leading geodetic works in land surveying, in construction of all types of buildings or generally in all types of infrastructural development in the physical environment, in the procedures of cadastral regulation and registration of real estate, in the fields of topography and cartography, in the fields of photogrammetry and remote sensing, at the establishment, maintenance and upgrading of geographic, cartographic and land information systems, participating in the preparation of spatial planning documents and knowing the legal, administrative and economic system in points important for the surveyor.

PREDMETNIK CURRICULUM

1. letnik 1st year

- Matematika III Mathematics III • ECTS 5
- Satelitska geodezija in navigacija Satellite Geodesy and Navigation • ECTS 5
- Izravnalni račun III Adjustment Computation III • ECTS 4
- Geodetski merski sistemi Geodetic Measuring Systems • ECTS 8
- Praktikum iz prostorskega načrtovanja Practicum from Spatial Planning • ECTS 4
- Izbirni predmet I Elective Course I • ECTS 7
- Geoinformatika II Geoinformatics II • ECTS 4
- Fizikalna geodezija Physical Geodesy • ECTS 4
- Analize prostorskih podatkov Spatial Data Analysis • ECTS 4
- Daljinsko zaznavanje in fotogrametrija II Remote Sensing and Photogrammetry II • ECTS 8
- Večpredstavnostna kartografija Multimedia Cartography • ECTS 7

2. letnik 2nd year

- Geodezija v inženirstvu II Engineering Survey II • ECTS 6
- Prostorska statistika Spatial Statistics • ECTS 4
- Zložba in preurejanje zemljišč Land Consolidation and Rearrangement • ECTS 4
- Množično vrednotenje nepremičnin Mass Real Estate Valuation • ECTS 4
- Izbirni predmet II Elective Course II • ECTS 12
- Projektna naloga Project Task • ECTS 20
- Magistrsko delo Master Thesis • ECTS 10

Izbirni predmeti Elective Courses

- Športna vzgoja Physical Education • ECTS 3
- Terensko projektno delo Field Project Work • ECTS 4
- Geoinformatika III Geoinformatics III • ECTS 4
- Projektno delo v kartografiji Project Work in Cartography • ECTS 4
- Zagotavljanje kakovosti geodetske izmere Quality Assurance of the Geodetic Survey • ECTS 4
- Optimizacija geodetskih mrež Optimization of Geodetic Networks • ECTS 4
- Izbrana poglavja iz višje geodezije in geodetske astronomije Selected Topics from Geodesy and Geodetic Astronomy • ECTS 4
- Urbanistično načrtovanje Urban Planning • ECTS 4
- Bližnjeslikovna fotogrametrija Close-Range Photogrammetry • ECTS 4
- Geofizika v geodeziji Geophysics in Geodesy • ECTS 4
- Sodobne tehnologije daljinskega zaznavanja State of the Art Remote Sensing Technologies • ECTS 4
- Obdelava oblakov točk Point Clouds Processing • ECTS 4

MAGISTRSKI ŠTUDIJSKI PROGRAM DRUGE STOPNJE PROSTORSKO NAČRTOVANJE SECOND-CYCLE ACADEMIC STUDY PROGRAMME SPATIAL PLANNING

SKRBNIK TRUSTEE
viš. pred. dr. **Mojca Foški**

Drugostopenjski magistrski študijski program Prostorsko načrtovanje traja dve leti (štiri semestre) in obsega skupaj 120 kreditnih točk. Študijski program ne vključuje smeri in se izvaja le kot redni študij.

Študij izoblikuje strokovnjake na področjih trajnostnega prostorskega načrtovanja, regionalnega planiranja in prostorskega varstva okolja za delo na prostorskih načrtih in v sektorskem planiranju, v upravi, razvoju, raziskovanju in pedagoškem delu. Poleg zaposlitve v gospodarskih družbah za prostorsko načrtovanje in prostorski menedžment so večja delovna področja še državna, regionalna in občinska uprava, regionalne razvojne agencije, regionalno raziskovanje, mednarodno planiranje, umeščanje velikih projektov v prostor. Študij nadalje oblikuje strokovnjake za posebne prostorske vede, kot so prostorsko planiranje turizma, industrije, kmetijstva in gozdarstva, lokacijske odločitve, prometno planiranje, prostorsko planiranje energetskih, vodooskrbnih, komunalnih, okoljevarstvenih in drugih sistemov, izobraževanje strokovnjakov za presojo vplivov na okolje in za mednarodno prostorsko načrtovanje.

Študij je organiziran v okviru študijev na UL FGG na Oddelku za geodezijo, vendar je zaradi svoje interdisciplinarne naravnanosti zanimiv tudi za študente drugih fakultet z opravljeno prvo stopnjo, ki se želijo usmeriti v prostorsko načrtovanje. Za študente, ki že imajo temeljna znanja iz prostorskih ved, vpisnih pogojev ni, ostali morajo opraviti diferencialne izpite. V večini razvitih držav Evrope in sveta se prostorski načrtovalci oblikujejo na drugi stopnji, ko svoja posebna znanja interdisciplinarno nadgradijo z znanji prostorskega načrtovanja.

S študijskim programom se usposobi prostorski načrtovalec – generalist z uravnovešenimi znanji s področij urejanja prostora, varstva okolja, geoinformatike, urbane in regionalne geografije, prostorske zakonodaje, prostorske ekonomije, prostorske sociologije, infrastrukturnih sistemov in drugih prostorskih ved.

V študijskem letu 2021/22 se je izvajal samo prvi letnik študija; vpisala se je šesta generacija študentov. V študijskem letu 2022/23 se je izvajal samo drugi letnik študija.

The second-cycle master study programme Spatial Planning consists of two years and amounts to 120 credit points. It is open for enrolment every second year.

The study qualifies students as professionals in the areas of sustainable spatial planning, regional planning and spatial environment protection for the work with spatial plans and in sectorial planning, in the administration, development, research and educational work. Apart from the employment positions in business companies for spatial planning and spatial management, some other major work areas are government, regional and municipal administration, regional development agencies, regional research, international planning, positioning of major projects into space. The study also qualifies experts for special spatial sciences such as spatial planning of tourism, industry, agriculture and forestry, location decisions, traffic planning, spatial planning of electricity and water supply, municipal environmental and other systems, education of experts for the evaluation of impacts on environment and for international spatial planning.

The study is organised in the framework of the studies offered at UL FGG, the Department of Geodesy, but due to its interdisciplinary nature it is also interesting for students from other faculties with a completed first degree who wish to focus on spatial planning. For students who already possess basic knowledge from spatial sciences there are no entry conditions, all other shall pass differential exams. In the majority of the developed European countries and the world spatial planners get the main skills at the second degree, when their special knowledge is upgraded with interdisciplinary knowledge of spatial planning.

The study programme qualifies students for spatial planners – generalists with balanced knowledge and skills from the areas of spatial planning, environment protection, geoinformation, urban and regional geography, spatial legislation, spatial economy, spatial sociology, infrastructural systems and other spatial sciences.

In the academic year 2021/22 only the first year of the study programme was implemented, the sixt generation of students enrolled. In the academic year 2022/23 only the second year of the study programme was implemented.

PREDMETNIK CURRICULUM

1. letnik 1st year

Stvarno pravo Property Law • ECTS 3

Osnove prostorske sociologije Basics of Spatial Sociology • ECTS 3

Urejanje krajine in varstvo okolja Landscaping and Environment Protection • ECTS 4

Kompozicija in oblikovanje Composition and Design • ECTS 4

Metodika prostorskega načrtovanja s projektnim delom Spatial Planning Methodology with Project Work • ECTS 10

Izbirni predmet I (UL FGG ali zunanji) Elective Course I (UL FGG or external) • ECTS 6

Kartografska upodobitev Cartographic Representation • ECTS 5

Urbanistično načrtovanje s projektnim delom Urban Planning with Project Work • ECTS 6

Prostorske analize Spatial Data Analyses • ECTS 4

Ruralno planiranje Rural Planning • ECTS 5

Katastrsko preurejanje zemljišč Cadastral Land Rearrangement • ECTS 4

Komunalno in stanovanjsko gospodarstvo Municipal Economics and Housing Policies • ECTS 6

2. letnik 2nd year

Prostorska statistika Spatial Statistics • ECTS 4

Regionalno prostorsko planiranje Regional Spatial Planning • ECTS 4

Prostorska ekonomika Spatial Economics • ECTS 3

Infrastrukturni sistemi s seminarjem Infrastructural Systems with Seminar • ECTS 6

Praktično usposabljanje Practical Training • ECTS 6

Izbirni predmet II (UL FGG ali zunanji) Elective Course II (UL FGG or external) • ECTS 6

Infrastrukturni sistemi s seminarjem Infrastructural Systems with Seminar • ECTS 4

Gospodarjenje z nepremičninami Real Estate Management • ECTS 3

Uvod v magistrsko delo Introduction to Master Thesis • ECTS 4

Projektna naloga s seminarjem (državna in mednarodna raven) Project Task with Seminar (national and international level) • ECTS 10

Magistrsko delo Master Thesis • ECTS 6

Izbirni predmeti Elective Courses

Daljinsko zaznavanje Remote Sensing • ECTS 3

Vrednotenje nepremičnin Real Estate Valuation • ECTS 6

Pozicioniranje in zajem prostorskih podatkov Spatial Data Positioning and Acquisition • ECTS 6

Varstveno načrtovanje Environment Planning and Impact Assessment • ECTS 3

Urbana prenova Urban Renewal • ECTS 3

Voda v načrtovanju urbanega prostora Water Sensitive Urban Design • ECTS 3

KATEDRA ZA GEODEZIJO CHAIR OF GEODESY

KADER PERSONNEL

PREDSTOJNICA HEAD
doc. dr. **Simona Savšek**

NAMESTNIK PREDSTOJNICE DEPUTY HEAD
doc. dr. Klemen Kregar

PEDAGOGI TEACHERS
izr. prof. dr. Tomaž Ambrožič, izr. prof. dr. Dušan Kogoj, doc. dr. Božo Koler, doc. dr. Aleš Marjetič, asist. dr. Gašper Štebe

SODELAVECA ASSOCIATES
doc. dr. Tilen Urbančič, mag. Janez Goršič

Katedra za geodezijo se ukvarja s klasičnimi terestričnimi metodami zajema, obdelave in prikaza prostorskih podatkov, ki zagotavljajo najvišji nivo natančnosti določitve koordinat točk. Leta 2022 se nam je pridružila Katedra za inženirsko geodezijo. Trenutno v okviru katedre delujejo štirje učitelji predavatelji, štirje asistenti in tehnični sodelavec. Na Oddelku za geodezijo pokrivamo področja klasične terestrične in inženirske geodezije. Člani katedre poleg pedagoškega dela sodelujemo na strokovnem, razvojnem in znanstvenoraziskovalnem področju doma in v tujini. Včlanjeni smo v strokovna združenja, kot so Zveza geodetov Slovenije, Slovenska zveza za geodezijo in geofiziko in v Inženirsko zbornico Slovenije, kjer je naš član predstavnik v upravnem odboru Matične sekcije geodetov, član Komisije za izobraževanje in član več delovnih skupin. Kot mentorji sodelujemo tudi s posameznimi kandidati, ki želijo opraviti strokovni izpit na IZS za pridobitev naziva pooblaščeni inženir geodezije.

Z razvijanjem in spremljanjem sodobnih tehnoloških rešitev, ki jih vključujemo v pedagoški proces, izobražujemo samostojne, kompetentne in zaposljive kadre. Na področju pregradnega inženirstva izvajamo za upravljavce pregradnih objektov celovit monitoring za spremljanje stabilnosti ter posodobitev geodetskih tehničnih opazovanj. Na ta način postavljamo visoke strokovne standarde na področju preciznih meritev. Naročnikom ponujamo sodobne in inovativne rešitve, ki v stroki postajajo »pravila dobre prakse«.

PEDAGOŠKA DEJAVNOST

Katedra za geodezijo pokriva pomemben del temeljnih strokovnih predmetov na obeh dodiplomskih študijih geodezije: Geodezija in geoinformatika ter Tehnično upravljanje nepremičnin. Poleg tega poučujemo geodezijo tudi na prvostopenjskih študijih Gradbeništvo, Operativno gradbeništvo ter Vodarstvo in okoljsko inženirstvo na naši fakulteti. Na študijih druge stopnje poučujemo pretežno na študiju Geodezija in geoinformatika ter predavamo osnove geodetskega zajema prostorskih podatkov na študiju Prostorsko načrtovanje. Naši predavatelji sodelujejo tudi na doktorskem študiju Grajeno okolje. Izven matične fakultete delujemo na Biotehniški fakulteti Univerze v Ljubljani, in sicer na Oddelku za gozdarstvo in na Oddelku za krajinsko arhitekturo. Nadaljujemo tudi več kot 25-letno sodelovanje z Odsekom za geodezijo Sarajevske fakultete, kjer smo člani Katedre za geodezijo somentorji njihovim študentom pri izdelavi magistrskih nalog, plod sodelovanja je tudi soavtorstvo pri učbeniku Inžinjerska geodezija u rudarstvu.

Naša izobraževalna področja so temeljna geodetska in detajlna izmera, vodenje katastra GJI, precizna terestrična izmera, geodetski merski sistemi, optimizacija geodetskih mrež, standardi v geodetski merski tehniki ter terensko projektno delo. Študentom posredujemo znanja, povezana s klasično geodetsko izmero, kjer se srečajo z najsodobnejšimi merskimi postopki, opremo in tehnologijami za pridobivanje, obdelavo in analizo merskih podatkov. Naučijo se oceniti kakovost zajetih podatkov. Pridobijo potrebna znanja s področja izdelave geodetskega načrta in inženirskih postopkov zakoličbe gradbenih objektov in spremljanja njihove stabilnosti.

The Chair of Geodesy deals with the classic terrestrial methods of recording, processing and displaying spatial data, which ensure the highest level of accuracy in determining the coordinates of points. The Chair of Engineering Geodesy joined us in 2022. Currently, members of the Chair include four teachers, lecturers, four assistants and one technical assistant. At the Department of Geodesy, we cover the fields of classical terrestrial geodesy and engineering geodesy. In addition to teaching, the Chair members are involved in professional, development and scientific research in Slovenia and internationally. We are members of professional organisations such as the Association of Surveyors of Slovenia, the Slovenian Association of Geodesy and Geophysics and the Chamber of Engineers of Slovenia, where our members are represented on the Board of Directors of the Central Section of Surveyors, in the Commission for Education and in several working groups. As supervisors, we also work with individual candidates who wish to take the professional examination at the Slovenian Chamber of Engineers in order to obtain the title of authorized geodetic engineer.

By developing and using modern technological solutions and including them in the educational process, we educate independent, competent and employable graduates. In the field of dam engineering, we offer to the managers of dam structures comprehensive monitoring in order to assist them in monitoring stability and updating technical surveying records. In this way, we establish high professional standards in precise terrestrial surveying. We offer our customers modern and innovative solutions that are becoming »rules of good practice« in our profession.

EDUCATIONAL ACTIVITY

The Chair of Geodesy covers an important part of the basic professional courses of the two undergraduate degree programmes in geodesy: Geodesy and Geoinformatics and Technical Real Estate Management. We also teach geodesy at the first-cycle studies of Civil Engineering, Construction Management and Water Science and Environmental Engineering offered at our faculty. In the second-cycle studies, we focus on teaching in the study programme Geodesy and Geoinformatics and offer the content of the fundamentals of geodetic recording of spatial data in the study programme Spatial Planning. Our teachers are also involved in the doctoral study programme Built Environment. Outside our faculty, we work at the Biotechnical Faculty of the University of Ljubljana, Department of Forestry and Department of Landscape Architecture. We also continue our more than 25 years of cooperation with the Department of Geodesy of the Faculty of Sarajevo, where members of the Chair of Geodesy are co-supervisors for their students in the preparation of master theses, and the result of the cooperation is the co-authorship of the textbook Inžinjerska geodezija u rudarstvu.

We transfer to our students knowledge of the methods of spatial data point recording, where they learn about the latest measuring procedures, equipment and technology for the acquisition, processing and analysis of spatial data. They learn to value quality of the recorded data and how to

Študente vključujemo v terenske projektne in aplikativno usmerjene strokovne naloge. S svojim pozitivnim pedagoškim pristopom znamo primerno motivirati študente k razmišljanju, zato uspešno opravljamo vlogo mentorjev letnikov, tutorjev in mentorjev diplomantom na različnih smereh in stopnjah študija.

ZNANSTVENA IN RAZISKOVALNA DEJAVNOST

Člani katedre delujemo na področju dveh znanstvenih programov, ki ju financira ARRS/ARIS:

— P2-0227 Geoinformacijska infrastruktura in trajnostni prostorski razvoj Slovenije,
— P2-0406 Opazovanje Zemlje in geoinformatika.

Poleg tega smo vključeni v različne razvojne in aplikativne projekte te agencije. Sodelujemo z drugimi strokami in katedrami z drugih fakultet in objavljamo zanimive raziskave v mednarodno odmevnih revijah.

V okviru osnovnega geodetskega sistema izvajamo raziskave na področju transformacije višin med starim višinskim sistemom SVS2000/Trst in novim višinskim sistemom SVS2010/Koper. Na osnovi razlik višin reperjev v starem in novem višinskem sistemu, ki so stabilizirani na območju vzhodne Slovenije, smo določili višinsko transformacijsko ploskev za dve različni velikosti območij. Za obe območji smo analizirali vpliv različnih interpolacijskih metod in vpliv uporabe razlik višin reperjev različnih redov nivelmanske mreže na kakovost določitve višinske transformacijske ploskve.

Na področju geodetskega monitoringa razvijamo modificirane metode deformacijske analize. Raziskujemo možnosti uporabe različnih merskih sistemov na področju geodetskega monitoringa:

— z novimi metodami izravnave (TLS),
— s kombinacijo GNSS in terestričnih meritev (cerkveni zvoniki),
— s skeniranjem in obdelavo oblakov točk (cerkveni zvoniki, vertikalnost dimnikov ...).

Raziskujemo uporabnost terestričnega laserskega skeniranja v praksi. V sodelovanju z Oddelkom za geologijo z Naravoslovnotehniške fakultete spremljamo spremembe na slovenski klifni obali. V sodelovanju z Oddelkom za okoljsko gradbeništvo testiramo uporabo metode skeniranja plavja v rekah.

Raziskovalno oblikujemo metodo za uporabo nizkocenovnih inercialnih merskih senzorjev za absolutno pozicioniranje nihajočega objekta in za izboljšanje kinematične natančnosti sledenja trajektorije robotske roke. Z metodo smo natančnost določitve položaja nihajočega objekta izboljšali na nekaj centimetrov.

STROKOVNA DEJAVNOST

Naše osnovno vodilo je, da strokovne vsebine, ki jih s pedagoškim delom posredujemo študentom, skušamo v največji možni meri prenesti v prakso in tako dvigniti strokovni nivo izvedbe operativnih nalog za zahtevne naročnike. Hkrati so izkušnje, ki jih dobimo pri strokovnih nalogah, osnova za pedagoško delo. Na katedri večino

locate them into space. They acquire knowledge necessary to draw up a geodetic plan, perform cadastral procedures for the arrangement and equipment of land with economic infrastructure and to arrange engineering procedures for setting out building structures and monitoring their stability.

We involve students in field projects and application-oriented professional tasks. With our positive pedagogical approach, we know how to properly motivate students to think, which is why we successfully take on the role of year mentors, tutors and supervisors for graduates in various subject areas and cycles of study.

SCIENTIFIC AND RESEARCH ACTIVITIES

Chair members are active in two core research programmes financed by the National Research Agency:

— P2-0227 Geoinformation infrastructure and sustainable spatial development of Slovenia,
— P2-0406 Earth observation and geoinformatics.

In addition, we are involved in various development and application projects of this same agency. We collaborate with other disciplines and chairs of other faculties and publish interesting research articles in internationally renowned journals.

As part of the basic geodetic system, we conduct research in the field of height transformation between the old height system SVS2000/Trieste and the new height system SVS2010/Koper. Based on the differences between the heights of the benchmarks in the old and the new height system, which are stabilized in the area of eastern Slovenia, we determined the height transformation area for two different area sizes. For both areas we analysed the influence of different interpolation methods and the influence of using height differences in benchmarks of different orders of the levelling grid on the quality of the determination of the height transformation area.

In the field of geodetic monitoring, we are developing modified methods of deformation analysis. We are investigating the possibilities of using various measuring systems in the field of geodetic monitoring:

— with new levelling methods (TLS),
— with a combination of GNSS and terrestrial measurements (church towers),
— by scanning and analysing cloud points (church towers, verticality of chimneys, etc.).

We are investigating the usefulness of terrestrial laser scanning in practice. In cooperation with the Department of Geology of the Faculty of Natural Science and Technology, we are monitoring changes on the Slovenian coastal cliffs. In cooperation with the Department of Environmental Civil Engineering, we are testing the use of the flood scanning method in rivers.

We are researching and designing a method to use low-cost inertial measuring sensors for absolute positioning of an oscillating object and to improve the kinematic accuracy of robot arm trajectory tracking. With this method, we were able to improve the accuracy of the position determination of the oscillating object to a few centimeters.

zahtevnejših strokovnih del opravljamo na pregradah slovenskih hidroelektrarn na Dravi, Savi in Soči. Merimo pomike podpornih zidov (Polhov Gradec, pokopališče Velenje), območja ob prenovi železniške proge Ljubljana–Divača in tal (odlagališča hidrometalurške jalovine Boršt, plazovi v zaledju Koroške Bele). Izvajamo kontrolne meritve žerjavnih prog in visokih dimnikov (Termoelektrarna Brestanica, TE-TOL). V okviru strokovnih del smo v sodelovanju s Katedro za matematično in fizikalno geodezijo ter navigacijo (KMFGN) določili koordinate točk portalnih mrež vseh predorov projekta drugi tir Divača–Koper (2TDK).

POMEMBNI DOSEŽKI

Člani katedre smo objavili nekaj člankov v visoko rangiranih revijah, kar je razvidno iz naših bibliografij, ki so dostopne v Kooperativnem online bibliografskem sistemu COBISS.

V letu 2022 smo na pobudo elektro-energetskega podjetja in v sodelovanju z GIZ GI izvedli »izobraževanje za prakso«. Cilj takega izobraževanja je bil, da se geodetski strokovnjaki iz prakse opolnomočijo in nadgradijo svoja znanja, da bodo tudi sami lahko izvajali kompleksnejše geodetske izmere in izmere visoke natančnosti.

Član KG, izr. prof. dr. Dušan Kogoj, je iz odpisanih starinskih geodetskih instrumentov zasnoval in uredil muzejsko zbirko, ki je razstavljena na hodnikih fakultete. Za ureditev zbirke je prejel častno Valvasorjevo priznanje Slovenskega muzejskega društva in fakultetno priznanje za leto 2021.

PROFESSIONAL ACTIVITY

Our basic guideline is that we try to implement the professional content that we pass on to students through pedagogical work to the greatest extent possible in practice and thus raise the professional level in the performance of operational tasks for demanding customers. At the same time, professional experience is the basis for pedagogical work. The Chair carries out the most demanding professional work on the dams of the Slovenian hydropower plants on the Drava, Sava and Soča rivers. We measure the displacements of retaining walls (Polhov Gradec, Velenje cemetery), areas during the renovation of the Ljubljana–Divača railway line and soils (Boršt hydrometallurgical tailings, landslides in the hinterland of Koroška Bela). We carry out control measurements of crane lines and tall chimneys (Termoelektrarna Brestanica, TE-TOL). In cooperation with the Department of Mathematical and Physical Geodesy and Navigation (KMFGN), we determined the coordinates of the points of the portal grids of all tunnels of the second track of the Divača–Koper (2TDK) project.

SIGNIFICANT ACHIEVEMENTS

The Chair members have published several articles in high-ranking journals, which is evident from our bibliographies available in the Cooperative Online Bibliographic System COBISS.

In 2022, on the initiative of the electric power plant and in cooperation with GIZ GI, we carried out a Training for Practise. The aim of this training was to enable geodetic experts to empower themselves and expand their knowledge so that they can carry out more complex, high-precision geodetic measurements.

The Chair member Assoc. Prof. Dr. Dušan Kogoj designed and set up a museum collection from written-off antique surveying instruments, which is exhibited in the corridors of the Faculty. For the compilation of the collection he received the Valvasor Honorary Award of the Slovenian Museum Association and a 2021 Faculty Award.

KATEDRA ZA GEOINFORMATIKO IN KATASTRE NEPREMIČNIN CHAIR OF GEOINFORMATICS AND REAL ESTATE CADASTRES

KADER PERSONNEL

PREDSTOJNIK HEAD
prof. dr. **Krištof Oštir**

NAMESTNICA PREDSTOJNIKA DEPUTY HEAD
prof. dr. Anka Lisec

PEDAGOGI TEACHERS
doc. dr. Marjan Čeh, asist. dr. Urška Drešček, izr. prof dr. Samo Drobne, asist. Tanja Grabrijan, viš. pred. dr. Miran Ferlan (do aprila 2022 until April 2022), asist. dr. Jernej Tekavec, asist. mag. Peter Golob

RAZISKOVALCI RESEARCHERS
asist. Ana Potočnik Buhvald, asist. dr. Bujar Fetai, asist. Matej Račič

SODELAVKI ASSOCIATES
Barbara Trobec, doc. dr. Mihaela Triglav Čekada

Katedra za geoinformatiko in katastre nepremičnin (KGKN) pedagoško in raziskovalno deluje na področjih opazovanja Zemlje, geoinformatike in upravljanja nepremičnin. Naše delo zaznamujejo nove tehnološke rešitve za zajem in obdelavo množice prostorskih podatkov ter vse bolj prepoznavna vloga geoinformatike v družbi. Prostorski podatki z geoinformacijskimi rešitvami so namreč postali ključni za sprejemanje strateških in operativnih odločitev ter so temelj za trajnostni razvoj, upravljanje zemljišč in drugih naravnih virov, kmetijstvo in gozdarstvo, logistiko in turizem, upravljanje tveganj ter ukrepanje ob naravnih in drugih nesrečah. Področje delovanja katedre je izrazito interdisciplinarno, kar prinaša veliko izzivov in priložnosti. Na katedri smo zaposleni habilitirani visokošolski učitelji in sodelavci ter raziskovalci na področju geodezije in geoinformatike. Področja prava in ekonomike pokrivajo zunanji sodelavci s Pravne fakultete in Ekonomske fakultete Univerze v Ljubljani.

Na nacionalni ravni smo močno vpeti v razvojne in strokovne naloge na področjih daljinskega zaznavanja, prostorskih informacijskih sistemov, upravljanja zemljišč ter javne geodetske službe, kjer sodelujemo predvsem z ministrstvi in javnimi agencijami s področij okolja, prostora, geodezije, kmetijstva in gozdarstva, varstva narave ter državne statistike. Poleg tega dejavno sodelujemo z raziskovalnimi institucijami in podjetji, kot so Geodetski inštitut Slovenije, Znanstvenoraziskovalni center Slovenske akademije znanosti in umetnosti, Center odličnosti Vesolje-SI ter druga razvojno naravnana podjetja.

Na mednarodni ravni smo v tem obdobju krepili sodelovanje z mnogimi priznanimi univerzami in raziskovalnimi institucijami in med drugim pripravili številne razvojne projekte, kjer izpostavljamo predvsem sodelovanje z BOKU Dunaj, KU Leuven, Fondazione Bruno Kessler Trento, TU München, UTwente in TU Delft, HVL Bergen, KTH Stockholm, Evropsko vesoljsko agencijo (ESA), evropsko mrežo raziskovalnih institucij EuroSDR in Open Geospatial Consortium (OGC).

PEDAGOŠKA DEJAVNOST

Na področju pedagoške dejavnosti je poslanstvo katedre usposabljanje študentov prve, druge in tretje stopnje za izvajanje strokovnih nalog ter za raziskovalno delo na področjih opazovanja Zemlje, geoinformatike in nepremičninske administracije, kar vključuje poučevanje na področjih daljinskega zaznavanja, geografskih informacijskih sistemov (GIS), modeliranja prostora v digitalnih okoljih, programskih orodij, obdelave in povezovanja prostorskih podatkov in prostorskih analiz, tehnologije GIS, katastrov nepremičnin in katastrskega preurejanja zemljišč ter organizacije in vodenja projektov.

Pedagoško delo usklajujemo z razvojem stroke in znanosti ter s potrebami v organizacijah, ki zaposlujejo večino kvalificiranega kadra. Pri tem uvajamo sodobne načine poučevanja, kot so delo v skupinah, projektno delo, študije primerov iz prakse. Spoznanja in novosti iz raziskovalnega in strokovnega dela sproti vključujemo v pedagoški proces. V samo izvedbo pedagoškega dela vključujemo strokovnjake iz prakse preko vabljenih predavanj, strokovnih obiskov

The Chair of Geoinformatics and Real Estate Cadastres (KGKN) focuses its educational and research work on Earth observation, geoinformatics and real estate management. Our work is strongly marked by technological development for the acquisition and processing of mass spatial data. Spatial data with geoinformation solutions have become indispensable in taking strategic and operative decisions and are the basis for sustainable development, land and other natural resource management, agriculture and forestry, logistics and tourism, and risk and disaster management. Our activities have an interdisciplinary character, which brings a lot of challenges and opportunities. Members of the Chair are higher education teachers and associates, and researchers in the areas of geodesy and geoinformatics. The areas of law and economics are the responsibility of external partners coming from the Faculty of Law and Faculty of Economics of the University of Ljubljana.

At the national level, we are intensely engaged in the development projects in the areas of remote sensing, spatial information systems, land management and public geodetic service, where we mostly cooperate with the ministries and public agencies concerned with the environment, spatial development, surveying, agriculture and forestry, nature protection and state statistics. In addition, we actively collaborate with research institutions and companies, such as the Geodetic Institute of Slovenia, Scientific and Research Centre of the Slovenian Academy of Sciences and Arts, Centre of Excellence Space-SI and research-oriented business enterprises.

We have strengthened the collaboration and prepared several development projects in collaboration with eminent universities and research institutions from the domain, among others with BOKU Vienna, KU Leuven, Fondazione Bruno Kessler Trento, TU München, UTwente and TU Delft, HVL Bergen, KTH Stockholm, European Space Agency (ESA), European Spatial Data Research network (EuroSDR) and Open Geospatial Consortium (OGC).

EDUCATIONAL ACTIVITY

The mission of our Chair is the education of first-, second- and third-cycle students to prepare them for solving professional tasks and for research work in the fields of Earth observation, informatics and real estate administration. This includes education in remote sensing, geographic information systems (GIS), spatial modelling in digital environments, software tools, spatial data processing and their linking, spatial analyses, GIS technology, real estate cadastres and cadastral rearrangement of land, as well as project organisation and management.

Our educational activities are harmonised with the development of the profession and science and the market's needs. We introduce modern teaching methods, such as teamwork, project work, case studies and learning from practice. Findings and novelties from research and professional work are continuously being included in the educational process. We invite experts from practice to enrich our teaching with invited lectures as visiting experts and co-supervisors of final theses. Beside our educational

in somentorstva iz gospodarstva. Poleg pedagoškega dela na UL FGG smo kot predavatelji in mentorji vpeti v študijske programe drugih članic UL, pedagogi pa smo redno tudi gostujoči predavatelji na številnih tujih univerzah.

RAZISKOVALNA IN STROKOVNA DEJAVNOST

Znanstvenoraziskovalno in strokovno delo katedre je usmerjeno na področja opazovanja Zemlje, prostorsko informacijskega modeliranja prostora, spremljanja sprememb v prostoru ter prostorsko-informacijske podpore odločitvam v prostoru. Delo je koordinirano znotraj raziskovalne skupine Geoinformatika in upravljanje nepremičnin (0792-015) in raziskovalnega programa Opazovanje Zemlje in geoinformatika (P2-0406).

Na področju daljinskega zaznavanja se osredotočamo na obdelavo množice podatkov z algoritmi rudarjenja podatkov in strojnega učenja ter analizo časovnih vrst, kjer izzive prinašajo radarski in večspektralni podatki satelitov Sentinel ter podatki, zajeti s senzorji na letalih in daljinsko vodenih letalnikih. Ukvarjamo se z razvojem postopkov za generiranje topološko urejenih 3D-modelov prostora ter premoščanjem razlik med konceptoma BIM in GIS (GeoBIM). Posebno pozornost namenjamo prostorski analitiki v podporo upravljanju nepremičnin ter naravnega in grajenega okolja. Na področju nepremičninskih administrativnih sistemov so izzivi povezani z razvojem 3D-katastra, optimizacijo katastrskega (pre)urejanja nepremičnin ter zagotavljanjem kakovostnih nepremičninskih podatkov.

Rezultate raziskovalnega dela predstavljamo v mednarodno uveljavljenih revijah ter na znanstvenih in strokovnih srečanjih. Dejavni smo v različnih nacionalnih združenjih, kot so Zveza geodetov Slovenije, Slovenski inštitut za standardizacijo ter Slovensko društvo Informatika. Na mednarodni ravni smo dejavni pri Evropski vesoljski agenciji (ESA), Akademiji Copernicus, Evropski akademiji za rabo in razvoj zemljišč EALD, evropski zvezi EuroSDR, evropski zvezi GIS laboratorijev AGILE, mednarodnih strokovnih združenjih FIG in ISPRS, FAO pri OZN.

POMEMBNI DOSEŽKI

Dr. Jernej Tekavec je prejel svečano listino mladim visokošolskim učiteljicam in učiteljem ter visokošolskim sodelavkam in sodelavcem za izjemne pedagoške, raziskovalne in umetniške dosežke za leto 2022.

Dr. Samo Drobne prejel priznanje Državnega sveta za pripravo pokrajinske zakonodaje.

Magistrsko delo Žige Maroha, ki je nastalo pod mentorstvom prof. dr. Krištofa Oštirja, je prejelo priznanje za najboljše Esri delo.

Prof. dr. Anka Lisec je pri evropskem združenju EuroSDR za predsednica komisije za prenos znanja (EuroSDR Commission 6: Knowledge transfer), v okviru katere (so)organiziramo izobraževanja EduSERV 21.

activity at UL FGG, we are also lecturers in study programmes of other members of the University of Ljubljana, and we regularly visit several international universities as visiting professors.

RESEARCH AND PROFESSIONAL ACTIVITIES

The scientific, research and professional work of our Chair is focused on Earth observation, spatial information modelling, monitoring of changes in space and spatial-information support to decision making. The work is coordinated within the research group Geoinformatics and Real Estate Management (0792-015) and the core research programme Earth Observation and Geoinformatics (P2-0406).

In remote sensing, our work is focused on processing mass data using algorithms from data mining and machine learning and on time series analysis. Our main challenges are radar and multispectral data of satellites Sentinel and the data acquired by sensors in aircraft and drones. We are engaged in developing procedures for the generation of topologically arranged 3D spatial models and how to bridge the differences between BIM and GIS concepts (GeoBIM). Special attention is paid to spatial analytics as a support to real estate management and decision making in built and natural environment. In the field of real estate administrative systems, our challenges are related to developing a 3D cadastre, optimising cadastral real estate (re)arrangement, and providing high-quality real estate data.

The results of our research work are presented in internationally recognised journals and at conferences. We are active in various national associations, such as the Slovenian Association of Surveyors, Slovenian Institute for Standardization, and Slovenian Association Informatika. At the international level, we are members of international associations, such as ESA, Copernicus Academy, European Academy EALD, EuroSDR, European association of GIS labs AGILE, international associations FIG, ISPRS and UN FAO.

SIGNIFICANT ACHIEVEMENTS

Dr Jernej Tekavec was awarded the 2022 young higher education teachers and higher education associates award for outstanding teaching, research, and artistic achievements.

Dr Samo Drobne was awarded the National Council Award for drafting provincial legislation.

The master's thesis by Žiga Maroh, written under the supervision of Prof. Dr. Krištof Oštir, was awarded the Best Esri Thesis.

Prof. Anka Lisec is the Chair of the EuroSDR Commission 6: Knowledge transfer, within which we (co)organise EduSERV21 trainings.

KATEDRA ZA KARTOGRAFIJO, FOTOGRAMETRIJO IN DALJINSKO ZAZNAVANJE
CHAIR OF CARTOGRAPHY, PHOTOGRAMMETRY AND REMOTE SENSING

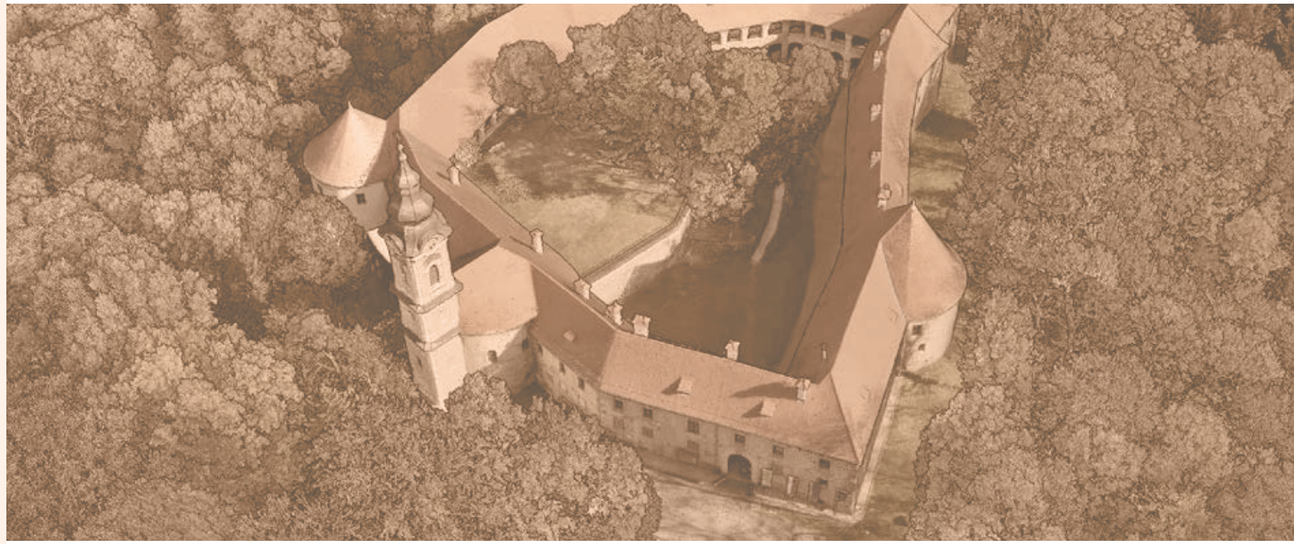
KADER PERSONNEL

PREDSTOJNIK HEAD
doc. dr. **Dušan Petrovič**

NAMESTNIK PREDSTOJNIKA DEPUTY HEAD
doc. dr. Klemen Kozmus Trajkovski

PEDAGOGA TEACHERS
doc. dr. Mojca Kosmatin Fras, doc. dr. Dejan Grigillo

MLADA RAZISKOVALKA YOUNG RESEARCHER
asist. Neža Ema Komel (do julija 2022 until July 2022)



Kartografija se ukvarja s preučevanjem, zasnovo, izdelavo, distribucijo ter uporabo kart oz. zemljevidov in drugih sorodnih oblik predstavitve prostorskih podatkov. Ima lastnosti znanosti, tehnologije in umetnosti. Karte so eno najbolj osnovnih sredstev komuniciranja, saj so jih naši predniki uporabljali že pred več 10.000 leti. Danes so glavne smeri razvoja večrazsežnostne in fotorealistične upodobitve obogatene resničnosti, spletna kartografija in kartografske aplikacije za mobilne naprave.

Fotogrametrija je znanost in tehnologija, ki se ukvarja s pridobivanjem zanesljivih geometričnih in semantičnih informacij iz fotografij, v sodobnem času pa tudi iz drugih virov. Sposobnost visoke stopnje avtomatizacije postopkov omogoča ekonomičen zajem prostorskih podatkov na večjih območjih. Prepoznaven in pogosto uporabljen izdelek je ortofoto. Bližnjeslikovna fotogrametrija se uporablja za 3D zajem in prikaz manjših objektov v najrazličnejših aplikacijah (industrija, gradbeništvo, arhitektura, arheologija, konservatorstvo, strojništvo idr.). Uporaba daljinsko vodenih letalnikov in obdelava posnetkov s sodobnimi postopki graditve strukture iz gibanja (angl. structure from motion) omogoča hitro izdelavo fotogrametričnih izdelkov tudi težje dostopnih območij v zelo kratkem času.

Daljinsko zaznavanje je znanost in tehnologija o zajemu, obdelavi in analiziranju podob, v povezavi z drugimi podatki o fizičnem površju Zemlje in planetov, ne da bi z njimi prišli v neposredni stik. Podobe pridobimo s senzorji v vesolju, zraku in na tleh. Zaznavamo in zapisujemo odbito ali sevano elektromagnetno valovanje v različnih spektralnih območjih, tudi izven vidnega spektra. Pridobljeni prostorski podatki se uporabljajo za spremljanje stanja in napovedovanje sprememb v prostoru.

PEDAGOŠKA DEJAVNOST

Pedagoško delo članov Katedre za kartografijo, fotogrametrijo in daljinsko zaznavanje (KKFDZ) poteka na vseh študijskih programih Oddelka za geodezijo UL FGG, na študijskem programu Vodarstvo in okoljsko inženirstvo UL FGG, na študijskih programih Urbanizem Fakultete za arhitekturo UL, Obramboslovje Fakultete za družbene vede UL in programu Krajinska arhitektura Biotehniške fakultete UL. Pedagoško delo obsega predavanja, seminarske in laboratorijske vaje, pri katerih študenti spoznavajo postopke in metode ter tudi sami izdelujejo izdelke; nekatere predmete organiziramo kot projektno delo, tudi v sodelovanju s fakultetami iz tujine. Občasno gostimo vabljene predavatelje iz prakse, predstavljamo praktične primere iz domačega okolja, organiziramo oglede in strokovne ekskurzije. Študentom na vseh stopnjah študija in študijskih programih nudimo različne teme za zaključna dela, pri katerih sodelujemo, pri zaključnih nalogah spodbujamo sodelovanje s podjetji in inštitucijami v Sloveniji ter s fakultetami v tujini, predvsem v okviru programov Erasmus+ in bilateralnih pogodb.

Cartography is the discipline dealing with the science, technology and art of making and using maps and other related forms for spatial data presentations. Maps are one of the most basic forms of communication – the oldest date back tens of thousands of years BC. Today, the development is focused mainly on multi-dimensional and photorealistic rendering of augmented reality, internet cartography and cartographic applications on/for mobile devices.

Photogrammetry is a science and technology of extracting reliable three-dimensional geometric and thematic information, often over time, of objects and scenes from image and range data. Due to the high level of automation of procedures it is possible to economically acquire spatial data in large areas. A recognisable and frequently used product is orthophoto. Close range photogrammetry is used for 3D acquisition and presentation of small structures in various applications (industry, construction, architecture, archaeology, conservation, machinery, etc.). The use of unmanned aerial vehicles (UAV) and processing of images using contemporary structure from motion procedures enables fast elaboration of photogrammetric products even at territories that are difficult to access, in a very short time.

Remote sensing is a science and technology of capturing, processing and analysing imagery, in conjunction with other physical data of the Earth and planets, from sensors in space, in the air and on the ground. We observe and record reflected and radiated electromagnetic waves in various spectral ranges, even outside the visual spectrum. The obtained spatial data are used for monitoring the status and for predicting changes in space.

EDUCATIONAL ACTIVITY

The members of the Chair of Cartography, Photogrammetry and Remote Sensing (KKFDZ) provide teaching for all study programmes at the Department of Geodetic Engineering within UL FGG, in the study programme Water Science and Environmental Engineering at UL FGG, as well as at other faculties of the University of Ljubljana, such as Urbanism at the Faculty of Architecture, Defense Studies at the Faculty of Social Sciences, and in the programmes Landscape Architecture and Forestry and Renewable Forest Resources at the Biotechnical Faculty. In our teaching we combine lectures, seminars and laboratory tutorials, where students learn about essential procedures and methods as well as how to make their own products; some courses are organised in the form of project work, also in cooperation with foreign faculties. Occasionally we invite practitioners who present practical cases from our home environment, and we organise visits and expert field trips. We cooperate in the organisation and implementation of field work for students, and include project work to specific courses, mainly in the second-cycle studies. For all study cycles and study programs that we are involved in, we offer students various themes for their final theses. In the final theses, we encourage cooperation with companies and institutions in Slovenia as well as faculties from abroad, mainly through Erasmus+ programs and bilateral agreements.

ZNANSTVENA, RAZISKOVALNA IN STROKOVNA DEJAVNOST

Glavna raziskovalna področja in strokovna dela na katedri so: bližnjeslikovna fotogrametrija, uporaba daljinsko vodenih letalnikov za zajem prostorskih podatkov, oblikovanje trirazsežnostnih znakovnih in večpredstavnostnih upodobitev, povezava uporabe kart z navigacijsko tehnologijo, oblikovanje upodobitev navidezne in obogatene resničnosti, zajem in vzdrževanje topografskih podatkov iz različnih virov ter kontrola kakovosti izdelkov.

Sodelujemo v strokovnih mednarodnih organizacijah (International Society for Photogrammetry and Remote Sensing, International Cartographic Association, EuroSDR) in domačih organizacijah (Zveza geodetov Slovenije, Sekcija za kartografijo ter Sekcija za fotogrametrijo in daljinsko zaznavanje) ter pri evropskih in domačih raziskovalnih projektih. Sodelujemo s številnimi uspešnimi gospodarskimi podjetji (Modri planet, C-Astral, Geavis, DFG Consulting, Flycom Techologies, Flai idr.), z Geodetsko upravo RS in Geodetskim inštitutom Slovenije, Planinsko zvezo Slovenije, Zvezo tabornikov Slovenije, Orientacijsko zvezo Slovenije idr. Kot recenzenti sodelujemo pri domačih in tujih znanstvenih revijah s področja geodezije in geoinformatike.

POMEMBNI DOSEŽKI

Digitalni modeli objektov kulturne dediščine se izdelujejo za namene dokumentacije, vzdrževanja, obnove ali rekonstrukcije. V članku, objavljenem v reviji International journal of architectural heritage, posebna izdaja Conservation, analysis, and restoration, smo predstavili rezultate večletnega raziskovalnega in strokovnega dela sodelavcev na KKFDZ, v katerem smo analizirali tehnologije in metode za izdelavo tridimenzionalnih modelov predmetov in objektov kulturne dediščine.

Na 19. generalni skupščini Mednarodnega kartografskega združenja ICA v Cape Townu, Južna Afrika (21. 8. 2023), je bil na predlog in s podporo Zveze geodetov Slovenije doc. dr. Dušan Petrovič izvoljen za enega izmed podpredsednikov in s tem člana izvršnega odbora Mednarodnega kartografskega združenja, ki velja za krovno svetovno strokovno in znanstveno združenje na področju kartografije.

SCIENTIFIC, RESEARCH AND PROFESSIONAL ACTIVITIES

The main research and professional areas are close-range photogrammetry, application of UAVs for the acquisition of spatial data, design of three-dimensional and multimedia cartographic presentations, connecting the map use with navigational technology, design of representations of virtual and augmented reality, acquisition and maintenance of topographic data from different sources and quality control of products.

We cooperate in professional international organisations (International Society for Photogrammetry and Remote Sensing, International Cartographic Association, EuroSDR) and national organisations (Association of Surveyors of Slovenia, Section for Cartography and Section for Photogrammetry and Remote Sensing), and in European and national research projects. We consult numerous successful business companies (Modri planet, C-Astral, Geavis, DFG Consulting, Flycom Techologies, Flai etc.), Surveying and Mapping Authority of RS and Geodetic Institute of Slovenia, Alpine Association of Slovenia, Scout Association of Slovenia, Slovenian Orienteering Federation, etc. As reviewers we participate in national and international scientific journals from the areas of geodesy and geoinformation.

SIGNIFICANT ACHIEVEMENTS

Digital models of cultural heritage objects are made available for documentation, maintenance, restoration or reconstruction purposes. In an article published in the International Journal of Architectural Heritage, special edition Conservation, Analysis, and Restoration, we presented the results of several years of research and professional work by members of the Chair, in which we analysed technologies and methods for the production of three-dimensional models of cultural heritage objects and buildings.

At the 19th General Assembly of the International Cartographic Association ICA in Cape Town, South Africa (August 21, 2023), at the proposal and with the support of the Association of Surveyors of Slovenia, Assoc. Prof. Dr. Dušan Petrovič was elected as one of the Vice Presidents and thus as a member of the Executive Board of the International Cartographic Association, which is regarded as the global professional and scientific umbrella organisation in the field of cartography.

KATEDRA ZA MATEMATIČNO IN FIZIKALNO GEODEZIJO TER NAVIGACIJO
CHAIR OF MATHEMATICAL AND PHYSICAL GEODESY AND NAVIGATION

KADER PERSONNEL

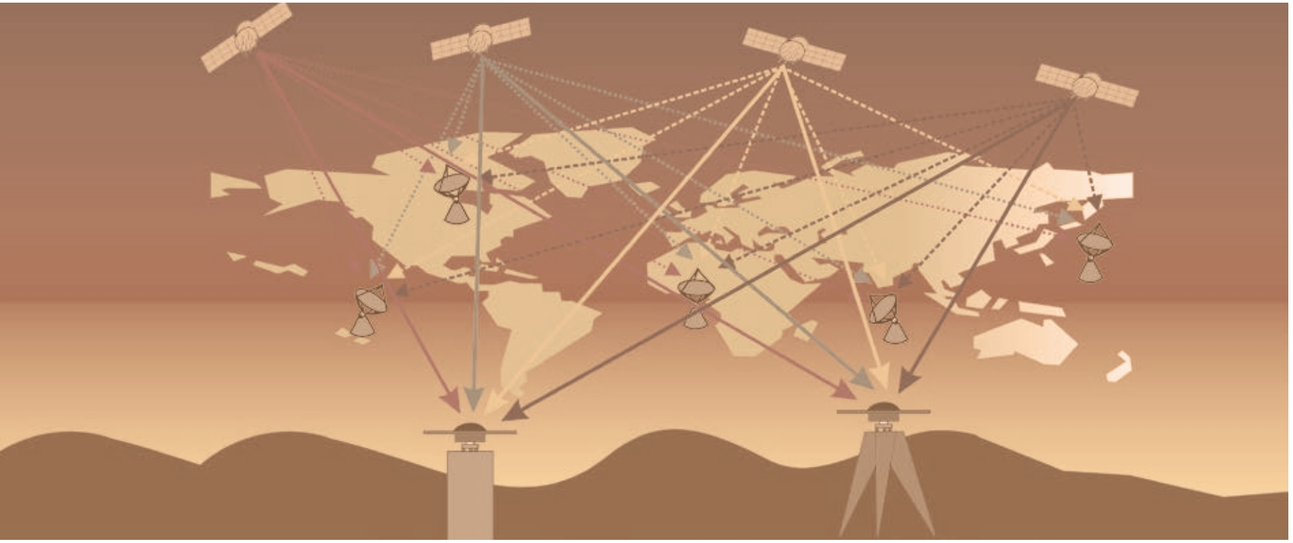
PREDSTOJNIK HEAD
prof. dr. **Bojan Stopar**

NAMESTNIK PREDSTOJNIKA DEPUTY HEAD
doc. dr. Oskar Sterle

PEDAGOGI TEACHERS
doc. dr. Polona Pavlovčič Prešeren, doc. dr. Miran Kuhar,
asist. Klemen Ritlop

MLADA RAZISKOVALCA YOUNG RESEARCHERS
asist. dr. Veton Hamza (do oktobra 2022 until October 2022),
Filip Viler

SODELAVEC ASSOCIATES
Albin Mencin



Sodelavci Katedre za matematično in fizikalno geodezijo ter navigacijo (KMFGN) sodelujemo pri pedagoškem in raziskovalnem delu na področjih matematične, fizikalne in satelitske geodezije ter teorije meritev v geodeziji. Glavni izzivi, s katerimi se ukvarjamo, so razvoj referenčnih sistemov v geodeziji, tehnologije GNSS (angl. Global Navigation Satellite System), aktivnih omrežij GNSS, postopkov za uporabo cenovno ugodnih sprejemnikov GNSS v aplikacijah visoke točnosti ter sovražnih napadov na signal GNSS.

PEDAGOŠKA DEJAVNOST

Poučujemo predmete na univerzitetnem študijskem programu prve stopnje Geodezija in geoinformatika, visokošolskem študijskem programu Tehnično upravljanje nepremičnin ter magistrskih študijskih programov druge stopnje Geodezija in geoinformatika ter Prostorsko načrtovanje.

V prvostopenjskih študijskih programih študente seznanimo s teorijo meritev v geodeziji, osnovnimi geometrijskimi lastnostmi Zemlje in težnostnega polja, izvedbo, obdelavo in analizo meritev GNSS ter uporabo koordinatnih sistemov v geodeziji, geoinformatiki in upravljanju nepremičnin. Z drugimi katedrami na Oddelku za geodezijo sodelujemo tudi pri izvedbi terenskega dela.

Na magistrskem študijskem programu druge stopnje Geodezija in geoinformatika študente seznanjamo s satelitsko in fizikalno geodezijo ter napredno obdelavo meritev v geodeziji. Na magistrskem študijskem programu druge stopnje Prostorsko načrtovanje študente seznanimo z osnovami geodezije.
Na vseh stopnjah in smereh študijev na Oddelku za geodezijo delujemo kot mentorji pri zaključnih delih.

ZNANSTVENA IN RAZISKOVALNA DEJAVNOST

Raziskovalno delo poteka v dveh raziskovalnih programih ARIS Geoinformacijska infrastruktura in trajnostni prostorski razvoj Slovenije (vodja prof. dr. Bojan Stopar) in Dinamična Zemlja, ki ga izvajamo z Geološkim zavodom Slovenije (vodja na UL FGG doc. dr. Oskar Sterle), v okviru temeljnega raziskovalnega projekta ARIS J2-2489 SLOKIN – geokinematski model ozemlja Slovenije (vodja prof. dr. Bojan Stopar), EU-projekta GEMOP (Galileo and EGNOS Monitoring Of Performances) (vodja izr. prof. dr. Polona Pavlovčič Prešeren) in v več drugih projektih.

V okviru operacije Razvoj raziskovalne infrastrukture za mednarodno konkurenčnost slovenskega RRI prostora –RI-SI-EPOS (European Plate Observing System) smo v letu 2021 pridobili raziskovalno opremo za spremljanje procesov, povezanih z Zemljo in njeno atmosfero. Od leta 2022 v okviru konzorcija EPOS-SI, ki ga sestavljajo ZRC-SAZU Inštitut za raziskovanje krasa, Geološki zavod Slovenije ter Institut Jožef Stefan, sodelujemo v infrastrukturnem centru ARIS.

Z Geodetsko upravo Republike Slovenije in Geodetskim inštitutom Slovenije sodelujemo pri nadzoru kakovosti državnega koordinatnega sistema ter državnih omrežij postaj GNSS.

Udeležujemo se znanstvenih in strokovnih srečanj, rezultate

Members of the Chair of Mathematical and Physical Geodesy and Navigation are involved in teaching and research work in the fields of mathematical, physical and satellite geodesy as well as measurement theory in geodesy. The main challenges we face are the development of reference systems in geodesy, Global Navigation Satellite System (GNSS) technology, active GNSS networks, procedures for using low-cost GNSS receivers in high-precision applications, and hostile attacks on the GNSS signal.

EDUCATIONAL ACTIVITY

We teach courses at the first-cycle academic study programme Geodesy and Geoinformatics, higher education professional programme Technical Real Estate Management and second-cycle master study programmes Geodesy and Geoinformatics and Spatial Planning.

In the first-cycle study programmes students learn the theory of measurements in geodesy, basic geometric properties of the Earth and gravity field, implementation, processing and analysis of the GNSS measurements and the use of coordinate systems in geodesy, geoinformatics and real estate management. We also cooperate with other chairs of the Department of Geodesy in carrying out field work.

At the second-cycle master study programme Geodesy and Geoinformatics students learn about satellite and physical geodesy as well as advanced processing of measurements in geodesy. At the second-cycle master study programme Spatial Planning students are introduced with the basics of geodesy.

We supervise final theses in all cycles and in all degree programmes in the Department of Geodesy.

SCIENTIFIC AND RESEARCH ACTIVITES

The research work is carried out in two research programmes financed by the National Research Agency: Geoinformation Infrastructure and Sustainable Spatial Development of Slovenia (Head Prof. Dr. Bojan Stopar) and Dynamic Earth, which we carry out in cooperation with the Geological Institute of Slovenia (Head at UL FGG Assoc. Prof. Dr. Oskar Sterle), a basic research project financed by the National Research Agency J2-2489 SLOKIN – Geokinematic Model of Slovenian Territory (Head Prof. Dr. Bojan Stopar), and an EU project GEMOP (Galileo and EGNOS Monitoring Of Performances) (Head Assoc. Prof. Dr. Polona Pavlovčič Prešeren), as well as several other projects.

As part of the operation Development of Research Infrastructure for the International Competitiveness of the Slovenian RRI Space–RI-SI-EPOS (European Plate Observing System), in 2021 we purchased research equipment for monitoring processes related to the Earth and its atmosphere. Since 2022, we have been involved in the ARIS Infrastructural Centre as part of the EPOS-SI consortium, which consists of the ZRC-SAZU Karst Research Institute, the Geological Survey of Slovenia, and the Jožef Stefan Institute.

We cooperate with the Surveying and Mapping Authority of the Republic of Slovenia and the Geodetic Institute of Slovenia in the quality control of the national coordinate

znanstvenoraziskovalnega dela objavljamo v domačih in tujih znanstvenih revijah. Delujemo tudi kot recenzenti domačih in tujih znanstvenih revij.

STROKOVNA DEJAVNOST

Na področju strokovne in razvojne dejavnosti vodimo geodetski monitoring na geološko zelo zahtevnem odseku hitre ceste Razdrto–Podnanos (vodja prof. dr. Bojan Stopar) in pri vzpostavitvi geodetske osnove za izgradnjo drugega tira železniške proge Divača–Koper. Doc. dr. Miran Kuhar deluje kot odgovorni urednik znanstveno strokovne revije Geodetski vestnik, glasila Zveze geodetov Slovenije in kot glavni tajnik Slovenske zveze za geodezijo in geofiziko.

POMEMBEN RAZISKOVALNI DOSEŽEK

V eni od skupnih raziskav z Univerzo v Trstu, natančneje z laboratorijem GeoSNaV, smo opredelili zmogljivost nizkocenovnih sprejemnikov u-blox ZED-F9P in ZED-F9R pri kinematičnem pozicioniranju kot tudi možnosti uporabe pametnih telefonov, opremljenih s čipi za določitev položaja z dvofrekvenčnimi faznimi opazovanji GNSS. Študija je vključevala analizo rezultatov kinematičnega določanja položaja s trajektorijo GNSS/INS, ki je bila določena s sistemom za mobilno kartiranje Applanix.

V ugodnih razmerah za izvedbo meritev sta se sprejemnika u-blox ZED-F9P in ZED-F9R zelo izkazala pri določitvi trajektorije meritev. Rezultati pa so potrdili tudi prednosti profesionalnih sprejemnikov pred nizkocenovnimi, zlasti v neugodnih razmerah. Ugotovitve so pomembne za raziskovalce, ki se ukvarjajo z izboljšanjem algoritmov za kinematično obdelavo GNSS in/ali razvojem čipov za pametne telefone in cenovno ugodne naprave GNSS. Poleg tega nudijo izhodišče za nadgradnjo uporabe pametnih telefonov in drugih cenovno ugodnih naprav pri določanju položaja, predvsem v podpori avtonomne vožnje in navigacije.

system and the national network of GNSS stations.

We participate in scientific and professional conferences and the results of our scientific research are published in national and international journals. We also work as reviewers for national and international scientific journals.

PROFESSIONAL ACTIVITY

In the field of professional and development activities, we carry out geodetic monitoring on the geologically very demanding section of the Razdrto-Podnanos expressway (headed by Prof. Dr. Bojan Stopar) and in the creation of the geodetic basis for the construction of the second track of the Divača-Koper railway line.

Assist. Prof. Dr. Miran is editor-in-chief of the scientific and professional journal Geodetski vestnik, the newsletter of the Association of Surveyors of Slovenia, and Secretary General of the Slovenian Association of Geodesy and Geophysics.

IMPORTANT RESEARCH ACHIEVEMENT

In one of the joint research tasks with the University of Trieste, more precisely with the GeoSNaV laboratory, we defined the performance of the low-cost u-blox receivers ZED-F9P and ZED-F9R in kinematic positioning and the possibilities of using smartphones equipped with chips for positioning with the observations with two frequency phases. The study included the analysis of kinematic positioning results with a GNSS/INS trajectory obtained by the Applanix mobile mapping system.

In favourable conditions for carrying out measurements, the u-blox ZED-F9P and ZED-F9R receivers performed very well in determining the measurement curve. The results also confirmed the advantages of the professional receivers over the low-cost receivers, especially under unfavourable conditions. The findings are relevant for researchers working on the improvement of algorithms for kinematic GNSS processing and/or the development of chips for smartphones and affordable GNSS devices. In addition, they provide a starting point for improving the use of smartphones and other affordable devices for positioning, especially to support autonomous driving and navigation.

KATEDRA ZA PROSTORSKO PLANIRANJE CHAIR OF SPATIAL PLANNING

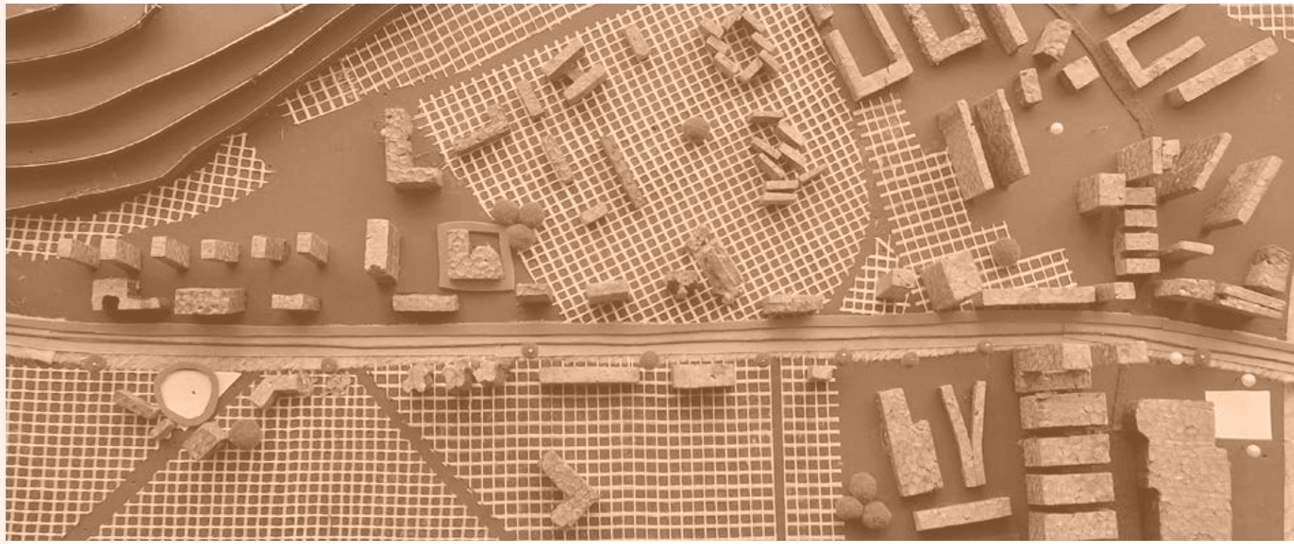
KADER PERSONNEL

PREDSTOJNIK HEAD
doc. dr. **Gregor Čok**

NAMESTNICA PREDSTOJNIKA DEPUTY HEAD
viš. pred. dr. Mojca Foški

PEDAGOGA TEACHERS
doc. dr. Alma Zavodnik Lamovšek, asist. Jana Breznik

SODELAVKA ASSOCIATE
Konstanca Soss



Na Katedri za prostorsko planiranje (KPP) smo se v letu 2021 ponovno kadrovsko okrepili, saj se nam je pridružila Jana Breznik, mag. prost. načrt., ki je nato v februarju 2022 pridobila tudi naziv asistentke za področje načrtovanje in urejanja prostora. V septembru 2023 se nam je za obdobje dveh let pridružila tudi Ornella Salimbene, raziskovalka iz Italije, ki izvaja svoj raziskovani projekt v okviru postdoktorskega programa EUTOPIA SIF.

Drugih bistvenih sprememb na področju pedagoškega dela v zadnjih dveh študijskih letih ni bilo. V pedagoški proces kljub kadrovski razširitvi še naprej vključujemo vabljene predavatelje iz prakse, ki v akademsko okolje prinašajo neposredne izkušnje iz realnega prostorsko načrtovalskega okolja. Na strokovnem področju smo v zadnjih dveh letih sodelovali tako z občinami kot regionalnimi razvojnimi agencijami. Sodelovanje z ministrstvi še naprej poteka v večini preko nacionalnih ciljnih raziskovalnih projektov, v katerih smo v zadnjih dveh letih raziskovali predvsem konflikte na podeželju ter usklajevanje katastrskega načrta z namensko rabo prostora. Sodelujemo tudi v projektih Načrta za okrevanje in odpornost (NOO).

PEDAGOŠKA DEJAVNOST

Drugostopenjski študijski program Prostorsko načrtovanje (PN) še naprej razpisujemo vsako drugo leto. V letu 2021/22 se je na študij Prostorskega načrtovanja vpisala šesta generacija študentov ter uspešno nadaljevala študij tudi v letu 2022/23. Študijski program Prostorskega načrtovanja v tem obdobju ni doživel večjih sprememb. Študenti šeste generacije so bili v sklopu predmeta Ruralno planiranje na štiridnevni strokovni ekskurziji v Osijeku (april 2022), v okviru predmeta Projektno delo s seminarjem so se udeležili šestdnevne mednarodne delavnice v Krakovu (maj 2023), prav tako pa smo v maju 2023 uspeli izvesti štiridnevno strokovno ekskurzijo v Švico in Italijo. Trudimo se, da študente Prostorskega načrtovanja vključujemo v delo v mednarodnem okolju.

Na tretji, doktorski stopnji izobraževanja na znanstvenem področju Načrtovanje in urejanje prostora imamo vpisanega novega študenta.

RAZISKOVALNA IN STROKOVNA DEJAVNOST

KPP se še vedno aktivno vključuje v temeljne in ciljne raziskovalne projekte (ARIS). V avgustu 2023 sta bila zaključena projekta, v katera smo bili vključeni: Povezljivost prostorskih podatkov uradnih evidenc s podatki katastra nepremičnin (CRP V2-2156), Konflikti na podeželju spodbujajo iskanje novih rešitev (CRP V6-2029). V manjšem obsegu smo sodelovali tudi pri temeljnem projektu Razvoj socialne infrastrukture in storitev za izvajanje dolgotrajne oskrbe v skupnosti (J6-9396), ki je bil zaključen že v letu 2022. V letu 2022 smo zaključili bilateralno sodelovanje s Fakulteto v Osijeku na temo preučevanja morfoloških značilnosti, razvojnih potencialov in regulativnih elementov slovenskih in hrvaških podeželskih naselij v panonskem območju (2020–21, podaljšan do leta 2022).

V okviru raziskovalnih projektov sodelujemo tako z drugimi članicami Univerze v Ljubljani kot z drugimi katedrami znotraj UL FGG.

The Chair of Spatial Planning was strengthened once again in 2021 with the addition of Jana Breznik, M.Sc. in Spatial Planning, who was then also given the title of Assistant in Planning and Spatial Development in February 2022. In September 2023, Ornella Salimbene, a researcher from Italy who is carrying out her research project as part of the EUTOPIA-SIF postdoc fellowships program, joined us for a period of two years.

There were no other significant changes in educational work in the last two academic years. Despite the expansion in the number of staff, the educational process continues to include invited lecturers from practice, who bring direct experience from the real spatial planning environment into the academic environment. In the professional field, we have worked with municipalities and regional development agencies over the past two years. Cooperation with the ministries continues to take place primarily in the framework of national targeted research projects, in which we have conducted research in the last two years primarily on conflicts in the countryside and on the coordination of the cadastral plan with the appropriate use of space. We are also involved in the projects of the Recovery and Resilience Plan (NOO).

EDUCATIONAL ACTIVITY

The second-cycle study programme Spatial Planning continues to be offered every second year. In the academic year 2021/22, the sixth generation of students enrolled in Spatial Planning, and successfully continued their studies in the academic year 2022/23. The study programme Spatial Planning did not undergo any major changes during this period. Students of the sixth generation were on a four-day field trip to Osijek (April 2022) as part of the Rural Planning course and took part in a six-day international workshop in Krakow (May 2023) as part of the course Project Work with Seminar. In May 2023, we organized a four-day field trip to Switzerland and Italy. We try to involve students of Spatial Planning in working in an international environment.

We have a new student enrolled in the third doctoral cycle in the scientific field of Planning and Spatial Development.

RESEARCH AND PROFESSIONAL ACTIVITES

The Chair members still actively participate in basic and targeted research projects financed by the National Research and Innovation Agency. In August 2023 the following projects, in which our researchers were involved, were successfully concluded: Geospatial Data Integration of Official Datasets with the Real Property Cadastre Data (V2-2156), Conflicts in Rural Areas as Simulators of Solutions Searching and Development (V6-2029). To a smaller scale, we also cooperated in the basic research project Development of Social Infrastructure and Services for Community Based Long-term Care (J6-9396), which was completed in 2022. In 2022, we completed bilateral cooperation with the Faculty in Osijek on the topic of studying the morphological characteristics, development potentials and regulatory elements of Slovenian and Croatian rural settlements in the Pannonian region (2020–21, extended until 2022).

In the framework of research projects, we cooperate with other members of the University of Ljubljana as well as with other

Razvijamo pa tudi raziskovalno sodelovanje z drugimi fakultetami in univerzami v evropskem prostoru (Krakov, Beograd, Zagreb, Osijek idr.).

POMEMBEN DOSEŽEK

Med pomembnejše dosežke štejemo članke, ki jih objavljamo v periodičnih publikacijah, tako v bazi SSCI kot v AHCI. Omeniti želimo prispevek z naslovom Spatial regulation instruments of work at home: the case of Slovenia as a post-transition country, objavljen v reviji Sustainability, ISSN 2071-1050 (Vol. 14, iss. 7, art. 4254, apr. 2022, [27] f.) katerega avtorji smo Čok, Gregor; Mrak, Gašper; Breznik, Jana; Foški, Mojca; Zavodnik Lamovšek, Alma.

chairs within UL FGG. We are also expanding our research collaboration with other faculties and universities in the European area (Krakow, Belgrade, Zagreb, Osijek, etc.)

SIGNIFICANT ACHIEVEMENT

Among our most important achievements are the articles published in journals in both the SSCI and AHCI databases. We would like to mention the article with the title Spatial regulation instruments of work at home: the case of Slovenia as a post-transition country, published in the journal Sustainability, ISSN 2071-1050 (Vol. 14, iss. 7, art. 4254, Apr. 2022, [27] f.), by the authors Čok, Gregor; Mrak, Gašper; Breznik, Jana; Foški, Mojca; Zavodnik Lamovšek, Alma.

ODDELEK ZA OKOLJSKO GRADBENIŠTVO
DEPARTMENT OF ENVIRONMENTAL CIVIL ENGINEERING

izr. prof. dr. **Nataša Atanasova**
predstojnica Oddelka za okoljsko gradbeništvo Head of the Department of Environmental Civil Engineering

Oddelek za okoljsko gradbeništvo UL FGG sestavljata dve katedri in dva inštituta: Katedra za splošno hidrotehniko, Katedra za mehaniko tekočin z laboratorijem, Inštitut za zdravstveno hidrotehniko in Vodnogospodarski inštitut. Na oddelku je zaposlenih 29 oseb, od tega je devet učiteljev in šest asistentov. Na dveh študijskih programih, univerzitetnem in magistrskem programu Vodarstvo in okoljsko inženirstvo uresničujemo svoje primarno poslanstvo – pedagoško delo.

The Department of Environmental Civil Engineering consists of two chairs and two institutes: Chair of Hydraulic Engineering, Chair of Fluid Mechanics with Laboratory, Institute of Sanitary Engineering, and Water Management Institute. The Department employs 29 people, of those 9 teachers and 6 assistants. Within two study programmes, academic undergraduate and master study of Water Management and Environmental Engineering, we fulfil our main mission – educational activity.

Magistrski program smo internacionalizirali s študijema za pridobitev dvojne diplome z univerzama iz Švice in Italije, sodelujemo pa tudi v mednarodnem programu za obvladovanje tveganja poplav z univerzami iz Nemčije, Španije in Nizozemske. Inženirji, ki zaključijo katerega od ponujenih študijev, so pripravljeni za reševanje izzivov prihodnosti z znanji obvladovanja suš in poplav, pridobivanja zelene in nizkoogljične energije, gospodarjenja s sekundarnimi surovinami, uvajanja učinkovitih okoljskih tehnologij, sonaravnega urejanja vodotokov in drugih vodnih teles, hkrati pa pridobijo klasična in napredna znanja iz preskrbe s pitno vodo ter odvajanja in čiščenja odpadnih voda.

Najpomembnejši del raziskovalnega in strokovnega dela zajemajo raziskave s temeljnih področij hidrologije, mehanike tekočin, hidravlike ter inženirske in zdravstvene hidrotehnike, kjer se vse bolj usmerjamo na raziskave in uporabo sodobnih sistemov preskrbe s čistejšo energijo in pitno vodo ter trajnostnega gospodarjenja z odpadnimi vodami in sekundarnimi surovinami. Zavedanje o nepreklicnih lokalnih in globalnih klimatskih spremembah nas vzpodbuja tudi k delovanju v smeri zmanjševanja njihovih posledic. S sodobnimi orodji, ki jih deloma sami razvijamo, izvajamo simulacije prenosa toplote in onesnažil v okolju ter njihove razgradnje, pa tudi načrtovanja in izvedbe hidrotehničnih objektov na vseh vrstah vodnih teles. Pri raziskovalnem delu sodelujemo z inštituti, fakultetami in univerzami v tujini in Sloveniji, predvsem pa znotraj UL in UL FGG. Zavedamo se, da brez nenehnega pretoka informacij in znanja med nami in prakso ni mogoče dosegati odličnosti na področjih raziskav, reševati trenutnih in prihodnjih izzivov stroke, niti slediti potrebam družbe. Zato si v okviru ponujenih priložnosti in strokovne odgovornosti ves čas prizadevamo vzdrževati tudi močne stike z gospodarskimi družbami in upravnimi organi.

The master programme has been internationalised, as it enables our students to obtain a double degree, in cooperation with a university from Switzerland and a university from Italy. We also participate in an international programme Flood Risk Management in a consortium with institutions from Germany, Spain, and the Netherlands. Engineers who graduate from one of the offered studies are ready to face the challenges of the future and are equipped with knowledge for the management of droughts and floods, the production of green and low-carbon energy, management with secondary raw materials, the introduction of efficient environmental technologies, sustainable management of rivers and other bodies of water. At the same time, they acquire classical and advanced knowledge in the field of drinking water supply and wastewater disposal.

The most important part of our research and professional work consists of research in the basic areas of hydrology, fluid mechanics, hydraulics and engineering and sanitary hydraulics, where we are increasingly focused on the research and application of modern systems for clean energy and drinking water supply as well as sustainable wastewater and secondary raw materials management. Awareness of unavoidable local and global climate change is the impetus for our activities to mitigate its consequences. Using modern tools, partly developed in-house, we perform simulations of heat and pollutant transport in the environment and investigate pollutant degradation. We design and implement hydrotechnical structures on all types of water bodies. In the field of research, we cooperate with institutes, faculties and universities in Slovenia and abroad, and, most importantly, within the University of Ljubljana and the Faculty of Civil and Geodetic Engineering. We are aware that without a constant flow of information and knowledge and without practical work, we cannot achieve excellence in research, solve current and future challenges of the profession or follow the needs of society. For this reason, we are constantly striving to make use of all the opportunities offered and to maintain close contacts with the business community and administrative bodies.

PEDAGOŠKA DEJAVNOST

Oba študijska programa, ki ju izvajamo na Oddelku za okoljsko gradbeništvo, univerzitetni in magistrski program Vodarstvo in okoljsko inženirstvo, sta interdisciplinarna in uspešno zapolnjujeta vrzel med tehniškimi in naravoslovnimi programi varstva okolja Univerze v Ljubljani.

Oba študija nenehno posodabljamo in s tem sledimo razvoju znanosti na področju tehničnega varstva okolja, na katerem kot tipična tehniška fakulteta ponujamo celovit in moderen študij tudi z uspešnim sodelovanjem z izvajalci iz drugih fakultet UL. V okviru evropskega mehanizma za okrevanje in odpornost NextGenerationEU od leta 2022 izvajamo pilotne projekte, osredotočene na kurikularno prenovo, ter tudi projekt vseživljenjskega učenja. Vsi projekti so v skladu z zelenim prehodom in digitalizacijo. Že na univerzitetnem programu se študenti seznanijo s širino študijske problematike ter z reševanjem sprva enostavnejših problemov. Znanja in spretnosti poglobijo, razširijo in z izbiro modula tudi specializirajo na magistrski stopnji. Pridobljena znanja so že in bodo vedno bolj pomembna pri reševanju perečih problemov tretjega tisočletja: spopadanja s posledicami klimatskih sprememb, posledičnih suš in poplav, potencialnega onesnaženja okolja zaradi nujnega povečevanja proizvodnje in drugih sodobnih izzivov. Majhno število, okrog 70 študentov na obeh študijih, nam ponuja odlične možnosti za individualno usmerjeno delo v majhnih skupinah, študentom pa so na voljo sodobna merska, laboratorijska, strojna in programska oprema. Sistem poučevanja je podprt s spletnimi učilnicami in spletnim referatom. Pri vseh oblikah poučevanja in individualnega, laboratorijskega in terenskega ter skupinskega dela na projektih je največji poudarek na predajanju znanj za praktično delo po končanem študiju. Pod mentorstvom naših pedagogov in v sodelovanju s strokovnjaki iz podjetij se izvajajo projekti Po kreativni poti do praktičnega znanja, zaključna dela naših študentov pa so prejela že več kot 25 nagrad in priznanj, med katerimi v zadnjih letih posebej izstopajo univerzitetna in fakultetna Prešernova nagrada ter Goljevščkove nagrade.

Enako pomembno kot strokovno znanje je tudi poznavanje veščin komuniciranja z laičnimi in strokovnimi javnostmi, zato študente med študijem seznanjamo s poslovanjem s strankami v upravnih postopkih, postopkih javnega naročanja ter projektiranja objektov in ukrepov. Po zaključku prve in druge stopnje študija imajo diplomanti možnost neposrednega nadaljevanja študija na številnih magistrskih in doktorskih študijskih programih v Sloveniji in tujini. Magistrski

EDUCATIONAL ACTIVITY

Both study programmes carried out by the Department of Environmental Civil Engineering, academic bachelor and master study programmes Water Management and Environmental Engineering, are interdisciplinary and successfully bridge the gap between the study programmes of engineering and natural sciences at the University of Ljubljana.

Both studies are continuously updated to keep up with the scientific development in the field of technical environmental protection. As a typical technical faculty, we offer an integrated and modern study also involving partners from other faculties of the University of Ljubljana. Since 2022, we have been running pilot projects as part of the European recovery and resilience mechanism NextGenerationEU, focusing on the renewal of curricula, and a lifelong learning project. All projects are in line with the green transition and digitalisation. Already at the academic level, students become familiar with the wide range of problems in this area and first start by solving simple problems. The knowledge and skills are then upgraded, expanded and specialised at the master level, where students select a module. The knowledge acquired has proved, and will continue to be, important in the future to solve urgent problems of the third millennium: fighting the consequences of climate change, the resulting drought and floods, the potential pollution of the environment due to unavoidable production growth and other challenges of this modern age. The small number of students in both study programmes, about 70, gives us excellent opportunities for individual work in small groups. Students can benefit from modern measuring, laboratory, hardware and software equipment. The teaching system is supported by e-classrooms and an online student office. In all forms of teaching as well as in individual, laboratory, field and team work on projects, our main focus is on providing our students with knowledge for practical work in their later professional life. Under the supervision of our teachers and in cooperation with experts from the business community, we implement projects called Creative Path to Practical Knowledge. The final theses of our students have been awarded by 25 prizes and recognitions. Among them, the University and the Faculty Prešeren Awards and the Goljevšček Awards deserve special mention.

Beside professional knowledge, we also value practical communication skills for dealing with lay and expert public. Therefore, we teach our students how to work with customers in administrative procedures, the public procurement procedures, project design and measures.

študij Vodarstvo in okoljsko inženirstvo ima vzpostavljeni tudi sodelovanji s Zürich University of Applied Sciences in Università della Calabria. V obeh primerih omogoča sodelovanje pridobitev dveh certifikatov o zaključku študija (dvojna diploma). Sodelujemo tudi v skupnem študijskem programu univerz iz Dresdna, Delfta in Barcelone na področju obvladovanja tveganj pri poplavah. Povečan dotok študentov iz tujine v okviru izmenjav Erasmus+ ter naštetih študijskih programov je priložnost za vzporedno izvajanje predmetov v angleščini, ki jo lahko s pridom izkoristijo tudi naši študentje.

ZNANSTVENA, RAZISKOVALNA IN STROKOVNA DEJAVNOST

Na Oddelku za okoljsko gradbeništvo deluje razmeroma majhna skupina raziskovalcev, ki pa je aktivna v domačem in mednarodnem okolju. Vpeti smo v mednarodne programe UNESCO, evropske okvirne programe, bilateralna in druga čezmejna sodelovanja, večina raziskovalcev sodeluje v programski skupini Vodarstvo in geotehnika, prav tako pa sodelujemo v nacionalnih temeljnih in aplikativnih projektih.

V štirih laboratorijih, hidravličnem, za agregate in dveh laboratorijih za zdravstveno hidrotehniko potekajo številne raziskave osnovnih področij toka vode in sedimentov, transporta snovi in toplote, zasnove in varnosti hidrotehničnih objektov, naprednih tehnologij priprave pitne vode in čiščenja odpadne vode, oskrbe s pitno vodo ter pridobivanja in uporabe bio-goriv. Razvoj in izdelava specifične merske opreme omogoča tudi izvedbo zahtevnih meritev, ki jih nato uporabljamo v matematičnih in numeričnih modelih. Številne modele in drugo programsko opremo razvijamo tudi sami, med drugim modele transporta in razgradnje onesnažil v naravnem okolju, modele toka vode, sedimentov, plazov in drobirskih tokov po različnih mrežnih in brezmrežnih numeričnih metodah, modele porušitev pregrad in nasipov ter dogajanja ob poplavnih dogodkih in drugih z vodo povezanih naravnih nesrečah.

Velik del raziskav je usmerjen na področja krožnega gospodarstva, mest prihodnosti, podnebnih sprememb in posledic za naravno in grajeno okolje. O aktivnosti raziskovalcevpriča naraščajoče število kakovostnih objav v priznanih revijah, sodelovanje na mednarodnih znanstvenih simpozijih in sodelovanje v uredniških odborih znanstvenih revij. Na Oddelku za okoljsko gradbeništvo urejamo tudi edino slovensko znanstveno revijo s področja vodarstva, hidrotehnike in širše problematike, povezane z vodami, revijo Acta hydrotechnica, ki je od leta 2019 indeksirana v bazi Scopus.

When students finish the first and second cycle of studies, they can immediately continue their studies at numerous master and doctoral study programmes in Slovenia and abroad. The master study programme Water Science and Environmental Engineering closely cooperates with the Zürich University of Applied Sciences and the Università della Calabria. In both cases, the cooperation enables our students to obtain two final certificates (double degree). We also participate in a joint study programme with the universities from Dresden, Delft and Barcelona in the field of flood risk management. An increasing number of foreign students within the Erasmus+ exchange programme and the programmes presented above is an opportunity for us to offer our courses in English, which is another advantage for our students.

SCIENTIFIC, RESEARCH AND PROFESSIONAL ACTIVITIES

The Department of Environmental Civil Engineering consists of a relatively small group of researchers, active in national as well as international communities. We are engaged in the international UNESCO programme, European framework programmes, bilateral and other cross-border cooperation. Most of our researchers participate in the core programme group Water Science and Geotechnics. We also participate in national basic and applied research projects.

In four laboratories, a hydraulic laboratory, a laboratory for aggregates, and two laboratories for sanitary engineering, we conduct numerous research projects dealing with water flow, transport of matter and heat, design and safety of hydraulic structures, advanced technologies of drinking water and wastewater treatment, water supply and use of biofuels. The development and elaboration of specific measuring instruments enable the performance of sophisticated measurements, which are then used in mathematical and numerical models. Many models and other software equipment are also the result of our work, including models for the transport and degradation of pollutants in the natural environment, models of water and sediment flows, landslides and debris flows using various mesh and meshfree numerical methods, models of dam and embankment failures and activities during flood events and other water-related natural disasters.

A large part of research is directed into the areas of circular economy, cities of the future, climate change and consequences for the natural and built environment. The results of our work can be seen in the growing number of high-quality publications in respected scientific journals, participation in international scientific symposia and

Sodelovanje z gospodarskimi in negospodarskimi družbami omogoča prenos izsledkov raziskav v prakso, s čimer postanejo rezultati našega dela uporabni in koristni za širšo družbo. Ministrstva, agencije in podjetja uporabljajo aplikacije, razvite na Oddelku za okoljsko gradbeništvo pri napovedovanju in odpravljanju posledic ekstremnih dogodkov, varovanju okolja, v hidroenergetiki in pri načrtovanju objektov in naprav, povezanih z vodami. Sodelujemo tudi kot projektanti in revidenti projektne dokumentacije ter izdelovalci študij na področju vodarstva in hidrotehnike. Nekaj sodelavcev je delno zaposlenih tudi v podjetjih, kar omogoča kakovosten prenos izkušenj in veščin v pedagoško delo, hkrati pa se izsledki raziskav na ta način hitreje prenašajo v prakso.

cooperation in editorial boards of scientific journals. Our department also publishes the only Slovenian scientific journal in the fields of water science, hydraulic engineering and the broader water related topics, Acta hydrotechnica. In 2019 the journal was added to the Scopus base.

Cooperation with industry and the non-commercial community enables us to disseminate the results of our research in practice. In this way we make sure that our work finds practical application in society. Ministries, agencies and companies use applications developed at the Department of Environmental Civil Engineering for the prediction and mitigation of the consequences of natural events, for the protection of the environment, in the field of hydropower and for the design of structures and equipment related to water. We also work as designers and reviewers of project documents and prepare studies in the field of water science and hydraulic engineering. Some of our members work partly in commercial enterprises, which guarantees a high-quality transfer of knowledge and skills into the teaching process. At the same time, this enables faster transfer of research results into practice.

UNIVERZITETNI ŠTUDIJSKI PROGRAM PRVE STOPNJE VODARSTVO IN OKOLJSKO INŽENIRSTVO SECOND-CYCLE ACADEMIC STUDY PROGRAMME WATER SCIENCE AND ENVIRONMENTAL ENGINEERING

SKRBNIK TRUSTEE
doc. dr. **Sabina Kolbl Repinc**

Prvostopenjski univerzitetni študijski program Vodarstva in okoljskega inženirstva poteka na Oddelku za okoljsko gradbeništvo Fakultete za gradbeništvo in geodezijo. Študij je sodoben in interdisciplinaren ter dopolnjuje druga dva univerzitetna študijska programa na fakulteti. Diplomant študijskega programa pridobi pregledno splošno temeljno naravoslovno in družboslovno znanje, hkrati pa osnovno temeljno in uporabno (gradbeno) tehniško znanje za reševanje enostavnih upravnih postopkov ter planiranje, načrtovanje, izvedbo in vzdrževanje manj zahtevnih (po Zakonu o graditvi objektov) gradbenih inženirskih objektov (po enotni klasifikaciji vrst objektov CC-SI) s področja vodarskega, okoljskega in komunalnega inženirstva.

Tekom študija študent ob teoretičnem temeljnem znanju spozna tradicionalna načela vodarstva, nadgrajena z najnovejšimi dognanji stroke, posredovanimi na sodoben način, s sodobno tehnologijo. Z delom v skupinah, projektnim delom, terenskim delom in reševanjem problemskih nalog se privaja na interdisciplinarno delo v skupini, uči veščine nastopanja pred strokovno in laično javnostjo ter seznani s poslovanjem s strankami v upravnih postopkih, v postopkih javnega naročanja ter projektiranja objektov in ukrepov. Pridobljeno teoretično znanje kar najbolj preizkusi na primerih vaj in realnih primerih uporabe, kar mu omogoča lažjo vključitev v prakso po končanem prvostopenjskem študiju. Hkrati je cilj programa tudi osvojitev zadostnega obsega temeljnih inženirskih vsebin, ki omogočajo razvoj abstraktnega mišljenja in uspešno nadaljevanje študija na različnih programih druge stopnje.

The first-cycle academic study programme Water Science and Environmental Engineering is offered by the Department of Environmental Engineering of the Faculty of Civil and Geodetic Engineering. The programme is modern and interdisciplinary, and it supplements previous academic study programmes at our Department. The graduates acquire comprehensive general knowledge of natural and social sciences, as well as fundamental and applied (civil) engineering knowledge. Thus, they are qualified for solving simple administrative procedures and plan, implement and maintain less demanding structures according to the Construction Act (according to the uniform classification of construction types CC-SI) for the areas of water science, environmental and municipal engineering.

Besides gaining general theoretic knowledge about water science, students also learn about the modern principles of the profession, presented in a modern way using state-of-the-art technology. By working in groups, with project and field work, and by solving problem tasks, they acquire essential teamwork and public speaking skills and will be able to coherently present scientific and engineering ideas to expert and lay public. They become acquainted with communication with customers in administrative and public procurement procedures, about the design of structures and measures. The students have the opportunity to test all the acquired expert knowledge to the largest possible extent within practical tutorials and real-life case studies, which allows them a quick transition into practical work after the first-cycle studies. Another goal of the programme is to provide the graduates with a sufficient range of basic engineering contents that allow the development of abstract thinking and successful continuation of studies at various second-cycle programmes.

PREDMETNIK CURRICULUM

1. letnik 1st year

- Matematika I Mathematics I • ECTS 10
- Fizika Physics • ECTS 9
- Osnove ekologije celinskih voda Fundamentals of Freshwater Ecology • ECTS 4
- Uvod v okoljsko inženirstvo Introduction to Environmental Engineering • ECTS 6
- Matematika II Mathematics II • ECTS 8
- Osnove kemije Basic Chemistry • ECTS 4
- Geodezija Geodetic Engineering • ECTS 4
- Hidrologija Hydrology • ECTS 6
- Gradiva Construction and Building Materials • ECTS 4
- Digitalno načrtovanje in programiranje Digital Design and Programming • ECTS 5

2. letnik 2nd year

- Hidromehanika Hydromechanics • ECTS 5
- Osnove mehanike Introduction to Structural Mechanics • ECTS 8
- Matematika III Mathematics III • ECTS 7
- Gospodarjenje s sekundarnimi in odpadnimi snovmi Secondary and Waste Materials Management • ECTS 6
- Izbirni predmet - statistika Elective Course - Statistics • ECTS 4
- Osnove zdravstvene hidrotehnike Introduction to Sanitary Engineering • ECTS 4
- Hidravlika Hydraulics • ECTS 5
- Uporabna ekologija in ekotoksiologija Applied Ecology and Ecotoxicology • ECTS 4
- Mehanika tal in inženirska geologija Soil Mechanics and Engineering Geology • ECTS 7
- Komunalne naprave Communal Technical Infrastructure • ECTS 4
- Organizacija gradbenih del in poslovanje Organization of Construction Works and Operation • ECTS 6

3. letnik 3rd year

- Temelji ekonomske analize Introduction to Economic Analysis • ECTS 3
- Ceste in promet Roads and Traffic • ECTS 6
- Osnove lesenih in jeklenih konstrukcij Introduction to Timber and Steel Structures • ECTS 4
- Geotehnika Geotechnical Engineering • ECTS 6
- Vodne gradnje Introduction to Drainage Engineering • ECTS 4
- Temelji prostorskega načrtovanja Fundamentals of Spatial Planning • ECTS 7
- Osnove betonskih in zidanih konstrukcij Introduction to Concrete and Masonry Structures • ECTS 6
- Praktično usposabljanje Practical Training • ECTS 4
- Izbirni predmet Elective Course • ECTS 7
- Izbirni predmet Elective Course • ECTS 8
- Diplomsko delo Diploma Work • ECTS 5

Izbirni predmeti Elective Courses

- Osnove statistike v vodarstvu Basic Statistics in Water Science • ECTS 4
- Napredne statistične metode v vodarstvu Advanced Statistical Methods in Water Science • ECTS 4
- Operacijske raziskave v gradbeništvu Operational Research in Civil Engineering • ECTS 5
- Hidroinformatika Hydroinformatics • ECTS 4
- Gradbene tehnologije v vodarstvu Construction Technology in Water Works • ECTS 4
- Meritve v hidrologiji Hydrometry • ECTS 4
- Uvod v okoljske tehnologije Introduction to Environmental Technologies • ECTS 4
- *Naravne nesreče in njihov vpliv na okolje, prostor in družbo *Natural Disasters and Their Impact on the Environment and Society • ECTS 6

* predmet je namenjen študentom drugih fakultet * the course is intended for students from other faculties (social sciences, etc.)

MAGISTRSKI ŠTUDIJSKI PROGRAM DRUGE STOPNJE VODARSTVO IN OKOLJSKO INŽENIRSTVO SECOND-CYCLE ACADEMIC STUDY PROGRAMME WATER SCIENCE AND ENVIRONMENTAL ENGINEERING

SKRBNIK TRUSTEE
doc. dr. **Nejc Bezak**

Magistrski študijski program druge stopnje Vodarstvo in okoljsko inženirstvo traja dve leti (štiri semestre) in obsega 120 kreditnih točk. Študijski program poteka na Oddelku za okoljsko gradbeništvo UL FGG.

Diplomant programa bo pridobil poglobljeno temeljno naravoslovno znanje, nadgrajeno s temeljnim in predvsem uporabnim strokovnim (gradbeno) tehniškim znanjem za reševanje zahtevnejših upravnih postopkov ter planiranje, načrtovanje, izvedbo in vzdrževanje zahtevnejših gradbenih inženirskih objektov s področja vodarskega, komunalnega in okoljskega inženirstva.

Pri študiju bo študent ob teoretičnem temeljnem znanju s področja hidrotehnike in geotehnike spoznal sodobna načela vodarstva, nadgrajena z najnovejšimi dognanji stroke na posameznih področjih okoljskega inženirstva in gradbeništva, posredovanimi na sodoben način z uporabo sodobnih tehnologij. Z delom v skupinah, projektnim in terenskim delom ter reševanjem problemskih nalog bo razvijal veščine, pomembne za interdisciplinarno delo v skupini, nastopanje pred strokovno in laično javnostjo ter se seznanil z vodenjem projektov, povezanih z okoljskim gradbeništvom, vodarstvom in okoljskim inženirstvom, še posebej s projektiranjem posameznih specialnih vrst objektov in načrtovanjem ukrepov. Vse pridobljeno strokovno znanje bo študent tekom študija lahko preizkusil na primerih vaj in realnih primerih uporabe v praksi. To mu bo skupaj s praktičnim usposabljanjem kot sestavnim delom študijskega programa omogočalo lažje delovanje v praksi po končanem magistrskem študiju. Cilj programa je tudi osvojitev zadostnega obsega temeljnih inženirskih vsebin, ki omogočajo razvoj abstraktnega mišljenja in uspešno nadaljevanje študija na različnih programih tretje stopnje (npr. s področja gradbeništva ali varstva okolja).

The master study programme Water Science and Environmental Engineering is a 120-credit two-year programme (four semesters). The study programme is implemented at the UL FGG Department of Environmental Civil Engineering.

Graduates of the master study programme Water Science and Environmental Engineering acquire fundamental knowledge of natural sciences, as well as applicable expert (civil engineering) skills for solving demanding administrative procedures and for the design, planning, implementation and maintenance of more demanding civil engineering structures in the areas of water management, municipal and environmental engineering.

Besides gaining general theoretic knowledge about hydraulic and geotechnical engineering, students also learn about the modern principles of water science and the latest achievements of the profession in individual areas of environmental and civil engineering, presented in a modern way using state-of-the-art technological approaches. By working in groups, with project and field work, and by solving problem tasks, students acquire essential teamwork and public speaking skills and will be able to coherently present scientific and engineering ideas to expert and lay public. They become acquainted with project management in the fields of environmental civil engineering and water management, and especially related to the design of specialised construction types and planning measures. The students have the opportunity to test all the acquired expert knowledge to the largest possible extent within practical tutorials and real-life case studies, which allows them, together with practical training as part of the study, quick transition into practical work after the finished master study. Another goal of the programme is to provide the students with sufficient basic engineering knowledge to allow them to develop abstract thinking and successfully continue the study at various third-cycle (i.e. doctoral) programmes (e.g. civil engineering or environment protection).

PREDMETNIK CURRICULUM

1. letnik 1st year

Hidravlično modeliranje Hydraulic Modelling • ECTS 8
Hidrološko modeliranje Hydrological Modelling • ECTS 6
Vodovod in priprava pitne vode Drinking Water Supply and Treatment • ECTS 8
Vodenje projektov Project Management • ECTS 4
Osnove prostorske sociologije Basics of Spatial Sociology • ECTS 3

Urejanje vodotokov River Engineering • ECTS 8
Dreniranje in namakanje Drainage and Irrigation • ECTS 6
Zaščita voda Water Protection • ECTS 4
Morje in obalni pas Open Sea and Coastal Area • ECTS 4
Geotehnika okolja Environmental Geotechnics • ECTS 5
Daljinsko zaznavanje v okoljskem gradbeništvu Remote Sensing in Environmental Civil Engineering • ECTS 4

2. letnik 2nd year

Izbirni predmeti Elective Courses • ECTS 6
Predmeti po modulu Courses by Module • ECTS 24

Magistrsko delo MSc Thesis • ECTS 30

Moduli Modules

Modul Hidrotehnika Module Hydrotechnics • ECTS 24
Hidrotehnični objekti Hydraulic Structures • ECTS 8
Vodnogospodarski sistemi Water Management Systems • ECTS 4
Vodne moči Water Powers • ECTS 4
Kanalizacija in čiščenje odpadnih voda Sewerage and Waste Water Treatment • ECTS 8

Modul Okoljsko inženirstvo Module Environmental Engineering • ECTS 24
Kanalizacija in čiščenje odpadnih voda Sewerage and Waste Water Treatment • ECTS 8
Vodnogospodarski sistemi Water Management Systems • ECTS 4
Urejanje hudournikov in povirij Torrent and River Control • ECTS 4
Matematično modeliranje okoljskih procesov Mathematical Modelling of Environmental Processes • ECTS 5
Meteorologija Meteorology • ECTS 3

Modul poplave in upravljanje z vodami Module Flood Risk Management • ECTS 24
Urejanje hudournikov in povirij Torrent and River Control • ECTS 4
Prostorsko planiranje in ogroženost pred poplavami Spatial Planning for Flood Protection • ECTS 5
Sociološko ekonomska ocena ogroženosti pred poplavami Socio-Economical Assessment of Flood Protection • ECTS 5
Numerične metode v dinamiki tekočin Numerical Methods in Fluid Dynamics • ECTS 6
Okoljske tehnologije Environmental Technologies • ECTS 4

Izbirni predmeti Elective Courses

Stabilnost pobočij Slope Stability • ECTS 4
Hidravlični stroji in naprave Hydraulic Machines and Devices • ECTS 4
Vodarstvo Water Management • ECTS 4
Orodja za podporo odločanju Decision Support Systems in Water Management • ECTS 5
Urejanje krajine Landscape Management • ECTS 4
Uvod v raziskovalno delo Introduction to Research Work • ECTS 4
Projekt iz infrastrukturnih sistemov Project in Infrastructural Systems • ECTS 4
Izbrana poglavja iz matematike III Selected Topics from Mathematics III • ECTS 4
Ekohidrologija Ecohydrology • ECTS 4
Geotehnika nizkih gradenj Geotechnics of Infrastructural Facilities • ECTS 4
Praktično usposabljanje Practical Training • ECTS 6

INŠTITUT ZA ZDRAVSTVENO HIDROTEHNIKO THE INSTITUTE OF SANITARY ENGINEERING

KADER PERSONNEL

PREDSTOJNIK HEAD
doc. dr. **Mario Krzyk**

NAMESTNICA PREDSTOJNIKA DEPUTY HEAD
izr. prof. Nataša Atanasova

PEDAGOGA TEACHERS
prof. dr. Franci Steinman, doc. dr. Sabina Kolbl Repinc

RAZISKOVALCI RESEARCHERS
Renato Babič, doc. dr. Benjamin Bizjan, Marko Blagojevič, asist. Ajda Cilenšek, asist. dr. Matej Radinja

STROKOVNI SODELAVCI ASSOCIATES
doc. dr. Primož Banovec, prof. dr. Tjaša Griessler Bulc, doc. dr. Darja Istenič, dr. Aleksandra Krivograd Klemenčič, prof. dr. Blaž Stres, asist. dr. Jure Zevnik

Inštitut za zdravstveno hidrotehniko (IZH) UL FGG deluje od leta 1946. Pri delu IZH združujemo interdisciplinarna znanja in povezujemo različne stroke. Stremimo k izboljšanju kakovosti voda v naravi in zagotavljanju ustrezne kakovosti vodnih virov in vode za vodooskrbo ter k sonaravnim pristopom upravljanja vodnih teles in večji učinkovitosti čiščenja onesnaženih voda. V obdobju od leta 2021 do 2023 je bila prenovljena in posodobljena oprema kemijskega laboratorija.

Glavne raziskovalne, pedagoške in strokovne vsebine dela na IZH so:

— priprava pitne vode in oskrba s pitno vodo,
— odvodnja, obdelava in čiščenje padavinskih in onesnaženih voda,
— razvoj in implementacija modro-zelene infrastrukture za obvladovanje padavinskih voda,
— zaščita voda za ohranjanje in izboljševanje stanja naravnih voda,
— ekološko inženirstvo in integralno gospodarjenje z okoljem, predvsem z vodami,
— voda v krožnem gospodarstvu: ponovna uporaba odpadne vode, obnova virov iz odpadne vode, ravnanje s sekundarnimi viri surovin (odpadki, onesnažena voda) in
— anaerobna presnova.

PEDAGOŠKA DEJAVNOST

Pedagogi katedre IZH sodelujejo v izobraževalnem procesu na vseh treh stopnjah študija na UL FGG. Študentje se usposabljajo za projektiranje, gradnjo, vzdrževanje objektov in naprav komunalne in vodnogospodarske infrastrukture ter za upravljanje in gospodarjenje z vodnimi viri. V študijskih letih 2021/2022 in 2022/2023 je pod mentorstvom članov katedre IZH izdelalo zaključne naloge 7 študentov prve stopnje bolonjskega študija in 12 študentov druge stopnje študija UL FGG. Poleg predstavitve teoretičnih osnov področja zdravstvene hidrotehnike in pristopov pri reševanju praktičnih problemov tega področja je študentom omogočeno delo v laboratoriju, kjer spoznajo postopke določanja osnovnih tehnoloških parametrov objektov in naprav zdravstveno hidrotehnične infrastrukture. Laboratorijski aerobni reaktorji, pilotna ČN, naprava za napredno čiščenje pitne vode, pilotna naprava za pripravo pitne vode z GAC in AMPTS II ter kontinuirne meritve na zeleni steni se lahko uporabljajo za raziskovalne namene in pri izdelavi študentskih zaključnih nalog.

ZNANSTVENA IN RAZISKOVALNA DEJAVNOST

Na področju trajnostne urbane odvodnje razvijamo koncepte in napredne modele, ki upoštevajo večnamembnost modro-zelene infrastrukture. V okviru treh projektov ARIS sodelujemo s FS, BF, ZF in IJS pri raziskavah za optimizacijo delovanja zelenih sten, algnih sistemov in varne ponovne uporabe prečiščene odpadne vode. V sodelovanju s Fakulteto za strojništvo smo izvedli raziskave vpliva hidrodinamske kavitacije na lastnosti odvečnega blata, vsebnosti potencialno toksičnih snovi in mikroplastike, kar omogoča ustrezne interventne postopke za optimizacijo in stabilizacijo blata na ČN. Izvedli smo raziskavo vpliva kavitacije na produkcijo metana iz blata ČN.

The Institute of Sanitary Engineering UL FGG was established in 1946. In their work the members of the Institute combine interdisciplinary knowledge and connect different professions. We strive to improve the quality of water in nature and ensure adequate quality of water resources and water supply, as well as sustainable approaches to the management of water bodies and more efficient treatment of polluted water. In the period from 2021 to 2023, the equipment of the chemical laboratory was renovated and updated.

The main research, educational and professional tasks of our Institute are:

— preparation of drinking water and drinking water supply,
— drainage and treatment of precipitation and polluted (waste) waters,
— development and implementation of blue-green infrastructure for rainwater management,
— water protection to preserve and improve the conditions of natural waters,
— ecologic engineering and integral environmental management, mainly of waters,
— water in circular economy: reuse of wastewater, restoration of resources from wastewater, treatment of secondary raw material resources (wastes, wastewater),
— anaerobic digestion.

EDUCATIONAL ACTIVITY

The institute's teachers participate in the educational process in all three cycles of study at UL FGG. Students are qualified for the design, construction, maintenance of structures of municipal and water management infrastructure, as well as in the management of water resources. In the academic years 2021/2022 and 2022/2023, 7 students of the first-cycle studies and 12 students of the second-cycle studies at UL FGG completed their final theses under the supervision of the members of the institute. In addition to the presentation of the theoretical foundations of the field of sanitary engineering and approaches to solving practical problems in this field, students are able to work in the laboratory, where they learn about the procedures for the definition of basic technological parameters, structures and facilities of sanitary hydrotechnical infrastructure. The laboratory aerobic reactors, pilot WWTP, devices for advanced drinking water treatment, pilot device for the preparation of drinking water using GAC and AMPTS II, as well as continuous measurements on a green wall may be used for research purposes, mainly in final theses.

SCIENTIFIC AND RESEARCH ACTIVITIES

In the field of sustainable urban drainage, we develop concepts and advanced models that take into account the multi-purpose of blue-green infrastructure. As part of three national projects, we are cooperating with Faculty of Mechanical Engineering, Biotechnical Faculty, Faculty of Health and the Jožef Stefan Institute in research into optimizing the operation of green walls, algae systems and the safe reuse of treated wastewater. In cooperation with the Faculty of Mechanical Engineering, we researched the effects of hydrodynamic cavitation on the properties of the excess sludge, the content of potentially toxic substances and

STROKOVNA DEJAVNOST

Dejavnost zajema terensko delo, vzorčenje in laboratorijske raziskave kakovosti vode naravnih vodnih teles in potencialnih vodnih virov za vodooskrbo, monitoring kanalizacijskih sistemov in komunalnih čistilnih naprav (ČN), analize industrijskih, komunalnih odpadnih voda, izcednih voda iz deponij in blata iz ČN. Podali smo predloge zasnove kanalizacijskih sistemov in ustreznih postopkov čiščenja večjega števila naselij, predvsem tistih z manjšim številom prebivalcev. Na delu regionalnega sistema za oskrbo s pitno vodo Pomurja smo izvajali meritve temperature in analizo vplivnih faktorjev na spremembe temperature vode v sistemu tekom leta. Za številne vodne vire po Sloveniji, namenjene vodooskrbi, in druga vodna telesa smo izvajali analizo velikosti suspendiranih delcev. Izvedli smo analizo in oceno kakovosti vode reke Savinje na odseku od Celja do Laškega. Sodelujemo pri zahtevnejših inženirskih vsebinah z izdelavo študij, idejnih projektov, presoj vplivov na okolje, recenzij DGD in dokumentacije PZI v domačem in mednarodnem okviru.

POMEMBNI DOSEŽKI

Nekaj najpomembnejših objav s področij dela:

KOLBL REPINC, Sabina, BIZJAN, Benjamin, BUDHIRAJA, Vaibhav, DULAR, Matevž, GOSTIŠA, Jurij, BRAJER HUMAR, Barbara, KAURIN, Anela, KRŽAN, Andrej, LEVSTEK, Meta, MORALES ARTEAGA, Juan Francisco, PETKOVŠEK, Martin, RAK, Gašper, STRES, Blaž, ŠIROK, Brane, ŽAGAR, Ema, ZUPANC, Mojca. Integral analysis of hydrodynamic cavitation effects on waste activated sludge characteristics, potentially toxic metals, microorganisms and identification of microplastics. Science of the total environment. Feb. 2022, vol. 806, pt. 4, str. 1–14.

ZUPANC, Mojca, BRAJER HUMAR, Barbara, DULAR, Matevž, GOSTIŠA, Jurij, HOČEVAR, Marko, KOLBL REPINC, Sabina, KRZYK, Mario, NOVAK, Lovrenc, ORTAR, Jernej, PANDUR, Žiga, STRES, Blaž, PETKOVŠEK, Martin. The use of hydrodynamic cavitation for waste-to-energy approach to enhance methane production from waste activated sludge. Journal of environmental management. Dec. 2023, vol. 347, str. 1–11.

RADINJA, Matej, ŠKERJANEC, Mateja, ŠRAJ, Mojca, DŽEROSKI, Sašo, TODOROVSKI, Ljupčo, ATANASOVA, Nataša. Automated modelling of urban runoff based on domain knowledge and equation discovery. Journal of Hydrology. [Print ed.]. dec. 2021, letn. 603 (part c), [12] str., ilustr. ISSN 0022-1694.

RADINJA, Matej, ŠKERJANEC, Mateja, DŽEROSKI, Sašo, TODOROVSKI, Ljupčo, ATANASOVA, Nataša. Design and simulation of stormwater control measures using automated modeling. Water. 2021, vol. 13, no. 16, [26] str., graf. prikazi, tabele. ISSN 2073-4441.

microplastics, which enables suitable intervention procedures to optimize and stabilize the sludge in a wastewater treatment plant. We conducted a study on the effects of cavitation on methane production from sewage sludge in a wastewater treatment plant.

PROFESSIONAL ACTIVITY

Activities include field work, sampling and laboratory testing of water quality of natural water bodies and potential water sources for water supply, monitoring of sewerage systems and municipal wastewater treatment plants, analysis of industrial and municipal wastewater, leachate from landfills and sludge from wastewater treatment plants. We presented proposals for the design of wastewater systems and suitable treatment methods for a large number of settlements, especially those with a smaller population. In part of the Pomurje drinking water supply system, we carried out temperature measurements and analysed the factors influencing the changes in water temperature in the system throughout the year. For many water sources in Slovenia intended for water supply and other water bodies, we performed suspended particle size analysis. We analysed and assessed the water quality of the Savinja River in the section from Celje to Laško. We are involved in demanding engineering content by preparing studies, conceptual designs, environmental impact assessments, reviews of building permit and construction documents (DGD, PZI), etc., in national and international contexts.

SIGNIFICANT ACHIEVEMENTS

Some of our most important publications from specific areas of work:

KOLBL REPINC, Sabina, BIZJAN, Benjamin, BUDHIRAJA, Vaibhav, DULAR, Matevž, GOSTIŠA, Jurij, BRAJER HUMAR, Barbara, KAURIN, Anela, KRŽAN, Andrej, LEVSTEK, Meta, MORALES ARTEAGA, Juan Francisco, PETKOVŠEK, Martin, RAK, Gašper, STRES, Blaž, ŠIROK, Brane, ŽAGAR, Ema, ZUPANC, Mojca. Integral analysis of hydrodynamic cavitation effects on waste activated sludge characteristics, potentially toxic metals, microorganisms and identification of microplastics. Science of the total environment. Feb. 2022, vol. 806, pt. 4, str. 1–14.

ZUPANC, Mojca, BRAJER HUMAR, Barbara, DULAR, Matevž, GOSTIŠA, Jurij, HOČEVAR, Marko, KOLBL REPINC, Sabina, KRZYK, Mario, NOVAK, Lovrenc, ORTAR, Jernej, PANDUR, Žiga, STRES, Blaž, PETKOVŠEK, Martin. The use of hydrodynamic cavitation for waste-to-energy approach to enhance methane production from waste activated sludge. Journal of environmental management. Dec. 2023, vol. 347, str. 1–11.

RADINJA, Matej, ŠKERJANEC, Mateja, ŠRAJ, Mojca, DŽEROSKI, Sašo, TODOROVSKI, Ljupčo, ATANASOVA, Nataša. Automated modelling of urban runoff based on domain knowledge and equation discovery. Journal of Hydrology. [Print ed.]. dec. 2021, letn. 603 (part c), [12] str., ilustr. ISSN 0022-1694.

RADINJA, Matej, ŠKERJANEC, Mateja, DŽEROSKI, Sašo, TODOROVSKI, Ljupčo, ATANASOVA, Nataša. Design and simulation of stormwater control measures using automated modeling. Water. 2021, vol. 13, no. 16, [26] str., graf. prikazi, tabele. ISSN 2073-4441.

KATEDRA ZA MEHANIKO TEKOČIN Z LABORATORIJEM CHAIR OF FLUID MECHANICS WITH LABORATORY

KADER PERSONNEL

PREDSTOJNIK HEAD
prof. dr. **Matjaž Četina**

NAMESTNIK PREDSTOJNIKA DEPUTY HEAD
izr. prof. dr. Gašper Rak

PEDAGOGI TEACHERS
doc. dr. Gorazd Novak, doc. dr. Mateja Škerjanec, prof. dr. Dušan Žagar

RAZISKOVALEC RESEARCHER
Žan Pleterski

V pedagoškem procesu sodelavci katedre skrbimo za izobraževanje študentov na področju mehanike tekočin. Osnovna znanja hidromehanike, hidravlike, hidroinformatike in okoljskega gradbeništva podajamo na prvostopenjskih strokovnih in univerzitetnih študijih gradbeništva in geodezije ter vodarstva in okoljskega inženirstva (VOI), specializirane vsebine pa predvsem na magistrskem študijskem programu VOI. Za kvalitetno pedagoško delo je hkrati nujno potrebno opravljati temeljne in aplikativne raziskave, zato v okviru katedre deluje tudi laboratorij za mehaniko tekočin, ki omogoča eksperimentalno preverjanje numerično dobljenih rezultatov in predstavlja učno bazo za študente. V okviru strokovnih nalog izvajamo zahtevne numerične in eksperimentalne raziskave tokov s prosto gladino in pod tlakom ter širjenja onesnažil v vodnih telesih.

PEDAGOŠKA DEJAVNOST

Raziskovalna in strokovna področja sodelavcev katedre so zanimiva tudi za ostale oddelke UL FGG, zato sodelujemo v pedagoškem procesu pri več študijskih programih. Osnovna znanja s področja gradbeništva in infrastrukture ter okoljskega inženirstva prenašamo študentom prve stopnje gradbeništva, geodezije ter vodarstva in okoljskega inženirstva. Poleg področja mehanike tekočin, kjer poučujemo predmete s področij hidromehanike in hidravlike na prvostopenjskih študijih gradbeništva ter vodarstva in okoljskega inženirstva, podajamo specializirane vsebine hidravlike nestalnega toka s prosto gladino in toka pod tlakom, hidravličnega modeliranja, inženirske hidrotehnike, vodnogospodarskih sistemov, hidroinformatike, obalnega in okoljskega inženirstva na drugi stopnji VOI ter ostalih oddelkov. V okviru UL sodelujemo z Biotehniško fakulteto (študij Krajinske arhitekture) pri predmetu Inženirska biologija, s Fakulteto za matematiko in fiziko pa pri predmetu Izbrana poglavja iz hidromehanike, hidravlike in hidrologije (študij Meteorologije). Izven UL z več predmeti sodelujemo tudi na dveh skupnih magistrskih programih za dosego dvojne diplome z Univerzo za uporabne znanosti v Zürichu ter Univerzo v Kalabriji v Cosenzi. Na doktorskih študijih Grajeno okolje in interdisciplinarnem univerzitetnem programu Varstvo okolja pedagogi KMT predavamo specializirane vsebine o eksperimentalnih metodah in numeričnih modelih za simulacijo turbulentnega gibanja tekočin, širjenju onesnažil ter vodnogospodarskih sistemih in ureditvah. Na vseh stopnjah delujemo tudi kot mentorji pri zaključnih diplomskih, magistrskih in doktorskih delih.

RAZISKOVALNA DEJAVNOST

Večino raziskav usmerjamo na področje razvoja in uporabe numeričnih matematičnih modelov in orodij za račun toka s prosto gladino, ki jih razvijamo v okviru raziskovalnega programa P2-180 Vodarstvo in geotehnika – orodja in metode za analize in simulacije procesov ter razvoj tehnologij, pri katerem sodelujemo. Modeli za račun porušitvenih, obratovalnih in visokovodnih valov v odprtih vodotokih so podprti z eksperimentalnim delom. Pri tem za meritve hitrosti tokov in vodne gladine uporabljamo in izpopolnjujemo

In the educational process, the Chair members transfer knowledge to students from the area of fluid mechanics. The basic knowledge of hydromechanics, hydraulics, hydroinformatics and environmental engineering is conveyed to students at the first-cycle studies of civil and geodetic engineering, and water science and environmental engineering. Specialised contents are part of master study programmes. High-quality educational work is not possible without basic and applied research work. Our research work is carried out in our laboratory of fluid mechanics that enables experimental testing of numerically obtained results. At the same time, it represents a teaching base for the students. Within professional tasks, we carry out demanding numerical and experimental investigations of pressurised flows, free surface flow and spreading of pollutants in water bodies.

EDUCATIONAL ACTIVITY

Research and professional activities conducted by our Chair members are interesting also for other UL FGG departments. For this reason, we participate in the educational process of several study programmes. We provide basic knowledge from civil engineering and infrastructure as well as environmental engineering, conveyed to the first-cycle students of civil engineering, geodesy and water science and environmental engineering. Beside the area of fluid mechanics, where we teach courses from hydromechanics and hydraulics at the first-cycle studies of civil engineering and water science and environmental engineering, we also offer specialised contents of hydraulics of unsteady free surface flow and pressurised flow, hydraulic modelling, engineering hydraulics, water-power systems, hydroinformatics, coastal and environmental engineering at the second cycle of water management and environmental engineering and other departments. Within the University of Ljubljana, we cooperate with the Biotechnical Faculty in the course Engineering Biology (study of Landscape Architecture), and with the Faculty of Mathematics and Physics in the course Selected Chapters from Hydromechanics, Hydraulics and Hydrology (study of Meteorology). Outside the University of Ljubljana, we cooperate with the Zurich University of Applied Sciences and the University of Calabria in Cosenza by offering several courses in joint master programmes leading to a double degree. At the doctoral study programmes Built Environment and interdisciplinary study programme Environmental Protection, our teachers hold lectures on experimental methods and numerical modelling for the simulation of turbulent movement of liquids, spreading of pollutants and water management systems and developments. At all three cycles, our teachers successfully supervise students in their final diploma, master and doctoral theses.

RESEARCH ACTIVITY

The most extensive research is carried out in the area of the development and use of numerical mathematical models and tools for the calculation of water movements in natural water bodies, developed within the core research programme P2-0180 Water Science and Technology, and Geotechnical Engineering: Tools and Methods for Process Analyses and

sodobne neintruzivne metode daljinskega zaznavanja s pomočjo laserskih meritev. Intenzivno se ukvarjamo tudi z uporabo Lagrangeeve metode hidrodinamike zglajenih delcev (SPH), ki jo uporabljamo za simulacije kompleksnih tokov v ribjih stezah. V okviru temeljnega raziskovalnega projekta IsoCont modeliramo masne tokove in pretvorbo živega srebra v vodnem okolju Idrijce, Soče in Severnega Jadrana. Razvijamo tudi orodja za modeliranje vodnogospodarskih sistemov, naprav in ureditev, ocen tveganja in varstva pred poplavami. Pri sistemih preskrbe z vodo proučujemo inovativne metode uporabe kavitacije pri dezinfekciji vode.

V okviru mednarodnega povezovanja sodelujemo v več EU projektih programa H2020 (EdiCitNet, OPTAIN), programa Obzorje (RISKADAPT) in programa UCPM (CROSScade). Pri raziskovalnem delu se povezujemo z drugimi enotami UL FGG ter raziskovalnimi institucijami in uveljavljenimi raziskovalci v Sloveniji in tujini, iz česar izvirajo skupne objave in predavanja na strokovnih in znanstvenih srečanjih.

STROKOVNA DEJAVNOST

Rezultate temeljnih in aplikativnih raziskav uporabljamo tudi v praksi, zato sodelujemo kot svetovalci ali recenzenti pri študijah v vodnem in elektro gospodarstvu ter z ministrstvi RS. Razvita simulacijska orodja so uporabna pri varovanju pred poplavami in drugimi naravnimi pojavi ali nesrečami, zato izvajamo zahtevnejše strokovne študije za naročnike iz gospodarstva in negospodarstva (IBE, NEK, HESS, iSProjekt, MNVP, IHR, IzVRS), ki zajemajo izračune porušitvenih, visokovodnih in obratovalnih valov, tokov v ribjih stezah, hlajenja in radioaktivnih izpustov NEK Krško. Na področju obalnega inženirstva pa izvajamo študije širjenja valov v pristaniščih ter razvijamo modele tokov in širjenja onesnaženja v Severnem Jadranu.

POMEMBEN DOSEŽEK

Leta 2022 smo v reviji Ecological Modelling (letnik 2023) v sodelovanju s tujimi raziskovalci objavili članek Interdisciplinary design of a fish ramp using migration routes analysis (Ecological Modelling 2023, 475, doi: https://doi.org/10.1016/j.ecolmodel. 2022.110189), ki obravnava numerično modeliranje toka v oblikovani ribji stezi z Lagrangeevo metodo hidrodinamike zglajenih delcev.

Simulations, and development of Technologies. Models for the calculation of flood, dam-break and operational waves in open watercourses, are supported by experimental work. To measure the velocity of flows and the water surface, we use and continuously improve contemporary methods of non-intrusive remote sensing with the help of laser measurements. We also work intensively with the Lagrange method of smoothed particle hydrodynamics (SPH), which we use to simulate complex flows in fish passes. As part of the basic research project IsoCont, we model the mass flows and transformation of mercury in the water environments of the Idrijca, Soča, and the northern Adriatic Sea. We also develop tools for modelling water management systems, equipment and facilities, risk assessments and flood protection. In the water supply systems, we investigate innovative methods for using cavitation in water disinfection.

As for international collaboration, we take part in several European H2020 projects (EdiCitNet, OPTAIN of the HORIZON programme (RISKADAPT) the UCPM programme (CROSScade). In terms of research we collaborate with other units at UL FGG as well as research institutions and renowned researchers in Slovenia and abroad, which is the basis for joint publications and lectures at domestic and international professional and scientific meetings.

PROFESSIONAL ACTIVITY

Our research results are available for practical application. Therefore we cooperate as consultants or reviewers in studies in the field of water management and electricity industry as well as with Slovenian ministries. The tools that we develop are used for protection against floods and other natural phenomena or disasters. Studies for contracting parties from the economy and other companies (IBE, NEK, HESS, iSProjekt, MNVP, IHR, IzVRS) which include calculations of failure, high water and operating waves, flows in fish passes, cooling and radioactive releases from the Krško nuclear power plant. In the field of coastal engineering, we carry out studies on wave propagation in ports and develop models for currents and the spread of pollution in the northern Adriatic Sea.

SIGNIFICANT ACHIEVEMENT

In 2022, we published the article Interdisciplinary Design of a Fish Ramp using Migration Routes Analysis in the journal Ecological Modelling (year 2023) in collaboration with foreign researchers (Ecological Modelling 2023, 475, doi: https://doi.org/10.1016/j.ecolmodel .2022.110189), which deals with the numerical modelling of the flow in a fish pass designed using the Lagrangian method of smoothed particle hydrodynamics.

KATEDRA ZA SPLOŠNO HIDROTEHNIKO CHAIR OF HYDROLOGY AND HYDRAULIC ENGINEERING

KADER PERSONNEL

PREDSTOJNICA HEAD
prof. dr. **Mojca Šraj**

NAMESTNIK PREDSTOJNICE DEPUTY HEAD
izr. prof. dr. Simon Rusjan

PEDAGOGI TEACHERS
izr. prof. dr. Andrej Kryžanowski, prof. dr. Matjaž Mikoš, doc. dr. Nejc Bezak, asist. dr. Mateja Klun

RAZISKOVALCI RESEARCHERS
znan. sod. dr. Andrej Vidmar, asist. dr. Klaudija Lebar, asist. Mark Bryan Alivio

SODELAVCI ASSOCIATES
zasl. prof. dr. Mitja Brilly, asist. Tamara Kuzmanić, asist. dr. Mira Kobold, Mojca Vilfan

Nastanek Katedre za splošno hidrotehniko (KSH) sega v sedemdeseta leta 20. stoletja, ko sta se združili Katedra za izrabo vodnih sil ter Katedra za hidrologijo in melioracije. S tem je katedra prevzela skrb za razvoj naslednjih pedagoških, raziskovalnih in strokovnih področij: hidrologije, erozije in sedimentacije, urejanja voda, dreniranja in namakanja, hidrotehničnih objektov, izrabe vodnih moči, vodarstva in upravljanja naravnih tveganj.

PEDAGOŠKA DEJAVNOST

Sodelavci KSH kot pedagogi sodelujejo pri predmetih na vseh treh stopnjah študija UL FGG. Na dodiplomskem študiju pedagoško skrbijo v celoti ali delno za naslednje predmete: Hidrologija, Meritve v hidrologiji, Gradbene tehnologije v vodarstvu, Vodne gradnje, Inženirska hidrotehnika, Uvod v okoljsko inženirstvo, Tehnološki procesi, Tehnologija ter Naravne nesreče in njihov vpliv na okolje, prostor in družbo, Površinska odvodnja (kanalizacija). Na magistrskih študijih poučujejo predmete: Hidrološko modeliranje, Dreniranje in namakanje, Vodarstvo, Hidrotehnični objekti, Vodne moči, Urejanje vodotokov, Pobočni procesi in Hudourništvo, Ekohidrologija, Uvod v raziskovalno delo, Prostorsko planiranje in ogroženost pred poplavami, Sociološko ekonomska ocena ogroženosti pred poplavami. Na doktorskih študijih Grajeno okolje in Varstvo okolja so sodelavci KSH nosilci predmetov: Orodja in metode v raziskovanju grajenega okolja, Hidrološke meritve in hidrološko modeliranje, Hidrološko in geotehnično raziskovanje zemeljskih plazov, Meritve in modeliranje erozije in sedimentacije, Urejanje vodnega režima, Zajem in modeliranje zemeljskega površja pri ocenah naravnih tveganj, Ekohidrologija ter Naravna tveganja v gorskem okolju.

V šolskih letih 2021/22 in 2022/23 je pod mentorstvom članov katedre končalo študij 23 študentov 1. in 2. stopnje in dva študenta 3. stopnje.

Pedagogi KSH sodelujejo tudi pri izvajanju mednarodnega magistrskega študijskega programa Erasmus Mundus Flood Risk Management, ki ga obiskujejo študenti z vsega sveta.

Člani katedre aktivno sodelujejo pri izvajanju promocijskih dejavnosti UL FGG ter študija vodarstva in okoljskega inženirstva z izvedbo tematskih predavanj na srednjih šolah po Sloveniji in s pripravo delavnic za osnovne in srednje šole. Vodili so študentski projekt za trajnostni razvoj »Zasnova in izdelava fizičnega simulatorja dežja«. Sodelujejo pri organizaciji in izvedbi poletnih šol UL FGG. V letu 2023 so organizirali mednarodno poletno šolo HydRoData 2023, namenjeno magistrskim in doktorskim študentom, na temo podatkov v hidrologiji.

ZNANSTVENA IN RAZISKOVALNA DEJAVNOST

KSH skrbi za razvoj raziskovalne in strokovne dejavnosti na svojih področjih. V okviru mednarodnega hidrološkega programa IHP UNESCO se katedra udeležuje konferenc in sestankov IHP, izvaja monitoring procesov hidrološkega kroga ter vzdržuje merilno opremo na eksperimentalnih poročjih. Člani se aktivno vključujejo v dejavnosti Unescove Katedre za zmanjševanje tveganj ob vodnih

The origins of the Chair of Hydrology and Hydraulic Engineering (KSH) go back to the 1970s, when the units Chair of Utilization of Hydropower and Chair of Hydrology, Irrigation and Drainage merged into one. With this merger the Chair became responsible for the following educational, research and expert areas: hydrology, erosion and sedimentation, river regulation, irrigation and drainage, hydraulic structures, utilization of hydropower, water management and managing natural risks.

EDUCATIONAL ACTIVITY

Its members teach at all three study cycles at the Faculty of Civil and Geodetic Engineering. At the undergraduate studies (first-cycle) they participate at or coordinate the courses: Hydrology, Building Technologies in Water Science, Introduction to Drainage Engineering, Engineering Hydraulics, Introduction to Environmental Engineering, Technological Processes, Technology and Natural Disasters and Their Impact on the Environment, Space and Society, Surface Drainage (Urban Drainage). At the second-cycle master studies they teach the courses: Hydrological modelling, Drainage and Irrigation, Water Science, Hydraulic Structures, Water Power, River Engineering, Slope Stability and Torrent Control Engineering, Ecohydrology, Introduction to Research Work, Spatial Planning for Flood Protection, Socio-Economical Assessment of Flood Protection. At the third-cycle doctoral studies Built Environment and Environmental Protection the Chair members are coordinators of the courses: Tools and Methods in Research of the Built Environment, Hydrologic Measurements and Modelling, Hydrologic and Geotechnical Research on Landslides, Measurements and Modelling of Erosion and Sedimentation, Management of Water Regime, Data Acquisition and Modelling of the Earth's Surface in Natural Risk Assessment, Ecohydrology and Natural Risks in Alpine Environment.

In the academic years 2021/22 and 2022/23, the Chair members supervised 23 final theses in the 1st and 2nd study cycles and two 3rd cycle students.

The Chair teachers are also involved in the international Erasmus Mundus Flood Risk Management program, attended by students from all around the world.

Its members have been actively involved in promoting UL FGG and the study of water science and environmental engineering by offering thematic lectures at secondary schools throughout Slovenia and by organising workshops for primary and secondary schools. They managed the student project for sustainable development »Design and Production of a Physical Rain Simulator«. They participate in the organization and implementation of the UL FGG summer schools. In 2023, they organized the international summer school HydRoData 2023, which was aimed at master and doctoral students and dealt with the topic of data in hydrology.

RESEARCH AND PROFESSIONAL ACTIVITIES

The Chair is concerned with the development of research and expert activities in its fields. As part of UNESCO's International Hydrological Programme IHP, the Chair participates in IHP conferences and meetings, monitors the processes of the hydrological cycle and maintains measuring equipment in

ujmah. Vključeni so tudi v projekte programa COST: CA16209: LAND4FLOOD – Natural Flood Retention on Private Land (2017–2021) in CA17109: DAMOCLES – Understanding and modeling compound climate and weather events (2018–2022).

Na nacionalni ravni raziskujejo v okviru raziskovalnega programa P2-0180 »Vodarstvo in geotehnika: orodja in metode za analize in simulacije procesov ter razvoj tehnologij«, temeljnih raziskovalnih projektov: slovensko-češkega projekta J6-4628 Vrednotenje hibridne infrastrukture za zmanjševanje ogroženosti pod vplivom podnebnih sprememb, slovensko-madžarskega projekta N2-0313 Lokalni vplivi na površinski odtok, slovensko-avstrijskega projekta J2-4489 Vrednotenje vpliva prestrezanja padavin na erozijo tal, J1-3024 Dešifriranje občutljivosti skalnih sten na podnebne spremembe in cikle zmrzovanja in odtaljevanja na območjih brez permafrosta, J1-2477 Erozijski procesi na obalnih flišnih klifih z oceno tveganja, ciljnega raziskovalnega projekta V2-2137 Razvoj metodologije za izračun visokovodnih valov na podlagi ekstremnih padavinskih dogodkov ter bilateralnega projekta s TU Braunschweig »Preverjanje različnih padavinskih podatkov v obliki reanaliz za namen hidrološkega modeliranja v Sloveniji (PRE-PROMISE)«. KSH sodeluje tudi v dveh projektih Obzorje Evropa: DANUBE4all »Obnova rečnih koridorjev na povodju Donave – celovit pristop k udejanjanju okoljskih ciljev v okviru projekta« in SpongeScapes »Danosti in rešitve za izboljšanje zadrževalne sposobnosti krajine v evropskih porečjih za večjo odpornost skupnosti na hidrometeorološke ekstremne dogodke« ter projektu UCPM BORIS »Ocena čezmejnega tveganja za izboljšano preventivo in pripravljenost v Evropi«.

Sodelavci KSH objavljajo v uglednih znanstvenih revijah, pri številnih revijah so recenzenti, člani uredniških odborov ter gostujoči uredniki posebnih številk.

POMEMBEN DOSEŽEK

Mojca Šraj je leta 2022 pridobila naziv prve redne profesorice na Oddelku za okoljsko gradbeništvo.

experimental basins. Members actively participate in the activities of the UNESCO Chair on Water-related Disaster Risk Reduction. They are also involved in COST actions: CA16209: LAND4FLOOD – Natural Flood Retention on Private Land (2017–2021) in CA17109: DAMOCLES – Understanding and Modeling Compound Climate and Weather Events (2018–2022).

At the national level they conduct research within core research programme P2-0180 »Water Science and Technology, and Geotechnical Engineering: Tools and Methods for Process Analyses and Simulations, and Development of Technologies«, basic research projects: Slovenian-Czech project J6-4628 Evaluation of Hazard-mitigating Hybrid Infrastructure under Climate Change Scenarios, Slovenian-Hungarian project N2-0313 Microscale Influence on Runoff, Slovenian-Austrian project J2-4489 Evaluation of The Impact of Rainfall Interception on Soil Erosion, J1-3024 Deciphering the Sensitivity of Rock Faces to Climatic Changes and Freeze-Thaw Cycles in Permafrost-Free Regions, J1-2477 Erosional Processes on Coastal Flysch Cliffs and their Risk Assessment, targeted research project V2-2137 Development of the Methodology for the Flood Hydrograph Calculation Using Extreme Precipitation Events; and bilateral project with TU Braunschweig: Validation of Precipitation REanalysis PROducts for rainfall-runoff Modelling In SlovEnia (PRE-PROMISE). The Chair also participates in two Horizon Europe projects: DANUBE4all Restoration of the Danube River Basin Waters for Ecosystems and People from Mountains to Coast and SpongeScapes Evidence and Solutions for improving SPONGE Functioning at LandSCAPE Scale in European Catchments for increased Resilience of Communities against Hydrometeorological Extreme Events, and in the project UCPM BORIS »Cross BOrder RISk Assessment for Increased Prevention and Preparedness in Europe.

The Chair members publish in major scientific journals. In numerous journals they are reviewers, members of editorial boards, and guest editors.

SIGNIFICANT ACHIEVEMENT

In 2022, Mojca Šraj was the first woman awarded the title first full professor at the Department of Environmental Civil Engineering.

HIDROTEHNIŠKI LABORATORIJ HYDROTECHNICAL LABORATORY

KADER PERSONNEL

VODJA LABORATORIJA HEAD OF LABORATORY
izr. prof. dr. **Gašper Rak**

PEDAGOGI TEACHERS
prof. dr. Dušan Žagar, doc. dr. Mateja Škerjanec, doc. dr. Gorazd Novak

Hidrotehniški laboratorij (HTL), tudi Hidravlični laboratorij ali Laboratorij za mehaniko tekočin, predstavlja za študente neposredni stik s praktičnimi primeri s področja hidrotehnike. Glavni namen je študentom prikazati osnovne kot tudi kompleksne hidravlične pojave in tokovne razmere (hitrosti, sile, obtekanja ...) na različnih objektih v in ob vodi, kar prispeva k boljšemu in širšemu razumevanju vodnih pojavov in obtežb na objekte. Poleg eksperimentalne podpore predavanj in vaj se v laboratoriju opravljajo meritve in poskusi za diplomske, magistrske in doktorske naloge, pa tudi zunajštudijski skupinski raziskovalni projekti. Fizične modelne raziskave hidravličnih pojavov v cevovodih in odprtih vodotokih ter hidromehanske opreme in vodnih zgradb so povezane z numeričnim modeliranjem, zato govorimo o »hibridnih hidravličnih modelih«. Z interdisciplinarnim povezovanjem z drugimi strokami se združujejo posebna znanja različnih strok, npr. strojništva, merilne tehnike, čiščenja odpadne vode, biologije. Na področju hidravličnega modeliranja se dobro povezujemo z delom javnega raziskovalnega zavoda Hidroinštitut.

RAZISKOVALNA DEJAVNOST

Pri starih študijskih programih je potekalo izvajanje eksperimentalnega dela pri znanstvenih magisterijih in doktorskih disertacijah. Pri bolonjskih študijih pa je težišče dela na disertacijah, možne pa so tudi raziskave pri strokovnih magisterijih, predvsem s področja hidromehanske opreme na vodnih zgradbah, na optimizaciji primarnih usedalnikov za čiščenje surove odpadne vode in na področju hidrodinamske kavitacije (npr. obdelava balastnih voda). V zadnjih dveh letih so bili v laboratoriju izvedeni eksperimenti in meritve v okviru raziskovalnega projekta ARIS (projekt št. J2-3056).

Za izboljšanje pogojev raziskav je bila opravljena prenova in posodobitve laboratorijske infrastrukture (črpališča ...) in merilne opreme. Z odličnim sodelovanjem z Laboratorijem za vodne in turbinske stroje Fakultete za strojništvo so postavljene nove eksperimentalne postaje, vključene in razvite nove merilne naprave in metode. Za pedagoški proces in raziskave so na voljo:

Hydrotechnical laboratory (HTL), also called Hydraulic laboratory or Laboratory of Fluid Mechanics, offers the students direct contact with practical cases from the area of hydraulics. The main purpose is to show the students some basic as well as complex hydraulic phenomena and conditions (velocities, forces, draining, etc.) at different water or water-side structures, which contributes to their better and wider understanding of water phenomena and structural loads. Beside experimental support to lectures and tutorials, the laboratory is also used for measurements and tests performed for diploma, master and doctoral theses, as well as for extra-curricular research projects. Physical model investigations of hydraulic phenomena in pipelines, open rivers and hydromechanical equipment and water structures are linked to numerical modelling, for which the term »hybrid hydraulic models« is used. With interdisciplinary links to other professional fields, special knowledge of different professions, such as mechanical engineering, measuring technology, waste water treatment, biology, etc., is combined. In the area of hydraulic modelling the laboratory cultivates good relationships with the public research institution Institute for Hydraulic Research.

RESEARCH ACTIVITY

For the previous study programmes, the experimental work was part of scientific master theses and doctoral theses. For the present Bologna study programmes, the focus of research is on doctoral theses, although it is done also for scientific master theses, mainly dealing with hydromechanical equipment on water structures, optimization of primary sedimentation tanks for wastewater treatment, with hydrodynamic cavitation (e.g. ballast water treatment). Experiments and measurements have been carried out in the laboratory over the last two years as part of the ARIS research project Development of an Optical Measuring Method for Measurement of the Turbulent Two-Phase Flow with Free Surface (project No. J2-3056).

To improve the research conditions, our laboratory equipment (e.g. pumping stations) and measuring equipment have been renovated und modernized. Owing to excellent cooperation with the Laboratory for Water and Turbine Machines from the Faculty of Mechanical Engineering, new experimental stations

— eksperimentalna postaja za simuliranje pojava kavitacije, pri čemer je mogoča modifikacija ali zamenjava objekta raziskave,
— eksperimentalna postaja za simuliranje delovanja turbinskih strojev in določanje njihovih karakteristik,
— eksperimentalna postaja sotočja vodotokov pri deročem režimu vodnega toka,
— eksperimentalna postaja primarnega usedalnika (z vizualizacijsko metodo),
— prenovljena postaja (hidravličnega udara) v cevovodu z vodostanom,
— posodobljeno črpališče z regulacijo pretoka s frekvenčnim pretvornikom,
— merilna oprema (hitra kamera, laserski skener, ultrazvočni in EM merilniki itd.).

Vse je računalniško podprto s programsko opremo (npr. LabView).

PEDAGOŠKA DEJAVNOST

Na I. stopnji se s prikazom hidravličnih pojavov in izvedbo meritev študentje srečajo pri predmetih Hidromehanika in hidravlika, Hidromehanika, Inženirska hidrotehnika in Hidravlika (programa Gradbeništvo ter Vodarstvo in okoljsko inženirstvo). Zahtevnejši eksperimenti nestalnih pojavov se obravnavajo na II. stopnji pri predmetih Hidravlično modeliranje in Morje in obalni pas ter kasneje pri zaključnih delih magistrskega in doktorskega študija.

POMEMBNI DOSEŽKI

Na podlagi raziskovalnega dela v laboratoriju je bilo v mednarodnih revijah objavljenih več člankov. Izpostavljamo naslednjega:
ŠKERJANEC, Mateja, KREGAR, Klemen, ŠTEBE, Gašper, RAK, Gašper. Analysis of Floating Objects Based on Non-intrusive Measuring Methods and Machine Learning. Geomorphology : an International Journal of Pure and Applied Geomorphology. [Print ed.]. jul. 2022, vol. 408, art. 108254.

have been established, new measuring devices and methods introduced and developed, etc. Thus, for the teaching process and research activity the following equipment is available:

— Experimental station for the simulation of cavitation phenomena, with the possible modification to replace the study object
— Experimental station for the simulation of turbine machine functioning and for defining its characteristics
— Experimental station for river confluences in a torrential regime of water flow
— Experimental station of primary sedimentation tank (with visualization method)
— Renovated station (of hydraulic shock) in pipeline with a surge tank
— Modernized pumping station with flow regulation, including a frequency converter
— Measuring equipment (rapid camera, laser scanner, ultrasound and EM meters, etc.)

The whole equipment is computer software supported (e.g. LabView).

EDUCATIONAL ACTIVITY

Within the first-cycle studies, the presentation of hydraulic phenomena and measurements is intended for the students of Hydromechanics and Hydraulics, Hydromechanics, Engineering Hydraulics, and Hydaulics (study programs Civil Engineering and Water Science and Environmental Engineering). Demanding experiments of unsteady phenomena are part of the second-cycle studies, within the courses Hydraulic Modelling, Open Sea and Coastal Area, and later on, when students finalize their master and doctoral studies.

SIGNIFICANT ACHIEVEMENTS

Based on the research work in the laboratory, the chair members published several articles in international journals. One of the most important of these is:
ŠKERJANEC, Mateja, KREGAR, Klemen, ŠTEBE, Gašper, RAK, Gašper. Analysis of Floating Objects Based on Non-intrusive Measuring Methods and Machine Learning. Geomorphology : an International Journal of Pure and Applied Geomorphology. [Print ed.]. Jul. 2022, vol. 408, art. 108254.

VODNOGOSPODARSKI INŠTITUT WATER MANAGEMENT INSTITUTE

KADER PERSONNEL

PREDSTOJNICA HEAD
doc. dr. **Mateja Škerjanec**

NAMESTNICA PREDSTOJNICE DEPUTY HEAD
doc. dr. Sabina Kolbl Repinc

RAZISKOVALCI RESEARCHERS
izr. prof. dr. Nataša Atanasova, doc. dr. Primož Banovec, prof. dr. Tjaša Griessler Bulc, asist. Ajda Cilenšek, doc. dr. Darja Istenič, asist. Jerca Praprotnik Kastelic, asist. dr. Davor Kvočka, izr. prof. dr. Gašper Rak, asist. dr. Matej Radinja, prof. dr. Franci Steinman

SODELAVCI ASSOCIATES
Matej Cerk, Uroš Lesjak, Žiga Ščukovt, Andreja Žerjav

Vodnogospodarski inštitut (VGI) je bil ustanovljen leta 2009 kot raziskovalni inštitut v okviru UL FGG, ki pokriva področje voda in vodnega gospodarstva. Od januarja 2012 se na inštitutu izvajajo številni mednarodni projekti. Takšna ureditev omogoča vključevanje raziskovalcev tudi iz drugih slovenskih institucij v raziskovalne skupine projektov in s tem različnih interdisciplinarnih znanj, potrebnih za uspešno prijavo in izvedbo tovrstnih projektov.

Raziskovalne teme inštituta so zelo široke, saj celostno gospodarjenje z vodami obravnava vode in vodno okolje kot življenjsko pomemben vir in habitat, kot pogoj za razvoj družbe, kot surovino za vrsto dejavnosti, kot neposreden vir nevarnosti (poplave, suše, žled) ali kot sprožilo za druge procese (npr. plazove). Zato so potrebne tudi raziskave s področja varstva vodnega okolja in učinkovitih javnih služb, od oskrbe s pitno in tehnološko vodo, zbiranja in obdelave onesnaženih voda, zaščite in izboljševanja stanja voda in grajenih vodnih teles, do raziskav okoljskega inženirstva in integralnega gospodarjenja z naravnimi in sekundarnimi viri surovin.

PEDAGOŠKA DEJAVNOST

Izkušnje, pridobljene v mednarodnih raziskovalnih projektih, predstavljajo odlično osnovo za pripravo novih, zanimivih in predvsem aktualnih vsebin, ki jih pedagogi vključujemo v svoja predavanja in vaje ter tako pridobljena znanja predajamo študentom. Raziskovalni projekti ponujajo tudi možnosti za izdelavo magistrskih in doktorskih nalog.

The Water Management Institute (VGI) was established in 2009, as a research institute within UL FGG for the area of waters and water management. Since January 2012, numerous international projects have been implemented by the Institute members. Its formal structure allows for a inclusion of researchers also from other Slovenian institutions in research groups of projects, as well as the resulting integration of different interdisciplinary knowledge required for successful application and implementation of such projects.

Research themes of the Water Management Institute are very wide; integrated water management deals with waters and the water environment as an important source of life and habitats, as a condition for the development of society, as raw material for a number of activities, as a direct source of threats (floods, draughts, sleet, etc.) and as a trigger for other processes (landslides, etc.). For this reason, investigations from the area of water environment protection and efficient public services are required, including drinking and technological water supply, wastewater collection and treatment, protection and improvement of water and built water bodies, as well as investigation of water engineering and integrated management with natural and secondary raw material sources.

EDUCATIONAL ACTIVITY

The experience gained in international research projects provides an excellent basis for the development of new, interesting and, above all, up-to-date content, which we teachers incorporate into our lectures and exercises and

ZNANSTVENA IN RAZISKOVALNA DEJAVNOST

Razvejanost raziskovalnega področja VGI je predstavljena z opisi projektov, pri katerih sodelujemo:

— RISKADAPT – Obzorje Evropa
Uspešni smo bili pri prijavi novega triletnega projekta, ki naslavlja prilagoditve kritične infrastrukture ekstremnim vremenskim pojavom. Cilj projekta je natančneje oceniti pričakovane obremenitve tovrstnih konstrukcij in degradacijo materialov v času ekstremnih dogodkov. V sklopu projekta bo razvita posebna platforma, ki bo podpirala sistemske odločitve v zvezi s sestavljenimi dogodki naravnih nesreč. Hkrati bo projekt iskal povezave med naravnimi nevarnostmi ter družbeno ranljivostjo in odpornostjo.

— OPTAIN – H2020
Nadaljuje se 5-letni projekt OPTAIN, kjer obravnavamo rešitve za zadrževanje vode in hranil na kmetijskih površinah (v luči pričakovanih podnebnih sprememb), bodisi z malimi zadrževalniki ali novimi kmetijskimi praksami, ob upoštevanju načel krožnega gospodarstva. V projektu sodelujejo tri članice UL (BF, FGG in ZF), testni poročji v Sloveniji pa sta Pesnica in Kobiljski potok.

— EdiCitNet – H2020
Nadaljuje se 5-letni projekt, ki mestom nudi pomoč pri uvajanju »užitnih rešitev« (angl. Edible City Solutions oz. ECS), tj. rešitev, vezanih na proizvodnjo, distribucijo in porabo urbano pridelane hrane. Za potrebe projekta so bile formirane mestne skupine, ki združujejo lokalne prebivalce, mala in srednje velika podjetja, nevladne organizacije ter druge deležnike. Cilj projekta je mestne skupine vključiti v proces načrtovanja in soustvarjanja ECS, z izmenjavo znanj in odprtim dostopom do koristnih informacij in orodij.

Uspešno so bili zaključeni naslednji projekti:

— WACOM – Interreg Podonavje
Ključni izziv projekta je predstavljalo pomanjkanje usklajenega odziva v primeru izrednih razmer ob onesnaženjih in poplavah na čezmejnih vodotokih v porečju Save, kar predstavlja potencialno nevarnost za ljudi, okolje in izrabo vodnih virov. Projekt je z razvojem odzivnih mehanizmov, ki omogočajo dopolnitev že obstoječih sistemskih rešitev, pripomogel k izboljšanju in uskladitvi čezmejnega delovanja.

— TEACHER-CE – Interreg Srednja Evropa
Projekt je povezal rezultate izbranih preteklih projektov programa Srednja Evropa (tj. PROLINE-CE, FRAMWAT, RAINMAN in SUSTREE). Cilj projekta je bil razvoj skupnega orodja, ki državnim in lokalnim skupnostim nudi nabor ukrepov za prilagajanje podnebnim spremembam (tj. intenzivnim padavinam in suši), varovanje virov (pitne) vode, zmanjšanje poplavne ogroženosti, trajnejšo rabo prostora in boljše gospodarjenje z gozdovi. Orodje je bilo testitano v devetih pilotnih območjih v osmih državah Srednje Evrope.

— MUHA – Interreg ADRION
Ključni cilj projekta je bil uskladitev načina priprave načrtov varne oskrbe z vodo in mehanizmov civilne zaščite na transnacionalni ravni s pomočjo orodij in postopkov, ki skušajo v državah jadransko-jonske makroregije v čim večji meri poenotiti ključne postopke in kriterije za izdelavo ocen tveganja. Poudarek je bil na štirih vrstah tveganj, povezanih z oskrbo s pitno vodo: izrednih onesnaženjih, poplavah, sušah in prekinitvi oskrbe s pitno vodo zaradi potresov. Razvita orodja in postopki so bili preizkušeni v šestih pilotnih območjih.

pass on the knowledge we have acquired to our students. Research projects also offer opportunities for master's and doctoral theses.

SCIENTIFIC AND RESEARCH ACTIVITIES

The diversity of the Institute research area is illustrated by descriptions of the projects in which we are involved:

— RISKADAPT – Horizon Europe
We were successful in our application for a new 3-year project dealing with the adaptation of critical infrastructure to extreme weather events. The aim of the project is to assess more precisely the expected loads on such structures and the degradation of materials during extreme events. The project will develop a dedicated platform that will support systemic decisions related to compound natural disasters. At the same time, the project will look for links between natural hazards and social vulnerability and resilience.

— OPTAIN – H2020
The 5-year OPTAIN project continues, in which we discuss solutions for retaining water and nutrients on agricultural lands (in light of anticipated climate change), either with small reservoirs or new agricultural practices that incorporate the principles of the circular economy. Three UL members (Biotechnical Faculty, FGG and Faculty of Health Sciences) are involved in the project, while the test river basins in Slovenia are Pesnica and Kobiljski potok.

— EdiCitNet – H2020
The 5-year project, which provides cities with assistance in introducing "edible solutions" (Edible City Solutions or ECS) continues. It includes solutions for the production, distribution and consumption of food grown in the city. City teams have been formed for the needs of the project, bringing together local residents, small and medium-size enterprises, non-governmental organisations and other stakeholders. The project aims to involve the city teams in the process of planning and co-designing of ECS, through knowledge sharing and open access to useful information and tools.

The following projects were successfully completed:

— WACOM – Interreg Danube
The key challenge of the project was the lack of a coordinated response to emergencies due to pollution and flooding on cross-border watercourses in the Sava River Basin, which poses a potential threat to people, the environment, and the use of water resources. The project contributed to the improvement and harmonization of cross-border operations by developing response mechanisms to complement existing system solutions.

— TEACHER-CE – Interreg Central Europe
The project integrates the results of selected previous Central Europe projects (i.e., PROLINE-CE, FRAMWAT, RAINMAN and SUSTREE). It aims to develop a common tool that will provide national and local communities with a set of measures to adapt to climate change (i.e., intense rainfall and drought), protect (potable) water resources, reduce flood risks, use land more sustainably and improve forest management. The tool will be tested in nine pilot areas in eight Central European countries.

— MUHA – Interreg ADRION
The main objective of the project was to harmonise the methodology for preparing water security plans and disaster prevention mechanisms at the transnational level using tools and procedures that tried to attempt to harmonise the key procedures and criteria for risk assessments in the Adriatic-Ionian macro-region. Four types of risks related to drinking water supply will be addressed: exceptional pollution, floods, droughts and disruption of drinking water supply due to earthquakes. The tools and procedures developed will be tested in six pilot areas.

POMEMBNI DOSEŽKI

Atanasova, N., Istenič, D. Designing Edible Cities: vabljeno predavanje na IWA World Water Congress & Exhibition Water for smart liveable cities, Workshop: Nature based solutions – a way to make our cities circular, 11-15 September 2022, Kopenhagen, Danska.

Romano, E., Banovec, P. in sod. 2022. The Adrion Project MUHA–Multi-Hazard Framework for Water Related Risks Management: Linking Water Utilities and Civil Protection Mechanisms through Water Safety Plans. Environ. Sci. Proc. 21, 1. doi: 10.3390/environsciproc2022021047.

Škerjanec, M., Steinman, F., Rak, G. 2021. Integrated flood management based on hazard analysis critical control point approach. J. Flood Risk Manag. e-12769: 1-13. doi: 10.1111/jfr3.12769.

SIGNIFICANT ACHIEVEMENTS

Atanasova, N., Istenič, D. Designing Edible Cities : invited lecture at IWA World Water Congress & Exhibition Water for smart liveable cities, Workshop: Nature based solutions – a way to make our cities circular, 11-15 September 2022, Kopenhagen, Denmark.

Romano, E., Banovec, P. in sod. 2022. The Adrion Project MUHA–Multi-Hazard Framework for Water Related Risks Management: Linking Water Utilities and Civil Protection Mechanisms through Water Safety Plans. Environ. Sci. Proc. 21, 1. doi: 10.3390/environsciproc2022021047.

Škerjanec, M., Steinman, F., Rak, G. 2021. Integrated flood management based on hazard analysis critical control point approach. J. Flood Risk Manag. e-12769: 1-13. doi: 10.1111/jfr3.12769.

RAZISKOVALNI INŠTITUT ZA GEO IN HIDROTVEGANJA (RIGHT)
RESEARCH INSTITUTE FOR GEO AND HYDRO THREATS (RIGHT)

KADER PERSONNEL

PREDSTOJNIK HEAD
prof. dr. **Matjaž Mikoš**

NAMESTNIK PREDSTOJNIKA DEPUTY HEAD
prof. dr. Janko Logar

RAZISKOVALCI RESEARCHERS
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SODELAVCI ASSOCIATES
doc. dr. Nejc Bezak, asist. dr. Mateja Klun, dr. Mira Kobold, asist. dr. Sašo Petan, asist. dr. Matej Radinja, asist. dr. Klaudija Sapač, viš. pred. dr. Jošt Sodnik, prof. dr. Blaž Stres, viš. pred. dr. Andrej Vidmar

Raziskovalni inštitut za geo in hidro tveganja (RIGHT) so 2014 ustanovile Katedra za kartografijo, fotogrametrijo in daljinsko zaznavanje (KKFDZ), Katedra za matematično in fizikalno geodezijo ter navigacijo (KMFGN), Katedra za mehaniko tal z laboratorijem (KMTal – danes Katedra za geotehniko) in Katedra za splošno hidrotehniko (KSH) in v njem opravljajo raziskovalno in strokovno delo na področju nevarnosti in tveganj v geo- in hidro okolju. Predstojnik inštituta je dr. Matjaž Mikoš, redni profesor za hidrologijo in redni profesor za inženirsko hidrotehniko, namestnik predstojnika je dr. Janko Logar, redni profesor za področje gradbeništva in okoljskega inženirstva. Pri delu inštituta sodelujejo pedagogi in raziskovalci ustanovnih kateder, zunanji dopolnilno zaposleni raziskovalci drugih raziskovalnih ustanov in podjetij v Sloveniji ter nekateri mladi raziskovalci, ki raziskujejo v programski skupini P2-0180 Vodarstvo in geotehnika: orodja in metode za analize in simulacije procesov ter razvoj tehnologij. Inštitut je na UL FGG samostojna raziskovalna skupina s šifro ARRS 0792-022.

UL FGG od leta 2008 redno pridobiva naziv svetovnega centra odličnosti za zmanjševanje tveganja zaradi zemeljskih plazov (WCoE – World Centre of Excellence on Landslide Risk Reduction) – nazadnje za obdobje 2020–2023.

Inštitut od ustanovitve redno sodeluje z Mednarodnim konzorcijem za zemeljske plazove (ICL) s sedežem v Kjotu na Japonskem. Predstojnik RIGHT je od leta 2022 predsednik Globalnega promocijskega odbora pri Mednarodnem programu za zemeljske plazove in Kjotski zavezi za zmanjševanje tveganj zaradi zemeljskih plazov. Inštitut s svojim delom in rezultati podpira delo Unescove Katedre za zmanjševanje tveganj zaradi vodnih ujm, ki jo je leta 2016 ustanovila Univerza v Ljubljani in deluje v okviru UL FGG.

Research Institute for Geo and Hydro Threats was founded by Chair of Cartography, Photogrammetry and Remote Sensing, Chair of Mathematical and Physical Geodesy and Navigation, Chair of Soil Mechanics with Laboratory – now Chair of Geotechnics, and Chair of Hydrology and Hydraulic Engineering, performing research and professional work in the field of hazards and risks in the geo and hydro environment. The Institute is chaired by Matjaž Mikoš, PhD, full professor in hydrology and full professor in hydraulic engineering. His deputy is Janko Logar, PhD, full professor for the area of civil and environmental engineering. Teachers and researhers of the founding chairs, external partners and researchers from other research institutions and companies in Slovenia as well as some young researchers involved in the work of the core research group P2-0180 Water Science and Technology, and Geotechnical Engineering: Tools and Methods for Process Analyses and Simulations, and Development of Technologies are involved in the Institute's work. The Institute is an independent research group of UL FGG with ARRS code 0792-022.

Since 2008, UL FGG has been regularly awarded the title WCoE – World Centre of Excellence on Landslide Risk Reduction – the last one for the period 2020–2023.

Since its establishment, the Institute has been regularly cooperating with the International Consortium on Landslides (ICL) with its seat in Kyoto, Japan. Since 2022, the Head of RIGHT has been Chairperson of the Global Promotion Committee of the International Programme on Landslides and the Kyoto Landslide Commitment. With its work and results, the Institute supports the work of the Unesco Chair on Water-related Disaster Risk Reduction, founded in 2016 by the University of Ljubljana and hosted by UL FGG.

ZNANSTVENO-RAZISKOVALNA TER STROKOVNA DEJAVNOST

Predstojnik inštituta je v drugi polovici leta 2022 prevzel koordinacijo projekta iz sheme NextGenerationEU (projekti Načrta za okrevanje in odpornost) na Univerzi v Ljubljani na temo njenega trajnostnega razvoja (pilot 4. Trajnostni prostor) – še posebej pilotnega projekta 4.01 Koncept trajnostnega razvoja Univerze v Ljubljani in pilotnega projekta 4.03 Trajnostna graditev stavb – demonstracijski center.

Nadaljevali smo delo na projektih Mednarodnega programa za zemeljske plazove (IPL; https://www.landslides.org/projects/ipl-projects/): IPL-261 World-wide-web-based Landslide Observatory (W3bLO) v sodelovanju z Inštitutom »Jožef Stefan« in IPL-262 Deciphering the sensitivity of rock faces to climatic changes and freeze-thaw cycles in permafrost-free regions v sodelovanju z Geološkim zavodom Slovenije.

Na inštitutu so potekali strokovni projekti Katedre za matematično in fizikalno geodezijo ter navigacijo (KMFGN) na področju geodezije in Katedre za splošno hidrotehniko (KSH) na področju laboratorijskega testiranja materialov – v letu 2023 smo začeli projekt skupaj s Fakulteto za strojništvo Univerze v Ljubljani o razvoju vibracijskega izolacijskega elementa za železniške proge za kitajskega naročnika. Inštitut je nadaljeval z izpopolnjevanjem nabora laboratorijske opreme za laboratorijsko preizkušanje agregatnih materialov v svojem Laboratoriju za agregate, ki je v prostorih fakultete v stavbi na Hajdrihovi 28.

PEDAGOŠKA DEJAVNOST

Raziskovanje je temelj kakovostnega poučevanja, predvsem na 2. in 3. bolonjski stopnji. Raziskovalni dosežki inštituta se prelivajo v pedagoške vsebine različnih predmetov na drugostopenjskih študijskih programih ter na doktorskih študijskih programih Grajeno okolje in Varstvo okolja. Kakovostno raziskovalno delo na inštitutu in mentorsko delo z mladimi raziskovalci je pomembna usmeritev dela inštituta. Z raziskovalnim delom na doktorski disertaciji je končal dr. Matej Radinja, ki je nato eno leto prebil na podoktorskem delu v tujini (2022–2023, Belgija), nadaljevali pa so delo mladi raziskovalci Tamara Kuzmanić, Mojca Likar, Timotej Jurček in Mark Brian Alivio.

Inštitut je sodeloval pri izvedbi skupnega magistrskega programa ERASMUS MUNDUS »Upravljanje poplavnega tveganja« in izvedbi poletne šole Unesco katedre septembra 2023 na temo hidroloških podatkov. Raziskovalci inštituta aktivno sodelujejo v različnih promocijskih aktivnostih fakultete, predvsem pri tehniških dnevih za srednješolce, dnevu odprtih vrat fakultete in pri informativnih dnevih za dijake srednjih šol.

SCIENTIFIC-RESEARCH AND PROFESSIONAL ACTIVITIES

In the second half of 2022, the Head of the Institute took over the coordination of a project from the NextGenerationEU programme (projects of the Recovery and Resilience Plan) at the University of Ljubljana on the topic of its sustainable development (Pilot 4. Sustainable Space) – in particular Pilot project 4.01 Concept of Sustainable Development of the University of Ljubljana and Pilot project 4.03 Sustainable Construction of Buildings – Demonstration Centre.

We continued work on the projects of the International Programme on Landslides (IPL; https://www.landslides.org/projects/ipl-projects/): IPL-261 World-wide-web-based Landslide Observatory (W3bLO) in cooperation with the Jožef Stefan Institute, and IPL-262 Deciphering the Sensitivity of Rock Faces to Climatic Changes and Freeze-Thaw Cycles in Permafrost-free Regions in cooperation with the Geological Institute of Slovenija.

Professional projects of the Chair of Mathematical and Physical Geodesy and Navigation in the field of geodesy and the Chair of Hydrology and Hydraulic Engineering in the field of laboratory testing of materials took place at the institute – in 2023, we started a joint project with the Faculty of Mechanical Engineering of the University of Ljubljana to develop vibration isolation elements for railway lines for a Chinese client. The Institute has further improved the laboratory equipment for the testing of aggregates in its Laboratory for Aggregates, which is located on the premises of the Faculty in the building at Hajdrihova 28.

EDUCATIONAL ACTIVITY

Research is the basis for quality teaching, especially in the 2nd and 3rd Bologna cycles. The Institute's research achievements are being implemented into educational content of various courses at the 2nd cycle study programs and at the doctoral study programs Built Environment and Environment Protection. High-quality research work of the Institute and supervision of young researchers are important guidelines for its activities. PhD student Matej Radinja finished his PhD thesis, who then spent a year abroad as a postdoctoral researcher (2022–2023, Belgium). Further young researchers continued their work: Tamara Kuzmanić, Mojca Likar, Timotej Jurček and Mark Brian Alivio.

The Institute was involved in the implementation of the ERASMUS MUNDUS Joint Master in Flood Risk Management and the Unesco Chair summer school in September 2023 on the topic of hydrological data. The Institute's researchers are actively involved in various UL FGG's promotional activities, particularly during technical days for secondary schools, at the Faculty's Open Day and in the Information Days for secondary schools.

POMEMBNI DOSEŽKI

Kot poseben dosežek lahko štejemo novo imenovanje UL FGG za Svetovni center odličnosti za zmanjševanje tveganj zaradi zemeljskih plazov (neprekinjeno od leta 2008 naprej). Med pomembne dosežke uvrščamo tudi naslednje znanstvene objave:

Mikoš, M. et al. (2023). Natural-Hazard-Related Web Observatory as a Sustainable Development Tool. V: Sassa, K., Konagai, K., Tiwari, B., Arbanas, Ž., Sassa, S. (ur.) Progress in Landslide Research and Technology, Volume 1 Issue 1, 2022. Progress in Landslide Research and Technology. Springer, Cham. https://doi.org/10.1007/978-3-031-16898-7_5

Kuzmanić, T., Lebar, K., Mikoš, M. (2023). Comparison of Different-Energy-Level Abrasion in Los Angeles and Micro-Deval Apparatuses Using Mass Loss and Rounding of Sediment Particles. Applied Sciences 13, 6102, https://doi.org/10.3390/app13106102

Kuzmanić, T., Mikoš, M. (2022). Dynamic image analysis of clasts' morphological changes due to fluvial abrasion. V: Ortega-Sanchez, M. (ur.). From snow to sea: 39th IAHR World Congress, Granada, Spain,19 – 24 June 2022. Madrid: International Association for Hydro-Environment Engineering and Research, 582-587, doi: 10.3850/IAHR-39WC252171192022937.

SIGNIFICANT ACHIEVEMENTS

The renewed appointment of UL FGG as a World Center of Excellence for Landslide Risk Reduction (continuously since 2008) can be counted as a special achievement. Other important achievements include the following scientific publications:

Mikoš, M. et al. (2023). Natural-Hazard-Related Web Observatory as a Sustainable Development Tool. V: Sassa, K., Konagai, K., Tiwari, B., Arbanas, Ž., Sassa, S. (ed.) Progress in Landslide Research and Technology, Volume 1 Issue 1, 2022. Progress in Landslide Research and Technology. Springer, Cham. https://doi.org/10.1007/978-3-031-16898-7_5

Kuzmanić, T., Lebar, K., Mikoš, M. (2023). Comparison of Different-Energy-Level Abrasion in Los Angeles and Micro-Deval Apparatuses Using Mass Loss and Rounding of Sediment Particles. Applied Sciences 13, 6102, https://doi.org/10.3390/app13106102

Kuzmanić, T., Mikoš, M. (2022). Dynamic image analysis of clasts' morphological changes due to fluvial abrasion. V: Ortega-Sanchez, M. (ed.). From snow to sea: 39th IAHR World Congress, Granada, Spain,19 – 24 June 2022. Madrid: International Association for Hydro-Environment Engineering and Research, 582-587, doi: 10.3850/IAHR-39WC252171192022937.

ŠTUDIJSKI PROGRAMI TRETJE STOPNJE THIRD-CYCLE STUDY PROGRAMMES

Doktorski študijski program je vsebinsko in metodološko nadaljevanje študijev prve in druge stopnje. Predstavlja znanstveno nadgradnjo vsebin gradbeništva in okoljskega inženirstva, geodezije, načrtovanja prostora in geologije.

Osrednji poudarek doktorskega študija je na raziskovalnem delu, na interdisciplinarnosti študija in na sodelovanju mednarodno uveljavljenih domačih in tujih strokovnjakov. Po priporočilih Evropskega združenja univerz je predvidena mednarodna izmenjava študentov in objava najmanj enega znanstvenega članka v mednarodno priznani reviji kot končni rezultat raziskovalnega dela. Poseben poudarek je namenjen ustreznemu odnosu med doktorandom in mentorjem. Študentje si mentorje lahko izbirajo med mednarodno priznanimi in uveljavljenimi znanstveniki in strokovnjaki. Program je v celoti ovrednoten po Evropskem prenosnem kreditnem sistemu (ECTS) in se lahko na ta način vključuje v mednarodno izmenjavo študentov v državah, ki ta sistem uporabljajo.

The doctoral study programmes continue with upgraded content and methodology from the first- and second-cycle studies. They represent the scientific upgrade of the content from civil engineering, environmental engineering, geodesy, spatial planning and geology.

The main focus of the doctoral study is research work, the interdisciplinarity of the studies and the cooperation of internationally recognized national and international experts. Following the recommendations of the European University Association, the study foresees international student exchange and publication of at least one scientific article in an internationally acknowledged journal as the final result of the research work. Particular emphasis is placed on an appropriate relationship between the doctoral student and the supervisor. Students can choose supervisors from internationally recognized and respected scientists and experts. The programme is fully evaluated according to the European Credit Transfer System (ECTS). It can, therefore, be included in the international student exchange programmes in all countries using this system.

DOKTORSKI ŠTUDIJSKI PROGRAM GRAJENO OKOLJE DOCTORAL STUDY PROGRAMME BUILT ENVIRONMENT

PREDSTOJNIK DOKTORSKEGA ŠTUDIJA GRAJENO OKOLJE HEAD OF THE DOCTORAL STUDY PROGRAMME BUILT ENVIRONMENT
prof. dr. **Krištof Oštir** (do novembra 2022 until November 2022),
prof. dr. **Dejan Zupan**

Fakulteta za gradbeništvo in geodezijo Univerze v Ljubljani skupaj z Naravoslovnotehniško fakulteto Univerze v Ljubljani izvaja doktorski študijski program Grajeno okolje.

Doktorski študijski program Grajeno okolje je razdeljen na štiri znanstvena področja: Gradbeništvo, Geodezijo, Načrtovanje in urejanje prostora ter Geologijo. Področje Gradbeništvo zajema konstrukcije, gradbene materiale, mehansko in matematično modeliranje, potresno inženirstvo, učinkovito rabo energije in bivalno udobje, prometno in komunalno inženirstvo, geotehniko, gradbeno informatiko, organizacijo gradbenih del in tehnologijo. Študijsko področje Geodezija zajema področja geodezije in inženirske geodezije, satelitske geodezije in navigacije, geofizike, kartografije, fotogrametrije in daljinskega zaznavanja in geoinformatike. Področje Načrtovanje in urejanje prostora je interdisciplinarno področje, zato je študij zanimiv za diplomante različnih programov. Študijsko področje Geologija je zasnovano tako, da pokriva vsa glavna polja geoloških znanosti, hkrati pa se usmerja tudi v specifičnosti geoloških razmer v širšem srednjeevropskem in sredozemskem prostoru.

Temeljni cilj doktorskega študijskega programa Grajeno okolje je izobraževanje visoko usposobljenih raziskovalcev za posamezna znanstvena področja, ki sestavljajo študijski program. Doktorand bo po končanem študiju usposobljen za znanstveno razmišljanje in reševanje znanstvenih problemov ter sodelovanje pri reševanju zahtevnih delovnih problemov z interdisciplinarnim pristopom. Sposoben bo kreativnega in samostojnega znanstveno-raziskovalnega dela in reševanja znanstvenih problemov bodočih delodajalcev. Usposobljen bo za obravnavo raziskovalnega problema po najsodobnejših znanstvenih metodah, kritično presojo raziskovalnih rezultatov, za razvoj novih raziskovalnih metod ter prenos novih tehnologij in znanja v prakso.

Doktorski študijski program Grajeno okolje traja štiri leta (osem semestrov) in obsega skupaj 240 kreditnih točk. Študijski program je sestavljen iz organiziranega dela pouka v obsegu 60 kreditnih točk, preostalih 180 kreditnih točk pa je namenjenih individualnemu raziskovalnemu delu za doktorsko disertacijo.

V letu 2021/22 je program Grajeno okolje uspešno zaključilo osem doktorjev (gradbeništvo: 6, geologija: 1, načrtovanje in urejanje prostora: 1), v letu 2022/23 prav tako osem (gradbeništvo: 2, geodezija: 3, geologija: 3).

The Built Environment is a joint doctoral study programme offered by University of Ljubljana's Faculty of Civil and Geodetic Engineering and Faculty of Natural Sciences and Engineering.

This study program Built Environment combines four scientific areas: Civil Engineering, Geodesy, Spatial Planning and Spatial Development, and Geology. Civil Engineering is covering structural analysis, building materials, mechanical and mathematical modelling, earthquake engineering, efficient energy use and dwelling comfort, traffic and municipal engineering, geotechnics, construction informatics, construction management and technology. The study area of Geodesy includes the areas of geodesy and engineering geodesy, satellite geodesy and navigation, geophysics, cartography, photogrammetry and remote sensing and geoinformatics. The area Spatial Planning and Spatial Development is interdisciplinary, which makes it interesting also for the graduates of many other programs. The study area Geology is designed to cover all major fields of geological sciences, specializing at the same time into geological conditions in the wider Central European and Mediterranean area.

The basic goal of the doctoral study program Built Environment is education of the highest qualified professionals in individual scientific areas included in the study program. After the studies, graduates are capable of scientific thinking and solving of scientific problems as well as cooperation in solving demanding practical problems with an interdisciplinary approach. They are capable of creative and independent scientific and research work and solving of scientific problems for future employers. They are capable to approach a research problem by using the latest scientific methods, to critically assess research results, develop new scientific methods and transfer new technologies and knowledge into practice.

The doctoral study programme Built Environment lasts for four years (eight semesters) and totals 240 ECTS. The study programme consists of organized teaching activities in the scope of 60 ECTS, with the remaining 180 ECTS intended to individual research work for the PhD thesis.

In the academic year 2021/22, 8 students successfully finished the study programme Built Environment (Civil Engineering: 6, Geology: 1, Spatial Planning and Spatial Development: 1) and in the academic year 2022/23, eight new doctors were promoted (Civil Engineering: 2, Geodesy: 3, Geology: 3).

PREDMETNIK CURRICULUM

1. letnik 1st year

Znanstveno raziskovanje grajenega okolja Scientific Research of the Built Environment • ECTS 5

Individualno raziskovalno delo Individual research work • ECTS 25

Znanstveno področje Scientific Field

Geodezija Geodesy

Raziskovanje v geodeziji Research in Geodesy • ECTS 10

Matematika v raziskovanju grajenega okolja Mathematics in Research of Built Environment • ECTS 5

Izbirni predmeti Elective Courses • ECTS 15

Načrtovanje in urejanje prostora Spatial Planning and Development

Prostorsko načrtovalsko raziskovanje Spatial Planning Research • ECTS 5

Izbirni predmeti Elective Courses • ECTS 25

Gradbeništvo Civil Engineering

Matematika v raziskovanju grajenega okolja Mathematics in Research of Built Environment • ECTS 5

Izbirni predmeti Elective Courses • ECTS 25

Geologija Geology

Izbirni predmeti Elective Courses • ECTS 30

2. letnik 2nd year

Izbirni predmeti Elective Courses • ECTS 10

Izdelava in predstavitev teme doktorske disertacije Elaboration and Presentation of Doctoral Theme • ECTS 5

Individualno raziskovalno delo Individual Research Work • ECTS 45

3. letnik 3rd year

Individualno raziskovalno delo Individual Research Work • ECTS 60

4. letnik 4th year

Individualno raziskovalno delo Individual Research Work • ECTS 50

Predstavitev doktorske disertacije pred javnim zagovorom Presentation of PhD Thesis before public defence • ECTS 5

Izdelava in javni zagovor doktorske disertacije Elaboration and public defence of PhD Thesis • ECTS 5

Izbirni predmeti Elective Courses

Bioklimatsko načrtovanje Bioclimatic Design • ECTS 5

Dinamika gradbenih konstrukcij z uporabo v potresnem inženirstvu Dynamics of Structures with Applications to Earthquake Engineering • ECTS 5 in 10

Duktilnost in stabilnost jeklenih konstrukcij Ductility and Stability of Steel Structures • ECTS 5 in 10

Dnevna svetloba Daylighting • ECTS 5

Eksperimentalno podprto projektiranje zidanih objektov Experimentally Supported Design of Masonry Buildings • ECTS 5 in 10

Empirično modeliranje okoljskih sistemov Data-driven Modelling of Environmental Systems • ECTS 5

Hidrološke meritve in hidrološko modeliranje Hydrologic Measurements and Modelling • ECTS 10

Hidrološko in geotehnično raziskovanje zemeljskih plazov Hydrologic and Geotechnical Research on Landslides • ECTS 5 in 10

Izbrana poglavja s področja hidrotehničnih konstrukcij Selected Topics in the Field of Hydraulics Structures • ECTS 5

Jekla visoke trdnosti v konstrukcijah Structural Application of High Strength Steels • ECTS 5

Lupine in membrane Shell and Membrane Structures • ECTS 5

Matematično modeliranje in turbulenca v hidravliki Mathematical Modelling and Turbulence in Hydraulics • ECTS 5 in 10

Matematično modeliranje v prometnem inženirstvu Mathematical Models in Traffic Engineering • ECTS 10

Meritve in modeliranje erozije in sedimentacije Measurements and Modelling of Erosion and Sedimentation • ECTS 5 in 10

Metode izboljšanja temeljnih tal Ground Improvement Methods • ECTS 5

Metode končnih elementov za konstrukcije Finite Element Methods for Structures • ECTS 5 in 10

Metode numeričnega modeliranja Computational Engineering Methods • ECTS 5 in 10

Modeliranje podzemnih objektov Modelling of Underground Structures • ECTS 5

Modeliranje prenosa in pretvorb snovi v vodnem okolju Modelling Transport and Transformation of Substances in Water Systems • ECTS 5

Na znanje oprto inženirstvo Knowledge Based Engineering • ECTS 5

Načrtovanje zdravih stavb Design of Healthy Buildings • ECTS 5 in 10

Napredne metode planiranja in spremljanja projektov Advanced Methods of Project Planning and Monitoring • ECTS 5

Napredne tehnologije malt in betonov Advanced Mortars and Concretes Technologies • ECTS 5 in 10

Napredni konstrukcijski sklopi – NKS Advanced Constructional Complexes – ACC • ECTS 5

Nelinearna analiza betonskih konstrukcij Nonlinear Analysis of Concrete Structures • ECTS 5

Nelinearna analiza in projektiranje potresno odpornih armiranobetonskih stavb Inelastic Analysis and Design of Earthquake Resistant Reinforced Concrete Buildings • ECTS 5 in 10

Nelinearna analiza kompozitnih konstrukcij Nonlinear Analysis of Composite Structures • ECTS 10

Nelinearna mehanika deformiranih teles Non-linear Continuum Mechanics • ECTS 5 in 10

Nelinearna požarna analiza Nonlinear Fire Analysis • ECTS 10

Novi materiali New Materials • ECTS 5 in 10

Numerične metode v mehaniki konstrukcij Numerical Methods in Structural Mechanics • ECTS 5

Numerične metode v raziskovanju grajenega okolja Numerical Methods in the Built Environment Research • ECTS 5 in 10

Numerične metode za elastoplastičnost Numerical Methods for Elastoplasticity • ECTS 5

Prenova nepremične kulturne dediščine Restoration of Immovable Cultural Heritage • ECTS 5

Presoja vodnogospodarske urejenosti Assessment of Water Management Impact on the River Basin • ECTS 10

Programiranje distribuiranih aplikacij Programming Distributed Engineering Applications • ECTS 5

Projektiranje in utrditev armiranobetonskih mostov na potresnih območjih Seismic Design and Strengthening of Reinforced Concrete Bridges • ECTS 5 in 10

Prostorske linijske konstrukcije Spatial Beam Structures • ECTS 5

Stabilnost konstrukcij Stability of Structures • ECTS 5

Teorija zanesljivosti konstrukcij Reliability of Structures • ECTS 5

Upravljanje s kakovostjo prostorskih podatkov Management of Spatial Data Quality • ECTS 5 in 10

Urejanje vodnega režima Management of Water Regime • ECTS 5

Verjetnostne metode v grajenem okolju Probability Methods in Built Environment Studies • ECTS 5

Zajem in modeliranje zemeljskega površja pri ocenah naravnih tveganj Data Acquisition and Relief Modelling in Natural Risk Assessments • ECTS 5 in 10

Zanesljivost konstrukcij z uporabo v potresnem inženirstvu Reliability of Structures with Application in Earthquake Engineering • ECTS 5 in 10

Zaščita vodnega okolja Protection of Water Environment • ECTS 5

Aplikativna geokemija okolja Applied Environmental Geochemistry • ECTS 5

Biotski odgovor na paleoekološke spremembe Biotic Response to Global Paleoecological Change • ECTS 5

Geoarheologija Geoarchaeology • ECTS 5

Geofizikalne metode raziskav Geophysical Investigation Methods • ECTS 5

Geoinformatika v znanosti in ontologija nepremičnin Geoinformatics in Science and Ontology of Real Properties • ECTS 10

Geokemijski procesi Geochemical Processes • ECTS 5

Hidrogeologija krasa in medzrnskega poroznega medija Hydrogeology of Karst and Intergranular Porous Media • ECTS 5

Kraški procesi in pojavi Karst Processes and Fractals • ECTS 5

Metode inženirskogeoloških raziskav za zahtevne objekte Engineering Geology Methods for Complex Structures • ECTS 5

Napredna petrologija magmatskih in metamorfnih kamnin Advanced Petrology of Igneous and Metamorphic Rocks • ECTS 5

Rentgenska strukturna analiza X-ray Diffraction Structural Analysis • ECTS 5

Sedimentarna evolucija Tetide Sedimentary Evolution of Tethyan Realm • ECTS 5

Sedimentalni bazeni Sedimentary Basins and Sedimentary Environments • ECTS 5 in 10

Seizmološke analize in raziskave Seismological Analyses and Investigations • ECTS 5 in 10

Stabilni izotopi in fiziološki procesi Stable Isotopes and Physiological Processes • ECTS 5

Strategija fanerozoika Stratigraphy of the Phanerozoic • ECTS 5

Tektonske strukture in procesi Tectonic Structures and Processes • ECTS 5

Deformacijska analiza naravnega in grajenega okolja Deformation Analysis of Natural and Built Environment • ECTS 5

GNSS v geodeziji in geofiziki GNSS in Geodesy and Geophysics • ECTS 5

Gravimetrija v geodeziji Gravimetry in Geodesy • ECTS 5

Obdelava podob daljinskega zaznavanja Remote Sensing Image Processing • ECTS 5 in 10

Raziskovanje vzpostavitve in vodenja topografskih podatkov Research of Topographic Data Establishment and Management • ECTS 5

Sodobna terestrična geodetska merska tehnologija Modern Terrestrial Geodetic Measurement Technology • ECTS 5

Pristopi k raziskovanju in načrtovanju rabe prostora Approaches to Spatial Development and Land Use Research • ECTS 5

Prostorsko načrtovalsko raziskovanje Spatial Planning Research • ECTS 5

Tehnično upravljanje nepremičnin – izbrana poglavja Technical Real-estate Management – Selected Chapters • ECTS 5

INTERDISCIPLINARNI DOKTORSKI ŠTUDIJSKI PROGRAM VARSTVO OKOLJA
INTERDISCIPLINARY DOCTORAL STUDY PROGRAMME ENVIRONMENTAL PROTECTION

PREDSTOJNICA DOKTORSKEGA ŠTUDIJA VARSTVO OKOLJA HEAD OF THE DOCTORAL STUDY PROGRAMME ENVIRONMENTAL PROTECTION
izr. prof. dr. **Nataša Atanasova**

Problemi varstva okolja so celostni, interdisciplinarni in združujejo naravoslovne, družboslovne, tehnične, medicinsko-higienske in druge vsebine. Ekološke probleme, ki jih pogosto povzročajo premalo premišljeni gospodarski ukrepi, opredelimo z naravoslovnim znanjem in rešujemo s tehničnimi ukrepi, ki so pogojeni z ekonomsko-pravnimi izhodišči in obremenjeni s socialnimi posledicami. Zato vidimo v integraciji različnih disciplin možnost za uspešno urejanje problemov varstva okolja. Na mejnih področjih različnih ved praviloma nastajajo nova znanja, spoznanja in nove tehnične rešitve.

Program Interdisciplinarnega doktorskega študijskega programa Varstvo okolja združuje znanstvena področja 13 fakultet Univerze v Ljubljani. Program je predviden kot interdisciplinarni študij za doktorande naravoslovnih, tehniških, biotehniških, družboslovnih, humanističnih in medicinskih ved, ki bodo pri izdelavi doktorske disertacije potrebovali znanja več področij. Doktorandi bodo poglobili svoje specialno znanje, hkrati pa se usposobili za skupinsko in interdisciplinarno delo pri urejanju najzahtevnejših problemov okolja.

Študijski program traja tri leta in obsega 180 kreditnih točk. Organiziranega dela pouka je v obsegu 60 kreditnih točk, preostalih 120 kreditnih točk pa je namenjenih individualnemu raziskovalnemu delu za doktorsko disertacijo. V letu 2021/22 je program Varstvo okolja uspešno zaključil en doktorand, v letu 2022/23 pa trije.

The problems of environmental protection are fully integrated, interdisciplinary, and combine natural sciences, social sciences, technical, medical-hygienic and other content. Ecological issues, often resulting from reckless economic measures, are defined by knowledge from natural sciences and solved by technical means, which are conditioned by economic-legal starting points and burdened by social consequences. For this reason, we consider the integration of various disciplines as an opportunity for successful solving of environmental problems. It is typical that new knowledge and discoveries, as well as new technical solutions, are created in border areas of different sciences.

The programme is interdisciplinary in structure and brings together academic areas from 13 faculties of the University of Ljubljana. It is designed as an interdisciplinary study programme for doctoral candidates in the natural sciences, engineering, biotechnology, social sciences, humanities and medicine who need knowledge from several fields to complete their doctoral thesis. Doctoral students build up their specialist knowledge and at the same time qualify for teamwork and interdisciplinary work in dealing with the most demanding environmental problems.

Interdisciplinary doctoral study programme Environmental Protection lasts for three years and consists of 180 ECTS credits. The study programme consists of an organized part of study activities totalling 60 ECTS credits, while the remaining 120 ECTS are intended for individual research work for the preparation of the doctoral thesis. In the academic year 2021/22, one student successfully finished the programme, and in 2022/23 three PhD were promoted.

PREDMETNIK CURRICULUM

1. letnik 1st year

- Metodološki predmet Methodological Course • ECTS 10
- Interdisciplinarno znanstveno raziskovalno delo Interdisciplinary Scientific Research Work • ECTS 10
- Temeljni predmet Fundamental Course • ECTS 10
- Zrak, klima in vode Air, Climate and Water • ECTS 10
- Izbirni predmet Elective Course • ECTS 10
- Individualno raziskovalno delo Individual Research Work • ECTS 20

2. letnik 2nd year

- Izbirni predmet Elective Course • ECTS 10
- Doktorski seminar s predstavitvijo teme doktorske disertacije Elaboration and Presentation of Doctoral Theme • ECTS 5
- Individualno raziskovalno delo Individual Research Work • ECTS 45

3. letnik 3rd year

- Individualno raziskovalno delo Individual Research Work • ECTS 55
- Doktorski seminar s predstavitvijo doktorske disertacije pred javnim zagovorom in javni zagovor Presentation of Doctoral thesis Before Public Defence Elaboration and Public Defence of Doctoral Thesis • ECTS 5

Izbirni predmeti Elective Courses

- Ekohidrologija Ekohydrology • ECTS 10
- Hibridno modeliranje okoljskih sistemov Hybrid Modelling of Environmental Systems • ECTS 10
- Inženirsko modeliranje ekoloških procesov v površinskih vodah Engineering Modelling of Ecological Processes in Surface waters • ECTS 10
- Naravna tveganja v gorskem okolju Natural Hazards in Mountainous Environment • ECTS 10
- Umeščanje rizičnih tveganj objektov v socialno okolje Placement of Risky Buildings in the Social Environment • ECTS 10
- Uporaba daljinskega zaznavanja Application of Remote Sensing • ECTS 10
- Vrednotenje zemljišč in gospodarjenje Land Evaluation and Management • ECTS 10
- Zaščita hidrosfere Protection of Hydrosphere • ECTS 10
- Prostor in okolje Spatial Planning and the Environment • ECTS 10

ŠTUDIJSKI PROGRAMI ZA PRIDOBITEV DVOJNE DIPLOME
DOUBLE DEGREE STUDY PROGRAMMES

Študijski programi dvojnih diplom predstavljajo izjemno priložnost za študente, ki želijo razširiti svoja akademska obzorja in si pridobiti konkurenčno prednost na globalnem trgu dela. Omogočajo pridobitev dveh visokošolskih diplom – ene na Fakulteti za gradbeništvo in geodezijo in druge na partnerski univerzi v tujini. Glavna prednost teh programov je optimizacija študijskega procesa, saj se opravljene študijske obveznosti na sodelujočih institucijah medsebojno priznavajo, kar v primerjavi s pridobivanjem dveh ločenih diplom bistveno skrajša skupni čas študija. Na fakulteti trenutno izvajamo tri študijske programe dvojnih diplom:

— evropski magistrski študijski program Informacijsko modeliranje zgradb (BIM A+)
— magistrski program Erasmus Mundus Poplave in upravljanje z vodami;
— magistrski študijski program Vodarstvo in okoljsko inženirstvo v sodelovanju z UNICAL in ZHAW.

Poleg pridobitve specifičnega akademskega znanja, ti programi študentom nudijo neprecenljive kulturne in mednarodne izkušnje ter veščine. Študij v drugem kulturnem okolju jim omogoča razvoj komunikacijskih sposobnosti v tujih jezikih, medkulturne kompetence in globalne perspektive. Te veščine so v današnjem povezanem svetu ključne za uspešno kariero.

Double degree study programs represent an exceptional opportunity for students who wish to broaden their academic horizons and gain a competitive edge in the global job market. They allow students to obtain two university degrees – one from the Faculty of Civil and Geodetic Engineering and another from a partner university abroad. Their main advantage is the optimization of the study process, because completed study obligations are mutually recognized between the participating institutions, which significantly shortens the total study time compared to obtaining two separate degrees. The Faculty currently offers three Double Degree study programs:

— European Master's Program in Building Information Modelling (BIM A+);
— Erasmus Mundus Master's Program in Flood and Water Management;
— Master's Study Programme in Water Science and Environmental Engineering in cooperation with UNICAL and ZHAW.

In addition to the specific academic knowledge these programs offer to the students invaluable cultural and international experiences and skills. Studying in a different cultural environment enables them to develop communication skills in foreign languages, intercultural competence and global perspectives. These experiences are crucial for a successful career in today's interconnected world.

MAGISTRSKI ŠTUDIJSKI PROGRAM DRUGE STOPNJE: GRADBENIŠTVO – SMER: INFORMACIJSKO MODELIRANJE ZGRADB (BIM A+) SECOND-CYCLE MASTER STUDY PROGRAMME CIVIL ENGINEERING – ORIENTATION: BUILDING INFORMATION MODELLING (BIM A+)

BIM A+ UL KOORDINATOR BIM A+ UL COORDINATOR
doc. dr. **Tomo Cerovšek**

Evropski magistrski študijski program Building Information Modeling (BIM A+) je ohranil svoj status enega vodilnih študijskih programov BIM na svetu. V preteklem študijskem letu so bili izvedeni pomembni koraki na različnih področjih, ki utrjujejo naš vodilni položaj na tem področju.

S ponosom sporočamo, da je v akademskem letu 2022/23 na Univerzi v Ljubljani 30 magistrantov uspešno zaključilo študij z dvojno diplomo Univerze v Ljubljani in Univerze v Minhu ali Politehnike Milano. Na program se prijavljajo študenti ne le iz Evrope, ampak tudi iz Severne in Južne Amerike, Afrike, Bližnjega in Daljnega vzhoda. Ta raznolik nabor izpostavlja mednarodno privlačnost programa in poudarja njegovo svetovno prepoznavnost.

Našo predanost vidimo v spodbujanju sodelovanja s partnerji iz industrije. Povečali smo število vabljenih predavanj, ki jih izvajajo vodilni strokovnjaki iz industrije. Ta sodelovanja so našim študentom zagotovila neprecenljive vpoglede in perspektive iz različnih strokovnih področij, kar je obogatilo njihovo učno izkušnjo. Poleg tega je naše sodelovanje z industrijo pri diplomskih delih prineslo uporabne rezultate. Iz teh partnerstev je nastalo več izjemnih diplomskih projektov, ki izkazujejo pomembnost in praktično uporabnost BIM ter raziskovalnih prizadevanj naših študentov.

Pri načrtih za prihodnost ostajamo predani nadaljnjemu izboljševanju kakovosti in relevantnosti našega programa. Na podlagi uspehov preteklih let želimo poglobiti naše industrijske vezi, razširiti naš globalni doseg in še naprej zagotavljati odličnost v izobraževanju in raziskavah na področju informacijskega modeliranja stavb.

K uspehu prispevajo vsi, odlični študenti, zaposleni fakultete, industrijski partnerji in podporniki, hvala vsem za predanost in prispevke k uspehu evropskega magistrskega študija informacijskega modeliranja zgradb (BIM A+). Skupaj bomo še naprej oblikovali prihodnost izobraževanja in inovacij BIM v svetovnem merilu.

The European Master in Building Information Modelling (BIM A+) has maintained its status as one of the world's leading BIM study programs. Throughout the academic year, significant strides have been made in various aspects, solidifying our position as a premier educational in this field.

We are proud to report that in the past academic 30 students not only from Europe but also from North and South Americas, Africa, the Middle East, and the Far East, successfully obtained a double master's degree from the University of Ljubljana and University of Minho or Politecnico Milano. This diverse cohort exemplifies the program's international appeal and underscores its global recognition.

Our commitment to fostering collaboration with industry partners has been unwavering. We have seen a notable increase in the number of invited lectures delivered by leading practitioners from the industry. These engagements have provided our students with invaluable insights and real world perspectives, enriching their educational experience. Furthermore, our collaboration with industry stakeholders on thesis works has yielded exceptional results. Several outstanding thesis projects have emerged from these partnerships, demonstrating the practical relevance of BIM and applicability of our students' research endeavours.

As we look ahead, we remain dedicated to further enhancing the quality and relevance of our program. Building upon the successes of the past years, we aim to deepen our industry ties, expand our global reach, and continue delivering excellence in education and research within the field of Building Information Modelling.

We express our gratitude to all our stakeholders, including students, faculty members, industry partners, and supporters, for their continued commitment and contributions to the success of the European Master in Building Information Modelling (BIM A+). Together, we will continue to shape the future of BIM education and innovation on a global scale.

ERASMUS MUNDUS MAGISTRSKI ŠTUDIJSKI PROGRAM: VODARSTVO IN OKOLJSKO INŽENIRSTVO – MODUL: POPLAVE IN UPRAVLJANJE Z VODAMI ERASMUS MUNDUS MASTER STUDY PROGRAMME WATER SCIENCE AND ENVIRONMENTAL ENGINEERING – MODUL: FLOOD RISK MANAGEMENT (FRM)

FRM UL KOORDINATOR FRM UL COORDINATOR
izr. prof. dr. **Simon Rusjan**

Erasmus Mundus magistrski program Poplave in upravljanje z vodami (Flood Risk Management - FRM) je prestižen, interdisciplinaren magistrski študij, namenjen usposabljanju študentov za znanstvene, tehnične in upravljavske izzive, povezane s poplavami v času podnebnih sprememb. Program izvajajo vodilne evropske institucije: UNESCO-IHE Institute for Water Education (Nizozemska), Tehniška univerza v Dresdnu (Nemčija), Barcelona Tech (UPC) (Španija) in Univerza v Ljubljani (Slovenija).

Dvoletni študij združuje teoretične osnove in praktične aplikacije. V prvem semestru na TU Dresden študenti pridobijo temeljna znanja iz klimatologije, hidrologije in upravljanja s poplavami, z izbirnimi predmeti iz ekologije, tal in hidravličnega inženirstva. Drugi semester na IHE Delft se osredotoča na hidroinformatiko, modeliranje poplav, podporne sisteme odločanja in uporabo umetne inteligence v vodnem gospodarstvu. Tretji semester poteka deloma na UPC v Španiji (obalne poplave, tokovi naplavin, radarsko napovedovanje) in deloma na Univerzi v Ljubljani (prostorsko načrtovanje in družbeno-ekonomske ocene ukrepov za zaščito pred poplavami). Koordinator študija na Univerzi v Ljubljani je izr. prof. dr. Simon Rusjan.

Zadnji semester je namenjen magistrski nalogi, ki jo študenti pogosto izvajajo v sodelovanju z akademskimi ali industrijskimi partnerji. Tematike vključujejo načrtovanje poplavno odpornih mest, napovedno upravljanje zajezitev, oceno družbenih vplivov in zelene infrastrukture. Diplomanti prejmejo magistrske listine, ki jih podelijo sodelujoče institucije, kar odraža integrirano in interdisciplinarno naravo programa. Diplomanti pridobijo kompetence za celostno analizo poplavne ogroženosti, modeliranje, načrtovanje politik in sodelovanje z deležniki, kar jih pripravi na uspešno kariero v vodnem gospodarstvu, raziskavah in oblikovanju politik na področju poplavne problematike.

Predmetnik študijskega programa na UL je vključen v opis magistrskega študija Vodarstvo in okoljsko inženirstvo (modul Poplave in upravljanje z vodami).

The Erasmus Mundus Master Programme in Flood Risk Management (FRM) is a prestigious, interdisciplinary MSc programme designed to equip students with the scientific, technical, and managerial skills necessary to address the complex challenges of flood risk in a changing climate. The programme is jointly delivered by a consortium of leading European institutions: UNESCO-IHE Institute for Water Education (The Netherlands), Technical University of Dresden (Germany), Barcelona Tech (UPC) (Spain), and the University of Ljubljana (Slovenia).

Structured over two years, the curriculum integrates theoretical foundations with practical applications. In the first semester at TU Dresden, students gain core knowledge in climatology, hydrology, and flood risk management, with electives in ecology, soils, and hydraulic engineering. The second semester at IHE Delft focuses on hydroinformatics, flood modelling, decision support systems, and AI applications in water systems. The third semester is split between UPC in Spain—covering coastal flooding, debris flows, and radar forecasting—and the University of Ljubljana, where students explore spatial planning and socio-economic assessments of flood protection. The coordinator of the study programme at the University of Ljubljana is Assoc. prof. Simon Rusjan.

The last semester is dedicated to the master's thesis, which students often carry out in collaboration with academic or industrial partners. Topics include flood resilient urban design, predictive management of hydraulic structures, social impact assessment and green infrastructure. Graduates of the programme receive joint MSc degrees from these partner institutions, reflecting the integrated and interdisciplinary nature of the curriculum. Graduates emerge with competencies in integrated flood risk analysis, modelling, policy planning, and stakeholder engagement, preparing them for impactful careers in water management, research, and policy-making worldwide.

The curriculum of the study program at the University of Ljubljana is included in the description of the master's study program in Water Science and Environmental Engineering (module Floods Risk Management).

MAGISTRSKI ŠTUDIJSKI PROGRAM: VODARSTVO IN OKOLJSKO INŽENIRSTVO – SODELOVANJE V OKVIRU DVOJNE DIPLOME Z UNICAL IN ZHAW MASTER STUDY PROGRAMME: WATER SCIENCE AND ENVIRONMENTAL ENGINEERING – DOUBLE DEGREE COOPERATION WITH UNICAL IN ZHAW

KOORDINATOR UNICAL IN ZHAW UNICAL AND ZHAW COORDINATOR

prof. dr. **Dušan Žagar**

Študij v okviru dvojne diplome je možnost, s katero je mogoče pridobiti certifikat o zaključku drugostopenjskega magistrskega študija na dveh univerzah, ki imata sklenjen sporazum. Gre za navzkrižno priznavanje kompetenc dveh študijskih programov, pri čemer študent opravi najmanj 30 KT na tuji univerzi in magistrsko nalogo v somentorstvu pedagogov z domače in tuje univerze.

Fakulteta za gradbeništvo in geodezijo Univerze v Ljubljani ima sklenjena sporazuma o dvojni diplomi z Univerzo v Kalabriji (Università della Calabria, UNICAL) in Univerzo v Zürichu (Zürscher Hochschule für angewandte Wissenschaften, ZHAW). Izmenjava poteka med magistrskim študijskim programom Vodarstvo in okoljsko inženirstvo ter magistrskima programoma Environmental and Territorial Safety Engineering na UNICAL od leta 2018, in Environment and Natural Resources na ZHAW od leta 2017. Glede na stopnjo sorodnosti med programoma je predmetnik, ki ga ponudimo tujim študentom, lahko popolnoma enak predmetniku za naše študente ali prilagojen tako, da so ob koncu študija dosežene vse potrebne kompetence za priznavanje naziva magister inženir okoljskega gradbeništva na UL FGG oz. naziva, ki ga svojim diplomantom magistrskega študija ponuja tuja univerza. Študijski program UNICAL je vsebinsko in po kompetencah praktično enak programu Vodarstvo in okoljsko inženirstvo, zato je ob izmenjavi mogoče zamenjati domače predmete s tujimi tako, da za doseganje kompetenc ni potrebno opraviti predmetov v povečanem obsegu. Študenti ZHAW, katerih magistrski študij obsega le 90 KT, pa morajo opraviti dodatne obveznosti v obsegu 30 KT, od katerih mora biti določeno število KT inženirskih vsebin.

Študij v okviru dvojne diplome je, podobno kot druge oblike izmenjave, namenjen manjšemu številu študentov, ki se na tujo univerzo vpišejo po merilih za prehode in opravljajo obveznosti skupaj z redno vpisanimi študenti na študijskem programu. Doslej so dvojno diplomo z UNICAL uspešno zaključili trije študenti UL FGG, s ZHAW pa je bilo pri nas pet študentov, ki so prav tako uspešno dokončali dvojni študij in pridobili naslov magistra inženirja na obeh institucijah.

Študenti v anketah to vrsto študija ocenjujejo kot neprecenljivo izkušnjo z veliko dodano vrednostjo, saj pridobijo dva certifikata o zaključenem magistrskem študiju brez bistveno povečanega obsega študijskih obveznosti. Tovrstno sodelovanje je priložnost tudi za pedagoge, saj se ob sodelovanju pri mentorstvih rojevajo odlične ideje za nadaljnje znanstveno in strokovno sodelovanje.

A double degree programme enables students to obtain a certificate of completion of a second-cycle master's degree from two universities that have signed an agreement. This involves the mutual recognition of the competencies of two study programmes, whereby students complete at least 30 ECTS credits at a foreign university, as well as a master's thesis under the joint supervision of lecturers from their home and host universities.

The Faculty of Civil and Geodetic Engineering at the University of Ljubljana (UL FGG) has double degree agreements in place with the University of Calabria (UNICAL) and Zürich University of Applied Sciences (ZHAW). Since 2018, the exchange has taken place between the Water Science and Environmental Engineering master's programme at UL FGG and the Environmental and Territorial Safety Engineering master's programme at UNICAL. Since 2017, the exchange has also taken place between the Water Science and Environmental Engineering master's programme at UL FGG and the Environment and Natural Resources master's programme at ZHAW. Depending on the similarity between the programmes, the curriculum offered to foreign students may be identical to that offered to our students, or adapted so that they acquire all the necessary competencies for the Master of Environmental Civil Engineering title at UL FGG or the title offered by the foreign university to its graduates. The UNICAL programme is practically identical to the Water Management and Environmental Engineering programme in terms of content and competences, so it is possible to replace home courses with foreign ones without increasing the workload required to achieve the necessary competences. ZHAW students whose master's degree comprises only 90 ECTS credits must complete additional requirements worth 30 ECTS credits, a certain number of which must be in engineering courses.

Similar to other exchange programmes, the double degree programme is intended for a small number of students who enrol at a foreign university in accordance with the transfer criteria, alongside students who are enrolled on the programme as regular students. To date, three UL FGG students have successfully completed a double degree with UNICAL, and five ZHAW students have also successfully completed their double degree and obtained a Master of Science certificate from both institutions.

Students rate this type of study highly in surveys, considering it an invaluable experience that provides significant added value, as they obtain two certificates for completed master's studies without a substantial increase in their study obligations. This type of cooperation also provides opportunities for teachers, as mentoring can lead to excellent ideas for further scientific and professional collaboration.

OSTALE DEJAVNOSTI
OTHER ACTIVITIES

ŠTUDENTSKE ORGANIZACIJE STUDENT ORGANISATIONS

ŠTUDENTSKI SVET UL FGG

Študentski svet UL FGG (ŠS UL FGG) se je, kot najvišji predstavniški organ študentov na fakulteti, tudi v letu 2021 zavzemal za dobrobit študentov ter prispeval k študentom prijaznejšemu in kakovostnejšemu študiju. V skladu s svojimi pristojnostmi je ŠS UL FGG podajal mnenja o pedagoškem delu asistentov, višjih predavateljev, docentov in izrednih profesorjev, ki so zaprosili za izvolitev v pedagoške nazive. V letu 2021 smo podali tudi mnenje o kandidatih za dekana UL FGG.

Na podlagi zastavljene vizije delovanja smo poskušali trenja med pedagogi in študenti reševati z dialogom. Poudariti je treba izvrstno delo predstavnikov v Študentskem svetu UL, v študijskih odborih posameznih oddelkov fakultete, v komisijah in Senatu UL FGG, ki so aktivno zastopali interese študentov in na podlagi lastne pobude ter pobude svojih kolegov, uspeli doseči konkretne spremembe.

Za študente smo pripravili obrazec, prek katerega lahko anonimno oddajajo pritožbe, pohvale ali druge komentarje, ki zadevajo študente na UL FGG. Vsako leto ŠS UL FGG izvede izbor za »Pedagoga leta«. Nagrajenih je deset pedagogov, ki so se po mnenju študentov UL FGG najbolj izkazali.

Izpostavljali smo športno vzgojo kot pomemben sestavni del fakultetnih izobraževalnih programov, zagovarjali uvedbo obveznega predmeta na ravni Univerze v Ljubljani ter predlagali, da se opravljena redna športna dejavnost zabeleži kot priloga k diplomi.

Nadaljevali smo s koordinacijo študentskega tutorstva na fakulteti preko koordinatorja tutorjev.

Nadaljevalo se je sodelovanje s Kariernim centrom FGG pri pripravi dejavnosti, ki bi zanimale študente; med poglavitne sodijo »hitri zmenki« ter delavnice za pripravo CV-ja.

Na področju obštudijskih dejavnosti lahko izpostavimo prvovrstno sodelovanje z vsemi tremi društvi UL FGG. Močno smo okrepili sodelovanje z DŠG in SILAMI, kjer skupaj skrbimo za vedno nove

UL FGG STUDENT COUNCIL

The UL FGG Student Council is the highest student representative body at the Faculty. Also in 2021, it continued to advocate for the welfare of the students and contributed to a more student-friendly and high-quality study programmes. In accordance with its competences, the UL FGG Student Council gave opinions on the teaching activities of assistants, senior lecturers, assistant professors and associate professors who applied for election to teaching titles. In 2021, we also issued an opinion on the candidates for the position of the UL FGG Dean.

Based on the established vision of operation, we tried to resolve any friction between teachers and students through dialogue. The excellent work of the representatives in the UL Student Council, in the study committees of the individual faculty departments, in the commissions and in the UL FGG Senate, who actively represented the interests of the students and were able to achieve concrete changes through their own initiative and the initiative of their colleagues, should be emphasised.

We have also prepared a form for students to anonymously submit complaints, compliments or other comments concerning students at the UL FGG. Every year, the UL FGG Student Council conducts an election for »Teacher of the Year«. Ten teachers who, in the opinion of the UL FGG students, excel the most, are honoured.

We highlighted physical education as an important part of the educational programmes at the Faculty, advocated the introduction of a compulsory course at the level of the University of Ljubljana and proposed that regular physical activity be recorded in the Diploma Supplement.

We continued the coordination of student tutoring at the Faculty through the tutoring coordinator.

Cooperation with the UL FGG Career Centre continued in the preparation of activities of interest to students, the most important of which include »speed dating« and CV writing workshops.

In the area of extracurricular activities, we can highlight the first-class cooperation between all three societies represented

ideje in uspešno pomagamo pri realizaciji dogodkov.

V letu 2021 in 2022 smo zaradi odpovedi raznih dogodkov in projektov zaradi epidemije kljub temu skrbeli, da je pouk na daljavo potekal kakovostno, in sprotno odpravljali probleme, ki so se pojavljali. Dodatno smo skrbeli, da študentje niso bili diskriminirani ob obravnavanju vlog za podaljšanje statusa zaradi izrednih razmer.

Udeležili smo se mednarodne konference »KSG – Kongres studenta građevinarstva«, ki se je odvijala na Paliću v Srbiji, od 20. do 23. oktobra 2021. Konferenca je študentom ponudila priložnosti za mreženje in spoznavanje potencialnih delodajalcev ter sovrstnikov iz tujine, nam dala vpogled v domače in tuje primere dobrih praks ter v trende in novosti na področju gradbeništva. Vsekakor pa je bila to izkušnja, ki nam bo služila kot dobra popotnica pri gradnji kariere na področju gradbeništva in geodezije.

Okrepili smo tudi sodelovanje z društvom ITA (Slovensko društvo za podzemne gradnje), ki je organizator Mednarodne konference o predorih in podzemnih gradnjah. Zainteresiranim študentom fakultete je ŠS UL FGG financiral udeležbo na 13. Mednarodni konferenci, od 17. do 19. novembra 2021, in 14. Mednarodni konferenci, od 15. do 17. novembra 2022.

Udeležili smo se sejma BAUMA v Münchnu (24.–30. oktober 2022).

Sodelujemo in pomagamo pri organizaciji strokovnih ekskurzij, ki jih organizira podjetje DRI. Pridobili smo tudi promocijski material za ŠS. Dvakrat letno ŠS UL FGG izdaja revijo Študentski most. Predsedstvo ŠS UL FGG je sodelovalo tudi pri nekaterih drugih dejavnostih na UL FGG, kjer je bilo zaželeno naše mnenje.

Študentski svet Fakultete za gradbeništvo in geodezijo je na konstitutivni seji 21. 11. 2022 imenoval novo sestavo. Predsednik ŠS za leto 2022/23 je Nejc Tacer, podpredsednica Lucija Babij in tajnica Katja Jenko. Celotno vodstvo ŠS ter predstavniki ŠS v senatu, odborih in komisijah UL FGG so navedeni na povezavi https://www.fgg.uni-lj.si/studenti/studentski-svet-ul-fgg/

SILE FGG

Študentsko organizacijo Fakultete za gradbeništvo in geodezijo UL (ŠO FGG) vodi ekipa SILE FGG od leta 2014/15.

2021/22

V sodelovanju s profesorjem športne vzgoje, pred. dr. Alešem Goljo, smo leto 2021 začeli z organizacijo predlogov za planinske pohode. Študenti in zaposleni na fakulteti so se tako lahko udeležili 11 organiziranih pohodov.

Februarja 2021 smo izvedli Toast dan, marca smo za študente pripravili online kuharski tečaj, primeren za študentski žep.

Študentom smo omogočili brezplačne karte za tradicionalni dobrodelni dogodek v začetku maja, Wings for Life World Run,

at the UL FGG. We have greatly strengthened our cooperation with Society of Civil Engineering Students and SILE, where we are constantly working together on new ideas and successfully helping to organise events.

In 2021 and 2022, due to the cancellation of various events and projects as a result of the pandemic, we nevertheless ensured that distance learning took place at a high quality and that the problems that had arisen were resolved promptly. In addition, we ensured that students were not discriminated against when processing applications for the extension of their status due to exceptional circumstances.

We participated in the international conference "KSG - Congress of Civil Engineering Students", which took place in Palić, Serbia, October 20-23, 2021. The conference provided students with the opportunity to network and meet potential employers and colleagues from abroad and gave us insight into national and international examples of best practice, trends and innovations in the construction sector. In any case, it was an experience that will serve as a good guide as we build a career in civil engineering and geodesy.

We also strengthened our cooperation with the ITA (Slovenian Society for Underground Structures), which is the organiser of the International Conference on Tunnels and Underground Structures. For interested students of the Faculty, the UL FGG Student Council financed participation at the 13th International Conference from November 17 to 19, 2021 and the 14th International Conference, November 15-17, 2022.

We participated in the BAUMA fair in Munich (October 24-30, 2022).

We cooperate and assist in the organization of professional excursions organized by the company DRI. During the year, we also acquired promotional material for the Student Council. Twice per year the UL FGG Student Council issues the journal Študentski most (Students' Bridge). The Presidency of the UL FGG Student Council also participated in several other activities at the UL FGG where our opinion was sought.

The UL FGG Student Council appointed new members at its constitutive meeting on 21 Nov., 2022. For 2022/23 they are: President Nejc Tacer, Vice-President Lucija Babij and Secretary Katja Jenko. The full leadership of the Student Council, the representatives in the UL FGG Senate, boards and committees, are listed in the link https://www.fgg.uni-lj.si/studenti/studentski-svet-ul-fgg/

SILE FGG

The UL FGG Student Organisation has been managed by the team called SILE FGG since the academic year 2014/15.

2021/22

In cooperation with the teacher of Physical Education, Dr Aleš Golja, we started 2021 by organising proposals for mountain hikes. Students and employees of the faculty were able to participate in 11 organised hikes.

In February 2021 we organised Toast Day, in March we prepared an online cooking course for students suitable for students' wallets.

At the beginning of May, we gave out free tickets to students for

kjer smo se pridružili teku za tiste, ki tega ne morejo. Pokrili smo prijavnine študentov FGG. Junija smo za študente pripravili online predstavitev programov IDEA StatiCa in SCIA Engineer.

Proti koncu študijskega leta 2020/2021 smo se člani zbrali na delovnem dnevu v okviru Študentskega kampusa v Ljubljani, na katerem smo izvedli prijeten team building in izdelali načrt za študijsko leto 2021/2022. Pripravili smo tudi promocijski material, ki smo ga brucem razdelili v začetku oktobra.

Novembra 2021 je prišel čas, ko smo študente lahko povabili na dogodke v živo, ob upoštevanju vseh ukrepov in priporočil NIJZ zaradi epidemije covid-19: izvedli smo bowling v Klubu 300, ki je tradicionalno naš najbolj obiskani dogodek.

December smo popestrili z dogodkom Pub kviz na Študentskem kampusu v Ljubljani ter v sodelovanju z Leo in Lions klubom Ljubljana Tivoli organizirali Dobrodelni december. V okviru tega smo obdarovali tiste, ki to še posebej potrebujejo. Zbirali smo prostovoljne prispevke za socialno ogroženo tričlansko družino ter igrače za otroke v socialno ogroženih družinah in azilnih domovih, v avli fakultete pa smo ob piškotih, kavi in čaju za tričlansko družino zbrali 1000 evrov.

V marcu 2022 smo v sodelovanju s študentsko organizacijo Pedagoške fakultete organizirali poizpitno zabavo v klubu Square. Prav tako smo sofinancirali udeležbo 37 študentov na Gradbenijadi 2022, največjem zborovanju študentov gradbeništva s celotnega Balkana, tokrat v Paliću pri Subotici v Srbiji, maja 2022.

Pokrili smo vstopnine za plezalni center Bolder scena do konca študijskega leta 2021/2022 in organizirali skupinska plezanja.

2022/23

Leto 2022 je bilo volilno leto na Študentski organizaciji Univerze v Ljubljani (ŠOU L]). V oktobru je bilo na volitvah izvoljeno novo vodstvo študentske organizacije SILE, njen novi predsednik je postal predsednik Kevin Mekicar. Pod njegovim vodstvom smo organizirali raznolike dogodke.

Oktobra smo veliko delali na promociji organizacije (razdeljevanje promo materiala, npr. geotrikotnikov, kemičnih svinčnikov), predvsem med bruci v luči prihajajočih se volitev, ter organizirali brucovanje v klubu Cirkus.

Prvič smo organizirali okroglo mizo »How to 1. letnik«, kjer so študenti višjih letnikov vseh smeri na FGG brucem delili uporabne informacije glede študija.

Novembra smo izvedli tradicionalni toast dan ter bowling v Woop centru, ki je bil razprodan v le nekaj urah – na dogodku se je družilo več kot 150 študentov FGG.

Decembra smo izvedli tradicionalne dobrodelne dogodke, kjer smo vsako sredo delili čaje, kave, toaste, domače piškote in hot doge v zameno za dobrodelne prispevke. Vsi zbrani prispevki so bili nakazani projektu Veriga dobrih ljudi, ZPM Moste Ljubljana.

the traditional Wings for Life World Run charity event, in which we ran for those who were unable to take part.

In June, we prepared an online presentation of the IDEA StatiCa and SCIA Engineer programmes for students.

Towards the end of the academic year 2020/2021, the members met for a working day within the student campus in Ljubljana, where we had a pleasant team building and prepared a plan for the academic year 2021/2022. We also prepared promotional material, which we distributed to first-year students at the beginning of October.

In November 2021, the time had come for us to invite students to live events, taking into account all NIJZ measures and recommendations due to the Covid-19 epidemic: we organised bowling at Klub 300, which is traditionally our most visited event.

We brightened up December with the Pub Quiz event at the student campus in Ljubljana and organized Charity December in cooperation with the Leo and Lions Club Ljubljana Tivoli. In this context, we distributed gifts to those most in need. We collected voluntary donations for a socially disadvantaged family of three, as well as toys for children in socially disadvantaged families and asylum homes, and in the faculty hall we sold cookies, coffee and tea and collected 1000 euros for the family of three.

In March 2022, we organised a post-exam party at the Square Club in collaboration with the student organization of the Faculty of Education. We also co-financed the participation of 37 students in Gradbenijada 2022, the largest gathering of construction students from across the Balkans, this time in May 2022 in Palić near Subotica, Serbia.

We paid the entrance fees for the Bolder scena climbing centre until the end of the academic year 2021/2022 and organized group climbing sessions.

2022/23

2022 was an election year for the Student Organization of the University of Ljubljana. In October, a new leadership of the student organization SILE was elected, and Kevin Mekicar became its new president. Under his leadership, we organised various events.

In October, we worked a lot on the promotion of the organization (distribution of promotional material, e.g. geotriangles, pens), especially among freshmen in view of the upcoming elections, and organized a freshmen party at the Cirkus Club.

For the first time, we organised a round table »How to 1st year«, at which students from the senior years of all study programmes at FGG shared useful information with first-year students about the studies.

In November, we held the traditional Toast Day and bowling at the Woop Centre, which was sold out within a few hours – more than 150 FGG students took part in the event.

In December, we held our traditional charity events, where every Wednesday we distributed tea, coffee, toast, homemade

Decembra smo organizirali tudi trenirka dan, kjer smo denarno nagradili najbolj izvirno oblečenega študenta.

Poleg tega smo ponovno zagnali projekt SILE plezajo v plezalnem centru, kjer smo vnaprej zakupili brezplačne obiske za študente.

Konec leta smo nabavili več kot 300 blokov A4 listov, ki jih študenti potrebujejo na vajah določenih predmetov na 1. stopnji študija. Za motivacijo članov in boljše sodelovanje v novem letu smo organizirali tudi zaključno večerjo.

Celotno zimo smo popestrili s Hot dog dnevi, na katerih smo študentom ponujali sveže in okusne hot doge, kar je prineslo tudi priložnost za sproščeno druženje. Toast dan je popestril februar, redne Silno dobrodelne srede pa so omogočile študentom sodelovanje v različnih dobrodelnih aktivnostih.

Omenjeni dogodki so krepili duh sodelovanja in povezanosti med študenti ter gradili fakultetni ponos. Ob koncu leta se z zahvalo oziramo na te uspešne dogodke. Študentska organizacija FGG ostaja zavezana ustvarjanju pozitivnega okolja za učenje in gradnji trajnih vezi med študenti FGG. V prihodnosti bomo s tem pristopom nadaljevali in ustvarjali nepozabne trenutke za študentsko skupnost FGG.

DRUŠTVO ŠTUDENTOV VODARSTVA

Nepogrešljivi del vodarske hiše na Hajdrihovi 28 je Društvo študentov vodarstva (DŠV), ki je bilo ustanovljeno leta 2012.

V letu 2021 je društvo prvič po enoletnem premoru zaradi epidemije covid lahko sklicalo redno sejo. Izvoljeno je bilo novo vodstvo, ki se je prvič soočilo z vodenjem društva pod pritiskom protikoronskih ukrepov.

Enega od julijskih dni smo uspešno izkoristili za vodarski piknik, na katerem se je spoznalo več vodarskih generacij. Oktobra smo s toplim prigrizkom v avli Oddelka za okoljsko gradbeništvo izvedli pozdrav brucem vodarjem, decembra pa s toplim čajem in piškoti vodarje pospremili v božične praznike. Za konec leta smo se še odločili razpisati natečaj za nove društvene puloverje.

Zavedamo se, da je v slogi moč, zato nas veseli, da ostajamo povezani tudi z drugimi društvi (DŠG, DŠGS, SILE FGG), s katerimi želimo še naprej sodelovati pri organizaciji skupnih tečajev in strokovnih predavanj.

V letu 2022 je Društvo študentov vodarstva obeležilo svojo 10. obletnico delovanja. S tem smo stavbo na Hajdrihovi 28 popestrili z novimi puloverji, ki jih študenti vodarstva z veseljem oblečejo še po končanem študiju. Občutek pripadnosti je pomembna potreba, za katero smo v preteklem letu dobro poskrbeli. Marca smo organizirali bowling vodarjev. Maja smo izvedli redno sejo zbora članov in jo nadgradili s pohodom na Lubnik. Da bi vodarje lepo pospremili v izpitno obdobje, smo junija organizirali piknik ob Gradaščici, kjer smo vezi spletali ne le med študenti, temveč tudi s profesorji.

cookies and hot dogs in exchange for donations; all donations collected were transferred to the Chain of Good People project, ZPM Moste Ljubljana.

In December, we also organised a Tracksuit Day, where we rewarded the most originally dressed student with a cash prize.

We also resumed the SILE Climbing Project at the climbing centre, where we pre-booked free visits for the students.

At the end of the year, we bought more than 300 pads of A4 paper for the students to take notes in the first-study cycle courses. To motivate the members and improve cooperation in the new year, we also organised a closing dinner.

We brightened up the entire winter with Hot Dog Days, offering students fresh and delicious hot dogs, which also provided an opportunity for a relaxed get-together. The Toast Day brightened up February and the regular Charity Wednesdays of SILE offered students the chance to take part in various charitable activities.

The events strengthened the spirit of collaboration and connectedness between students and fostered faculty pride. At the end of the year, we look back on these successful events with gratitude. The UL FGG student organization remains committed to creating a positive learning environment and building lasting bonds among FGG students. In the future, we will continue this approach and create memorable moments for the FGG student community.

SOCIETY OF WATER SCIENCE STUDENTS

The Society of Water Science Students, founded in 2012, is an indispensable part of the Water Science House at Hajdrihova street 28.

In 2021, the Society was able to convene a regular meeting for the first time after a one-year hiatus caused by the Covid epidemic. A new leadership was elected, which faced up to the pressure of the anti-corona measures for the first time.

We successfully used one of the days in July for a water science picnic, where several generations of water science students got to know each other. In October, we organised a welcome for the freshmen of water science study with a warm snack in the lobby of the Department of Environmental Civil Engineering, and in December we offered them hot tea and cookies as a welcome to Christmas holidays. At the end of the year, we decided to hold a competition for new Society's sweaters.

We are aware that power lies in standing united, so we are happy to stay connected with other societies (Civil Engineering, Geodesy, SILE FGG), with whom we want to continue organising joint courses and professional lectures.

In 2022, the Society of Water Science Students celebrated its 10th anniversary. In this context, we embellished the building at Hajdrihova 28 with new sweaters that the water science students are happy to wear even after graduation. A sense of belonging is an important need that we have provided for well over the past year. In March, we organised a bowling event for water science students. In May, we held a regular meeting of the Society members and coupled it with a hike to Lubnik. In

Novo šolsko leto smo začeli aktivno, številni študenti so v začetku oktobra prvič doživeli tradicionalni Mišičev vodarski dan v Mariboru, ki je bil nujen za dodaten zagon v vodarski hiši. Istega meseca smo krstili nove vodarje in v društvo vpisali nove člane. Ponosni smo na uspešno povezovanje z Društvom študentov gradbeništva, kjer so tudi naš člani pomagali pri organizaciji Kariernega dne, ki je študentom ponudil nove priložnosti za zaposlitev in številna poznanstva. Decembra se je nekaj vodarjev pomudilo v Pivovarni Union na vodenem ogledu muzeja in proizvodnje. Hajdrihova je pred zimskimi prazniki zadišala po božičnem domačem pecivu, a ta čas za nekaj članov društva ni predstavljal oddiha, saj so se začele intenzivne priprave na ekskurzijo DŠV na Češko.

V letu 2023 je Društvo študentov vodarstva obeležila zamenjava vodstva. S tem smo novim študentom omogočili priložnost spoznavanja delovanja društva kot oblike civilnodružbenega združevanja oziroma izražanja njihovega osebnega interesa in želje po udejstvovanju v vodarsko-družbenem življenju.

Občutek po pripadnosti je pomembna potreba, za kar smo v preteklem letu dobro poskrbeli. Marca je društvo po dolgem premoru organiziralo strokovno ekskurzijo na Češko, kjer smo poleg vsebin, vezanih na našo stroko, spoznali tudi druge študente naše fakultete in tako poskrbeli za povezovanje med gradbenimi smermi. Aprila smo organizirali tradicionalni bowling in s tem poskrbeli za športno udejstvovanje naših članov. Že tradicionalno pa smo za sproščeno popotnico v izpitno obdobje junija organiziral piknik vodarjev ob fakultetni stavbi na Hajdrihovi.

DRUŠTVO ŠTUDENTOV GEODEZIJE SLOVENIJE (DŠGS)

Po premoru zaradi epidemije covid je v preteklem študijskem letu na Fakulteti za gradbeništvo in geodezijo znova zaživelo Društvo študentov geodezije Slovenije. Vodstvo društva se je zavzemalo za pripravo in izvedbo različnih dogodkov, ki so pripomogli k strokovnemu izpopolnjevanju in grajenju skupnosti med študenti geodezije. Niz dogodkov vsako leto otvorimo s tradicionalnim geodetskim brucovanjem, v okviru katerega bruce pospremimo skozi neformalno iniciacijo, s čimer postanejo pravi študentje.

Društvo študentov geodezije Slovenije je v marcu organiziralo strokovno ekskurzijo v München. Ogledali smo si Tehniško univerzo v Münchnu in spoznali tamkajšnje študente geodezije, ki so nam predstavili celotno katedro za geodezijo in potek študija. Poleg omenjene fakultete smo si ogledali tudi Deutsches Museum in svoje večere popestrili v tradicionalnih nemških pivnicah ob družbi študentov geodezije iz različnih držav.

Poleg tega smo v sklopu društva, z željo po spoznanju stroke in tudi z vidika dela v praksi, v marcu organizirali okroglo mizo z delodajalci. Okrogle mize so se udeležili predstavniki podjetja Dobrovita, Flycom Technologies in DFG Consulting, ki so nam z veseljem odgovorili na naša vprašanja o stroki in poklicu geodeta nasploh.

order to give the students a positive start to the exam period, we organised a picnic at the Gradaščica in June, where we not only bonded with other students, but also with the teachers.

We got the new school year off to an active start, with many students experiencing the traditional Mišič Water Day in Maribor for the first time at the beginning of October, which gave the Water Science House an extra boost. That same month, we initiated new leaders and accepted new members into the Society. We are proud of the successful cooperation with the Society of Civil Engineering Students, where our members also helped organise the Career Day, which provided students with new job opportunities and many new acquaintances. In December, a few water science students took part in a guided tour of the Pivovarna Union with its museum and production line. Before the winter holidays, Hajdrihova smelled of home-baked Christmas cookies, but that did not mean a break for some members of the Society, as preparations for the professional excursion to the Czech Republic were in full swing.

2023 was marked by a change in the Society's management. This gave the new students the opportunity to learn about the functioning of the Society as a form of civil society that unites people, or their personal interest and desire to get involved in the social life of the water science profession.

A sense of belonging is an important need that we have provided for well over the past year. In March, after a long break, the Society organised a professional excursion to the Czech Republic, where we got to know other students from our faculty in addition to the professional content, thus ensuring the connection between the different civil engineering disciplines. In April, we organised a traditional bowling match to ensure the sporting participation of our members. Traditionally, we organised a picnic for water science students next to the faculty building at Hajdrihova to ease the transition to the exam period in June.

SOCIETY OF GEODESY STUDENTS OF SLOVENIA

After an interruption due to the Covid epidemic, in the last academic year the Society of Geodesy Students of Slovenia was re-launched at the Faculty of Civil and Geodetic Engineering. The leadership of the Society was committed to the preparation and implementation of various events that contributed to professional improvement and community building among geodesy students. Every year, a series of events opens with a traditional surveying ceremony for the first-year students, during which the freshmen are guided through an informal initiation process that turns them into real students.

In March, the Society of Geodesy Students of Slovenia organised a professional excursion to Munich. We visited the Technical University of Munich and met the geodesy students there, who introduced us to the entire Department of Geodesy and the study programme. We also visited the Deutsches Museum and spent our evenings in traditional German pubs in the company of geodesy students from different countries.

In addition, in March we organized a round table with employers to get to know the profession and the work in practice. The round table was attended by representatives from the companies Dobrovita, Flycom Technologies and DFG Consulting, who were happy to answer our questions about the profession and geodesy

V mesecu maju je društvo za sprostitev pred izpitnim obdobjem organiziralo geodetske karaoke, konec izpitnega obdobja pa smo člani društva zabeležili s pohodom na Krim.

V študijskem letu 2021/2022 je bil predsednik DŠGS Jernej Glavič, od leta 2022/2023 pa je predsednica Maja Filač.

DRUŠTVO ŠTUDENTOV GRADBENIŠTVA UL FGG

Društvo študentov gradbeništva UL FGG (DŠG UL FGG) deluje že od leta 2008 in združuje študente tako univerzitetne kot visokošolske smeri gradbeništva.

Najpomembnejše poslanstvo društva je, da z organizacijo najrazličnejših strokovnih ekskurzij, predavanj in različnih srečanj omogoča študentom gradbeništva, da pridobljeno teoretično znanje oplemenitijo s praktičnimi izkušnjami. Pomembna naloga Društva je tudi organizacija družabnih dogodkov, saj je na ta način najlaže ohranjati medsebojno povezanost študentov gradbeništva. Zaradi epidemije pa je bilo treba naše cilje prilagoditi. Družabni dogodki, predavanja in izobraževanja so se morali preseliti na splet, potovanja in ekskurzije smo žal morali preložiti na čas po epidemiji.

V letu 2021 smo organizirali on-line strokovna tečaja Autodesk Autocad in Excel ter eno izvedbo strokovnega tečaja Revit v poletnem semestru in eno izvedbo v zimskem semestru za vse študente naše fakultete. Tečaje smo izvedli v sodelovanju s SILAMI FGG, z Društvom študentov vodarstva (DŠV) ter Društvom študentov geodezije Slovenije (DŠGS). Tečaje so izvajali predstavniki podjetja CGS plus d.o.o. Predsednik društva je bil Savin Kotnik.

Društvo študentov gradbeništva UL FGG je v letih 2022 in 2023 doživelo preporod po obdobju pandemije. V tem času ga je prevzela Katja Jenko skupaj z zavzetimi študenti, združeni v skupni cilj podpirati, sodelovati in neformalno izobraževati študente gradbeništva. V oktobru 2022 smo uspešno izvedli projekt Karierni dan in ga v letu 2023 ponovili. Ta inovativni dogodek je vključeval predavanja, okrogle mize za študente ter hitre zmenke, kjer so se študentje lahko hitro povezali s predstavniki podjetij. Projekt je bil izjemno dobro sprejet in uspešen.

V obeh letih smo študente gradbeništva aktivno vključevali v mednarodno tekmovanje Gradbenijada. Ta večdnevni dogodek združuje gradbene fakultete v znanju in športu. Naša ekipa je bila uspešna, osvojili smo več nagrad ter poglobili mednarodno mreženje.

Obiskali smo več kot 20 gradbišč ter vzpostavili stike z več kot 30 fakultetami iz Evrope.

V teh dveh letih smo aktivno sodelovali na domačih in tujih konferencah ter tekmovanjih, kjer smo zavzeto predstavljali našo fakulteto in univerzo. Naš trud je bil nagrajen z ugledom in pozitivnimi odzivi. S tem smo dodali pomemben kamenček v mozaik razvoja Društva študentov gradbeništva UL FGG ter študentske skupnosti na splošno.

Vodstvo Društva študentov gradbeništva UL FGG od maja 2023:

— Emil Ikanović, predsednik
— Zaim Benjamin Šehović, podpredsednik
— Katja Jenko, tajnica

Družbena omrežja:

— LinkedIn: https://www.linkedin.com/company/dru%C5%A1tvo-%C5%A1tudentov-gradbeni%C5%A1tva-ul-fgg/

— Instagram: https://www.instagram.com/dsg_fgg?igsh=MzRlODBiNWFlZA==

in general.

In May, the Society organised geodetic karaoke to relax before the exam period. The Society members celebrated the end of the exam period with a hiking trip to Krim.

In the academic year 2021/2022 the Society's president was Jernej Glavič, and since 2022/2023 the president has been Maja Filač.

UL FGG SOCIETY OF CIVIL ENGINEERING STUDENTS

The UL FGG Society of Civil Engineering Students has been active since 2008 and unites students of the academic as well as higher education studies.

The UL FGG Society of Civil Engineering Students has been active since 2008 and unites students of the academic as well as higher education studies.

The most important mission of the Society is to give civil engineering students the opportunity to enrich their acquired theoretical knowledge through practical experience by organizing a wide variety of professional excursions, lectures and various meetings. An important task of the Society is also the organization of social events, as this is the easiest way to maintain the mutual connection of the construction students. Due to the epidemic, it was necessary to adjust our goals. Social events, lectures and training courses had to be moved online, and excursions and field trips unfortunately had to be postponed until after the epidemic.

In 2021, we organized online courses for Autodesk Autocad and Excel as well as a Revit professional course in the summer semester and one in the winter semester for all students of our faculty. The courses were organised in cooperation with SILE FGG, the Society of Water Science Students, and the Society of Geodesy Students of Slovenia. The courses were held by representatives of the company CGS plus d.o.o. The president of the association was Savin Kotnik.

In 2022 and 2023, the UL FGG Society of Civil Engineering Students experienced an upswing after the pandemic. During this time, it was taken over by Katja Jenko together with dedicated students who share the common goal of supporting, working with and informally teaching civil engineering students. In October 2022, we successfully implemented the Career Day project and repeated it in 2023. This innovative event included lectures, round tables for students and speed dating, where they could quickly make contact with company representatives. The project was extremely well received and successful.

In both years, we actively involved civil engineering students in the Gradbenijada international competition. This multi-day event brings together construction faculties in knowledge and sport. Our team was successful, we won several prizes and deepened our international networking.

We visited more than 20 construction sites and established contacts with more than 30 faculties from Europe.

During these two years, we actively participated in national and international conferences and competitions, where we represented our faculty and university with enthusiasm. Our efforts were rewarded with reputation and positive reactions.

With this, we added an important piece to the mosaic in the development of the UL FGG Society of Civil Engineering Students and the student community in general.

Leadership of the UL FGG Society of Civil Engineering Students since May 2023:

— Emil Ikanović, President
— Zaim Benjamin Šehović, Vice-President
— Katja Jenko, Secretary

Social media:

— LinkedIn: https://www.linkedin.com/company/dru%C5%A1tvo-%C5%A1tudentov-gradbeni%C5%A1tva-ul-fgg/

— Instagram: https://www.instagram.com/dsg_fgg?igsh=MzRlODBiNWFlZA==

SLUŽBA ZA MEDNARODNO IN RAZISKOVALNO DEJAVNOST OFFICE OF INTERNATIONAL AND RESEARCH ACTIVITY

KADER PERSONNEL

PRODEKAN ZA RAZISKOVALNO IN MEDNARODNO PODROČJE
VICE-DEAN FOR RESEARCH AND INTERNATIONAL ACTIVITY
prof. dr. **Matjaž Dolšek**

VODJA SLUŽBE ZA MEDNARODNO IN RAZISKOVALNO DEJAVNOST HEAD OF THE OFFICE OF INTERNATIONAL AND RESEARCH ACTIVITY
Romana Hudin

SODELAVCA ASSOCIATES
Tine Štebe, Mojca Vilfan

Služba za mednarodno in raziskovalno dejavnost je aktivna na naslednjih delovnih področjih:

— Erasmus+,
— Erasmus Mundus,
— dvojne diplome,
— mobilnost osebja,
— nacionalni raziskovalni programi in
— projekti Evropski projekti.

Služba aktivno sodeluje s pedagogi, raziskovalci, podpornimi službami in študenti vseh stopenj v zasledovanju glavnih ciljev s področja internacionalizacije, spodbujanja raziskovalnega in razvojnega dela fakultete.

Službo za mednarodno in raziskovalno dejavnost vodi Romana Hudin, ki je zadolžena predvsem za vse oblike mednarodnih izmenjav, sodelavec Tine Štebe skrbi za evropske projekte, sodelavka Mojca Vilfan pa pokriva nacionalne raziskovalne programe in projekte.

Mednarodne izmenjave na Fakulteti za gradbeništvo in geodezijo se izvajajo v obliki izmenjav študentov, učiteljev, raziskovalcev in podpornega osebja. Mednarodne izmenjave v obe smeri (v tujino in iz tujine) potekajo v največji meri pod okriljem programa Erasmus+. V okviru tega programa sodelujemo s približno 40 partnerskimi univerzami, kar nudi možnost izmenjave za okoli 70 študentov letno. Pri dohodnih študentih smo že vrsto let blizu tej številki, žal pa zaostajamo pri pošiljanju domačih študentov v tujino. Največji padec števila odhodnih študentov je bil v času pandemije COVID-19, od leta 2022 dalje pa beležimo rast odhodov študentov v tujino.

Poleg tega vsako leto sprejmemo več kot 50 študentov v okviru dveh projektov Erasmus Mundus: BIM A+, ki se izvaja v okviru magistrskega študijskega programa Gradbeništvo, in Flood Risk Management, ki se izvaja v okviru magistrskega študijskega programa Vodarstvo in okoljsko gradbeništvo. V okviru slednjega potekata tudi aktivna programa dvojnih diplom, in sicer z Università della Calabria (Italija) in Zürcher Hochschule für angewandte Wissenschaften (Švica). To tako odhajajočim kot prihajajočim študentom omogoča izmenjavo vsaj en semester in pridobitev dvojnih diplom.

Tudi izmenjave na raziskovalnem področju so živahne, predvsem v sklopu bilateralnih znanstvenoraziskovalnih projektov, ki jih sofinancira Agencija za znanstvenoraziskovalno in inovacijsko dejavnost (ARIS).

Fakulteta izvaja raziskovalno dejavnost pod okriljem nacionalnega raziskovalnega programa Republike Slovenije, v različnih ostalih domačih raziskovalnih projektih in v drugih oblikah mednarodnega raziskovalnega sodelovanja, v skupnem evropskem raziskovalnem prostoru (ERA). Vsi aktivni projekti so predstavljeni na spletni strani UL FGG. S preko 80 raziskovalnimi programi in projekti beležimo v letu 2023 bistveno rast števila tako nacionalnih kot evropskih raziskovalnih projektov. Več raziskovalno-razvojnih projektov financira gospodarstvo.

Raziskovalci so bili v letih 2021-2023 vključeni v osmih nacionalnih raziskovalnih programov, vodili so 14 temeljnih ali aplikativnih raziskovalnih projektov, v še 13 pa so sodelovali kot partnerji. Poleg tega je bilo aktivnih 12 ciljnih raziskovalnih projektov in kar 40 evropskih projektov.

Služba za mednarodno in raziskovalni dejavnost raziskovalcem nudi administrativno podporo vse od faze prijave projektov do spremljanja izvedbe in finančnega poročanja.

The Office of International and Research Activity is active in the following areas:

— Erasmus+,
— Erasmus Mundus,
— double degrees,
— staff mobility,
— national research programs and projects,
— European projects.

The office actively cooperates with teaching staff, researchers, support services and students at all levels to pursue the main goals in internationalisation and the promotion of the faculty's research and development work.

The Office of International and Research Activity is headed by Romana Hudin, who is primarily responsible for all forms of international exchanges, while Tine Štebe is responsible for European projects and Mojca Vilfan for national research programmes and projects.

International exchanges at the Faculty of Civil and Geodetic Engineering are carried out in the form of exchanges of students, teaching staff, researchers and support staff. The international exchanges in both directions (to and from abroad) take place to a large extent within the framework of the Erasmus+ program. As part of this programme, we cooperate with about 40 partner universities, which offers the possibility of exchange for approximately 70 students annually. In terms of the number of incoming students, we have been close to this figure for many years, but unfortunately we are lagging behind when it comes to sending domestic students abroad. The biggest decline in the number of outgoing students was during the COVID-19 pandemic, but from 2022 onwards the numbers have been growing again.

In addition, we host more than 50 students each year in the framework of two Erasmus Mundus projects: BIM A+, which is carried out as part of the master study program Civil Engineering, and Flood Risk Management, which is carried out as part of the master study program Water Science and Environmental Engineering. As part of the latter, there are also two active double degree programs with Università della Calabria (Italy) and Zürcher Hochschule für angewandte Wissenschaften (Switzerland). This allows both outgoing and incoming students to exchange at least one semester and obtain double degrees.

Exchanges in the field of research are also lively, especially in the framework of bilateral scientific research projects co-financed by the Slovenian Research and Innovation Agency.

Faculty carries out research activities in the framework of the national research program of the Republic of Slovenia, in various other national research projects and in other forms of international research cooperation within the European Research Area (ERA). All active projects are presented on the UL FGG website. With a total of close to 80 programs and projects, we are recording a significant increase in the number of both national and European research projects in 2023.

In 2021-2023, researchers were involved in 8 national research programs, led 14 fundamental or applied research projects, and participated as partners in further 13 projects. In addition, a total of 40 European projects were active.

The Office of International and Research Activity provides administrative support for researchers, from the project proposal phase to assistance with administrative and financial reporting.

PROMOCIJSKE DEJAVNOSTI PROMOTION ACTIVITIES

KOORDINATOR COORDINATOR

PRODEKAN ZA ŠTUDNENTSKE ZADEVE VICE-DEAN FOR STUDENT AFFAIRS
doc.dr. **Klemen Kozmus Trajkovski**

Na Fakulteti za gradbeništvo in geodezijo se zavedamo, da so za dvig prepoznavnosti študija in fakultete ter za dvig ugleda inženirskih poklicev, za katere izobražujemo, pomembne tudi promocijske aktivnosti. Pri njih sodelujemo tako profesorji kot tudi študentje višjih letnikov.

Promocijske dejavnosti, ki jih izvajamo na fakulteti, so namenjene različnim ciljnim javnostim – osnovnošolcem in srednješolcem, splošni javnosti in strokovni javnosti.

Del promocijskih aktivnosti so tudi dogodki – večinoma jih organiziramo sami, pri nekaterih pa sodelujemo na povabilo organizatorjev. Tako smo v študijskem letu 2022/23 začeli sodelovanje s Tehniškim muzejem Slovenije v Bistri, kjer marca na Dnevih gradnje in okolja z zanimivimi eksperimenti in prikazi predstavljamo fakulteto ter poklice, za katere izobražujemo. Vsako leto sodelujemo tudi na Sejmu izobraževanja in poklicev Informativa ter organiziramo informativne dneve, na katerih za bodoče študente pripravimo prav poseben program.

V obeh študijskih letih je bila zelo lepo obiskana tudi poletna šola za osnovnošolce in srednješolce, ki jo vsako leto organiziramo v prvem julijskem tednu in za udeležence pripravimo številne zanimive in poučne dejavnosti.

Za osnovnošolce večkrat letno organiziramo tudi t. i. tehniški dan, na katerem jim z zanimivimi aktivnostmi in eksperimenti čim bolj približamo svet gradbeništva, geodezije in okoljskega inženirstva.

Redno smo prisotni tudi na prireditvi Zotkini talenti. Udeležujemo so raznih sejemskih prireditev, kot je npr. Megra v Murski Soboti.

Zaposleni in študenti redno obiskujejo srednje šole, kjer izvajajo tematska predavanja ali sodelujejo na t. i. kariernih dnevih.

Da bi se kar najbolj približali bodočim študentom, smo v študijskem letu 2022/23 pripravili kratke promocijske videe o naših študijskih programih. Videe smo objavili na vseh naših kanalih in jih predvajali tudi na različnih dogodkih.

Od 15. februarja do konca junija 2023 je na naši fakulteti gostovala razstava Vsak milimeter šteje – geodezija na Slovenskem skozi čas, ki prikazuje razvoj geodezije pri nas in pojasnjuje številne z geodezijo in kartografijo povezane pojme. Razstavo je pripravil Tehniški muzej Slovenije v sodelovanju z Geodetsko upravo RS, Zvezo geodetov

At the Faculty of Civil and Geodetic Engineering we are aware that promotional activities are also important in order to raise the profile of the study and the faculty, as well as the reputation of the engineering professions for which we train. Both teachers and senior students take part in this.

The promotional activities carried out at the faculty are aimed at various target groups – primary and secondary school students, the general public and professional public.

Events are also part of the promotional activities – we organize most of them ourselves, but we also participate in some at the invitation of the organizers. In the academic year 2022/23, we started a cooperation with the Technical Museum of Slovenia in Bistra. In March, we presented the specialist area and the professions for which we educate at the Construction and Environment Days with interesting experiments and demonstrations. Every year we also take part in the Informativa Education and Professions Fair and organise Information Days where we prepare a very special program for future students.

In both academic years, the summer school for primary and secondary school students, which is organized every year in the first week of July and offers many interesting and educational activities for the participants, was also very well attended.

Several times a year, we also organise the Technical Day for primary school pupils, where we introduce them to the world of civil engineering, geodesy and environmental engineering with interesting activities and experiments.

We are also regularly represented at the Zotka's Talents event. We take part in various trade fair events, such as Megra in Murska Sobota.

Our staff and students regularly visit secondary schools, where they give thematic lectures or take part in the career days.

In order to get as close as possible to future students, we have prepared short promotional videos about our study programs in the academic year 2022/23. We published the videos on all our channels and played them at various events.

From February 15 to the end of June 2023, our faculty hosted the exhibition Every Millimeter Counts – Geodesy in Slovenia through Time, which shows the development of geodesy in our country and explains many concepts related to geodesy and cartography. The exhibition was prepared by the Technical Museum of Slovenia in cooperation with the Geodetic Administration of the Republic of Slovenia, the Association of

Slovenije ter Oddelkom za geodezijo na Fakulteti za gradbeništvo in geodezijo UL.

V okviru obštudijskih dejavnosti študenti že od leta 2004 pripravljajo revijo Študentski most, ki izhaja v tiskani in elektronski obliki. Revija je namenjena informiranju študentov in širše javnosti o aktualnem dogajanju na FGG ter projektih s področja gradbeništva, geodezije in vodarstva. V reviji so zanimivi intervjuji s pedagogi, vtisi s študentskih potovanj, ekskurzij in tekmovanj ter prispevki študentov o mednarodnih izmenjavah.

Z različnimi aktivnostmi skrbimo, da se redno pojavljamo v različnih medijih – na tak način širšo javnost obveščamo o raziskovalnih dosežkih zaposlenih in študentov, podajamo strokovna mnenja in komentarje na aktualna dogajanja v povezavi z gradbeništvom, geodezijo in vodarstvom, predstavljamo uspešne karierne poti diplomantov UL FGG ter dogodke, ki smo jih organizirali na fakulteti. V študijskem letu 2022/23 so se na primer naši profesorji kot strokovnjaki veliko pojavljali v medijih ob katastrofalnih poplavah, ki so poleti prizadele Slovenijo.

Vse novosti, članke in medijske prispevke, kjer se pojavljamo, redno objavljamo tudi na spletni strani fakultete ter družbenih omrežjih. S študijskim letom 2021/22 smo poleg Facebooka aktivni tudi na Instagramu.

Surveyors of Slovenia and the Department of Geodesy at the Faculty of Civil and Geodetic Engineering of the University of Ljubljana.

As part of their extracurricular activities, the students have been producing the journal Študentski most (Students' Bridge) since 2004, which is published in printed and electronic form. The journal is intended to inform students and the general public about current events at FGG and projects in the fields of civil engineering, geodesy and water science. The magazine contains interesting interviews with teachers, impressions of field trips, excursions and competitions as well as articles by students about international exchanges.

Through various activities, we ensure that we regularly appear in various media – informing the general public about the research achievements of staff and students, providing expert opinions and comments on current events related to civil engineering, geodesy and water management, and presenting the successful career paths of UL FGG graduates and the faculty events we organise. In the academic year 2022/23, for example, our teachers appeared in the media as experts during the catastrophic floods that hit Slovenia in the summer.

All news, articles and media contributions in which we appear are also regularly published on the faculty's website and social networks. As of the academic year 2021/22 in addition to Facebook, we are also active on Instagram.

PEDAGOŠKA ENOTA ZA ŠPORTNO VZGOJO IN ŠPORT EDUCATIONAL UNIT FOR PHYSICAL EDUCATION AND SPORT

KADER PERSONNEL

pred. asist. dr. **Aleš Golja**, prof. šp. vzg.

ŠPORTNA VZGOJA

V študijskih letih 2021/22 in 2022/23 ja Pedagoška enota za športno vzgojo in šport na UL FGG ponudila študentom pet športnih programov, zaposlenim pa v okviru promocije zdravja raznovrstne oblike dejavnosti:

— športna vzgoja za 1. letnik (obštudijska dejavnost brez kreditnega ovrednotenja),
— športno rekreativna vadba za vse študente in zaposlene UL FGG,
— izbirni predmet Športna vzgoja (4 KT) na I. stopnji bolonjskega študija,
— izbirni predmet Športna vzgoja (3 KT) na II. stopnji bolonjskega študija,
— športna tekmovanja na UL (študenti in zaposleni).

Namen programa športne vzgoje kot obštudijske dejavnosti brez kreditnega ovrednotenja za 1. letnik je, da bi študentom že na začetku študija (v sodelovanju s ŠS in društvi FGG) omogočili prepoznati pomen telesne dejavnosti in razviti odnose z vrednotami zdravega načina življenja v času študija.

Športno rekreativne dejavnosti so namenjene vsem študentom in zaposlenim na UL FGG za vzdrževanje in izboljšanje psihofizične kondicije, pridobivanje dodatnih znanj in izkušenj, krepitev psihomotoričnih in funkcionalnih sposobnosti ter medsebojno druženje (širitev socialne mreže).

Študenti, ki so izbrali izbirni predmet Športna vzgoja, so v okviru teoretičnega dela pridobili osnovne informacije o delovanju človekovega telesa, njegovega gibalnega, srčno-žilnega in dihalnega sistema, metodah preverjanja in ugotavljanja stanja psihomotoričnih in funkcionalnih sposobnosti, o športno-gibalnih aktivnostih kot preventivni in kurativni dejavnosti za ohranjanje in utrjevanje zdravja, prehranjevanju in uravnavanju telesne teže ter drugih zdravstvenih vidikih športa.

Študenti so opravili svoje obveznosti pri urah športne vzgoje z obiskovanjem športnih dejavnosti v univerzitetnih športnih dvoranah (nogomet, košarka, odbojka), pri športnih igrah, aerobiki, badmintonu, družabnem plesu, individualnih športih (tek v naravi, plavanje v bazenu) ter z aktivnostmi v naravi (pohodništvo, smučanje, jadranje, veslanje, taborjenje, ipd.).

Študenti so imeli v dogovoru s posameznimi fakultetami UL (FS, BF, FFA, FF – izmenjava študentov) možnost izbire programa športnih dejavnosti, ki so potekale organizirano preko UL FGG skozi celo leto. V študijskem letu 2021/22 je bilo vpisanih v obštudijsko dejavnost Športna vzgoja za 1. letnike in športno rekreativne programe 426 študentov ter v izbirni program predmeta Športna vzgoja 82 redno vpisanih študentov I. in II. stopnje bolonjskega programa.

Izvedene športno rekreativne dejavnosti v naravi 2021/22:

Planinski pohod na Slivnico, Slavnik, Nanos, Veliko planino, Ratitovec, Čemšeniško planino, Mrzlico, Otliško okno in Sinji vrh, Limbarsko goro, Krim, Lovrenška jezera, Kamniško sedlo, Stol, Tamar; vsako soboto preko celega leta pohodi na Šmarno goro; alpsko smučanje vsak petek na Krvavcu; predbožični družabni ples v avli fakultete; štiridnevno alpsko smučanje v Italiji (Tre Valli); petdnevni tečaj alpskega smučanja v Kranjski Gori; kajakaški izlet po reki Krki; sedemdnevni športno rekreativni tabor Volarje (Tolmin).

Študentje in študentke UL FGG so v študijskem letu 2021/22 dosegli na ligaških tekmovanjih Univerze v Ljubljani naslednje odlične športne dosežke: 2. mesto študentov v košarkarski ligi; 5. –6. mesto študentov v odbojkarski ligi; 10. –11. mesto študentov v dvoranskem nogometu.

V študijskem letu 2022/23 je bilo vpisanih v obštudijsko dejavnost Športna vzgoja za 1. letnike in športno rekreativne programe 499 študentov in v izbirni program predmeta Športna vzgoja 89 redno vpisanih študentov I. in II. stopnje bolonjskega programa.

Izvedene športno rekreativne dejavnosti v naravi 2022/2023:

Planinski pohod na Limbarsko goro, Slivnico, Otliško okno in Sinji vrh, Nanos, Slavnik, Nordijska hoja in tek okoli Gradiškega jezera, nočni pohodi na Šmarno goro, Čemšeniško planino, Mrzlico, Veliko planino, Snežnik, Ratitovec, Krim, Kamniško sedlo; vsako soboto preko celega leta pohodi na Šmarno goro; alpsko smučanje vsak petek na Krvavcu; predbožični družabni ples v avli fakultete; štiridnevno alpsko smučanje v Italiji (Tre Valli); kajakaški izlet po reki Krki; štiridnevni tečaj jadranja; sedemdnevni športno rekreativni tabor Volarje (Tolmin).

Študentje in študentke UL FGG so v študijskem letu 2022/23 dosegli na ligaških tekmovanjih Univerze v Ljubljani naslednje odlične športne dosežke: 5.–8. mesto študentov v košarkarski ligi; 5.–6. mesto študentov v odbojkarski ligi; 14.–16. mesto študentov v dvoranskem nogometu.

PROMOCIJA ZDRAVJA ZA ZAPOSLENE

V okviru promocije zdravja pri delu z zaposlenimi na UL FGG smo v študijskem letu 2021/22 in 2022/23 izvedli naslednje aktivnosti in ukrepe za izboljšanje počutja na delovnem mestu: štiridnevni smučarski izlet; 1-krat tedensko po 1 uro plavanja v bazenu Tivoli;

PHYSICAL EDUCATION

In the academic years 2021/22 and 2022/23, the Educational unit for physical education and sport at the UL FGG offered students five sports programs and employees various forms of activities as part of health promotion:

— physical education for the first year (extracurricular activity without credit evaluation),
— sports and recreation for all UL FGG students and staff,
— elective course Sport Education (4 ECTS) at the 1st Bologna cycle,
— elective course Sport Education (3 KT) at the 2nd Bologna cycle,
— Sport competitions at UL (students and employees).

The purpose of the physical education programme as an extracurricular activity without credit evaluation for 1st year students is to enable students to recognise the importance of physical activity at the beginning of their studies and to develop relationships with the values of a healthy lifestyle during their studies (in cooperation with the Student Council and FGG societies).

Sports and recreational activities are intended for all UL FGG students and staff to maintain and improve their psychophysical condition, gain additional knowledge and experience, strengthen psychomotor and functional skills and socialize (broadening the social network).

Students who choose Sports Education as an elective course acquire basic information about the functioning of the human body, its locomotor, cardiovascular and respiratory systems, about methods for testing and determining the state of psychomotor and functional abilities, about sport and movement activities as preventive and curative activities for maintaining and consolidating health, about nutrition and weight regulation and other health aspects of sport.

Students fulfil their obligations in Sport Education by attending sports activities in the university's sports halls (football, basketball, volleyball), sports games, aerobics, badminton, ballroom dancing and individual sports (running outdoors, swimming in the pool) as well as outdoor activities (hiking, skiing, sailing, rowing, camping, etc.).

In agreement with individual faculties (Faculty of Mechanical Engineering, Biotechnical Faculty, Faculty of Pharmacy, Faculty of Arts – student exchange), students had the opportunity to choose a sports program organised by UL FGG throughout the year.

In the academic year 2021/22, 426 students were enrolled in the extracurricular physical education programme in the first year of study and in the sports and recreation programmes, as well as 82 regularly enrolled students of the first and second Bologna cycles.

2021/22 outdoor sport and recreational activities:

Hiking tours to Slivnica, Slavnik, Nanos, Velika planina, Ratitovec, Čemšeniška planina, Mrzlica, Otliško okno and Sinji vrh, Limbarska gora, Krim, Lovrenška jezera, Kamniško sedlo, Stol, Tamar; every Saturday, throughout the year, hiking tours to Šmarna gora; alpine skiing every Friday at Krvavec; pre-Christmas ball dance in the Faculty's main hall; four-day alpine skiing in Italy (Tre Valli); five-day skiing school in Kranjska Gora; kayaking on the river Krka; seven-day sport and recreation camp in Volarje (Tolmin).

In 2021/22, UL FGG students achieved the following outstanding sporting performances in the University of Ljubljana league competitions: 2nd place among students in the basketball league; 5th to 6th place among students in the volleyball league; 10th to 11th place among students in indoor football.

In the academic year 2022/23, 499 students were enrolled in the extracurricular physical education programme in the first year of study and in the sports and recreation programmes, and 89 regularly enrolled first and second-cycle Bologna students were enrolled in the elective programme of the Sport Education course.

2022/23 outdoor sport and recreational activities:

Hiking tours to Limbarska gora, Slivnica, Otliško okno and Sinji vrh, Nanos, Slavnik, nordic walking and running around Gradiško jezero, night hikes to Šmarna gora, Čemšeniška planina, Mrzlica, Velika planina, Snežnik, Ratitovec, Krim, Kamniško sedlo; every Saturday, throughout the year, hiking tours to Šmarna gora; alpine skiing every Friday at Krvavec; pre-Christmas ball dance in the Faculty's main hall; four-day alpine skiing in Italy (Tre Valli); kayaking on the river Krka; four-day sailing course; seven-day sport and recreation camp in Volarje (Tolmin).

In 2022/23, UL FGG students achieved the following outstanding sporting results in the University of Ljubljana league competitions: 5th to 8th the place for students in the basketball league; 5th to 6th place for students in the volleyball league; 14th to 16th place for students in indoor football.

HEALTH PROMOTION PROGRAMME FOR STAFF

As part of the health promotion programme for the UL FGG staff, the following activities and measures were implemented in the academic years 2021/22 and 2022/23 to improve well-

poletno jutranje plavanje v bazenu Kolezija; 1-krat tedensko po 1 uro igranja badmintona v Športnem centru Konex; 1-krat tedensko po 2 uri fitnesa v Športnem centru Konex; zimski športni dan (februar 2022 in 2023: Kranjska Gora – smučanje, tek na smučeh, pohod v Tamar; februar 2022: planinski pohod na Veliko planino); kajakaški izlet po reki Krki; poletni športni dan (junij 2022: pohod na Sabotin, Soška kolesarska pot in Goriška brda, adrenalinski park Solkan; junij 2023: aktivnosti v podzemlju Pece in okolici Jamnice 2023) ter športno rekreativne počitnice v Volarjih.

Pedagoška enota za športno vzgojo in šport na UL FGG si bo tudi v bodoče, ob podpori vodstva fakultete, prizadevala, da študentom, bodočim intelektualcem in zaposlenim omogoči primerne pogoje dela za doseganje in vzdrževanje zdravega in aktivnega načina življenja.

being in the workplace: four-day skiing trip; 1 hour of swimming once a week at the Tivoli swimming pool; summer morning swimming at the Kolezija swimming pool; 1 hour of badminton once a week at the Konex sports center; 2 hours of fitness once a week at the Konex sports center; winter sports day (February 2022 and 2023: Kranjska Gora – skiing, cross-country skiing, hike to Tamar; February 2022: mountain hike to Velika planina); kayaking on the Krka River; summer sports day (June 2022: hike to Sabotin, Soška and Goriška Brda bike trail, Solkan adrenaline park; June 2023: Peca underground activities and the surroundings of Jamnica 2023) and sports and recreational holidays in Volarje.

The Educational Unit for Physical Education and Sport at UL FGG will continue to strive, with the support of the faculty management, to provide students, future intellectuals and staff with suitable working conditions to achieve and maintain a healthy and active lifestyle.

RAČUNALNIŠKI CENTER COMPUTER CENTRE

KADER PERSONNEL

VODJA HEAD
Andrej Vitek

SODELAVCI ASSOCIATES
Lučka Lucija Hodnik, Rok Horjak, Darko Malić

Sodelavci Računalniškega centra (RC) skrbimo za razvoj, nemoteno delovanje in podporo uporabnikom računalniške opreme na UL FGG:

— strojne in programske opreme računalniških učilnic,
— opreme računalniškega omrežja,
— ozadne opreme,
— računalniške opreme pedagogov, raziskovalcev in ostalih zaposlenih.

Računalniške učilnice
Danes je na fakulteti devet računalniških učilnic s skupno 167 računalniškimi delovnimi mesti, namenjenimi izvajanju vaj ter samostojnemu delu študentov v okviru domačih nalog, seminarjev ter zaključnih del. Dve učilnici sta namenjeni izključno slednjemu.

Ob pandemiji postavljena virtualna učilnica se je izkazala kot zelo uporabna, zato smo v preteklih šolskih letih to možnost dela za študente razširili in sedaj omogoča delo še večjemu številu uporabnikov.

V sklopu rednega prenavljanja opreme smo prenovili opremo dveh računalniških učilnic, mobilne učilnice, namenjene delu na terenu, in opremo predavalnic.

Ob prenovi predavalnic v III. etaži smo poleti 2022 te predavalnice opremili z interaktivnimi tablami. Table so sicer priročen pripomoček, imajo pa v sestavu opreme predavateljskega delovnega mesta svoje slabe strani.

Študentom je za namestitev na lasten računalnik v sklopu licenc, ki jih pokriva fakulteta, na voljo več programskih paketov, od operacijskega sistema Windows do vrste strokovnih programov. Popoln seznam z navodili za namestitev je na voljo v spletni učilnici. Na spletnih straneh s predstavitvijo opreme v računalniških učilnicah pa so zbrane povezave na strokovno programje, ki je na voljo zastonj ali zanj obstajajo študentske verzije.

Informacijski sistem
V začetku 2023 je fakulteta prešla na skupni poslovni informacijski sistem UL APIS. Sodelavci RC smo bili v veliki meri angažirani pri

Members of the Computer Centre (RC) are responsible for the development, uninterrupted operation, and support to the computer equipment users at the faculty:

— hardware and software of computer rooms,
— equipment of the computer network,
— background equipment,
— computer equipment for teachers, researchers, and other staff.

Computer Classrooms
Today, the faculty has nine computer classrooms with a total of 167 computer workstations, intended for tutorials and independent work of students working on their homework, seminars, and final theses. Two classrooms are intended exclusively to the latter.

The e-classroom set up during the pandemic has proven to be very useful, so much so that we have expanded this possibility of work for students and are now making it available to an even larger number of users.

As part of our regular equipment replacement, we renovated the equipment in two computer classrooms, a mobile field classroom and the equipment in lecture halls.

During the renovation of the lecture halls in IIIrd floor, in summer 2022, we equipped these lecture halls with interactive whiteboards. The whiteboards are a practical tool, but they also have their downsides when it comes to equipping a lecturer's workplace.

As part of the licenses covered by the faculty, students have access to several software packages that they can install on their own computers; from the Windows operating system to a range of professional software. A complete list of installation instructions is available in the e-classroom. On the web pages presenting computer classroom equipment, there are links to professional software that is available free of charge or for which student versions are available.

Information System
In early 2023, the faculty migrated to the University's shared business information system APIS. The members of the

pripravah ter izvedbi prehoda. Še pred tem smo na strežniško infrastrukturo v skupni data center Univerze v Ljubljani prenesli tudi študijski informacijski sistem, tako da so sedaj vsi najpomembnejši informacijski sistemi ustrezno podprti in varovani.

Vzporedno s tem prehodom smo obnovili tudi lastno strežniško infrastrukturo, potrebno za delovanje in nadzor omrežja in njegovih storitev, jo s tem pospešili in izboljšali.

Omrežje
Potem ko smo ob uvedbi IP telefonije uredili univerzalno omrežno ožičenje, smo začeli tudi s prenovo aktivne omrežne opreme. To nam omogoča stabilnejše delovanje ter povečanje hitrosti in varnosti omrežja ter načrtovano prenovo tudi brezžičnega omrežja s ciljem intenzivnejše rabe slednjega pri pouku.

Storitve
Ob predvideni uvedbi elektronske registracije delovnega časa smo pripravili vso za to potrebno infrastrukturo, ki jo načrtujemo dopolniti tudi z nadzorom dostopa na parkirišča in v stavbe FGG.

Kot dopolnitev službe za pomoč smo postavili spletni sistem z navodili, kjer lahko zaposleni najdejo pomoč in dokumentacijo o vsem na fakulteti, od rabe računalniške opreme, postopkov naročanja opreme do upravljanja klimatskih naprav.

Computer Centre played a key role in the preparation and implementation of the transition. Prior to this, we had also migrated the student information system to the server infrastructure in the University's shared data centre, so that all important information systems are now properly supported and protected.

Parallel to this transition, we also upgraded our own server infrastructure, which is necessary for the operation and control of the network and its services, thereby accelerating and improving it.

Network
Following the introduction of IP telephony, we also started to upgrade the active network equipment. This allowed us to achieve more stable operation and increase the speed and security of the network, as well as the planned upgrading of the wireless network with the aim of using it more intensively in classes.

Services
With the planned introduction of electronic working time registration, we prepared the necessary infrastructure, which we intend to supplement with access control to parking lots and FGG buildings.

To complement the helpdesk, we set up an online manual where employees can find help and documents on all areas of our faculty, from using computer equipment and ordering procedures to handling the air conditioning system.

REFERAT ZA ŠTUDIJSKE ZADEVE THE OFFICE OF STUDY AFFAIRS

KADER PERSONNEL

VODJA REFERATA HEAD OF OFFICE
Iztok Lovišček

SODELAVKE ASSOCIATES
Suzana Erjavec, Teja Japelj, Monika Golobar

Referat za študijske zadeve je obraz fakultete, s katerim se najpogosteje srečujejo študenti, neredko tudi v trenutkih negotovosti in stisk. Je služba, ki odgovarja na vsa njihova vprašanja in vprašanja pedagogov, ki so vezana na izobraževalno področje.

Referat za študijske zadeve na dodiplomskih in podiplomskih ter na vseh treh stopnjah bolonjskih študijskih programov skladno z Zakonom o visokem šolstvu, Statutom UL in Pravilnikom o študiju na prvi in drugi stopnji na UL FGG: skrbi za izvedbo vpisa študentov, opravlja administrativno delo, povezano z organiziranjem in zvajanjem študija, vodi evidence o študentih, izpitnih prijavah, opravljenih izpitih in drugih obveznostih študentov, izdaja dokumente in potrdila, vodi vse postopke v zvezi s pripravo zaključnih del in zaključkov študija, skrbi za organizacijo podelitev diplom, izvajanje administrativnih postopkov v zvezi z zagovorom zaključnih del, pisanje prilog k diplomam, izdaja račune za študijsko področje, pomaga pri pripravi gradiv za študijske odbore in Senat UL FGG, skrbi za izvedbo študentskih anket, spremlja študijski uspeh študentov, pripravlja analize in poročila ter vodi statistike za potrebe fakultete, UL in zunanje institucije za celotno študijsko področje, sodeluje s strokovnimi službami Univerze v Ljubljani, aktivno sodeluje s pedagogi na področju študijske dejavnosti in opravlja druga dela, ki vsebinsko sodijo v širše strokovno področje študijske dejavnosti, po nalogu vodstva fakultete.

Referat za študijske zadeve je sedanjo obliko dobil leta 2018, ko se je skupini pridružil zdajšnji vodja Iztok Lovišček. Teja Japelj, ki je pred tem na fakulteti administrativno pokrivala področje gospodarskih zadev, se je referatu pridružila leta 2012. Suzana Erjavec se je v njem zaposlila eno leto prej, torej 2011, Monika Golobar pa je v referatu zaposlena od leta 2017. Referat deluje na dveh enotah. Vse zadeve, vezane na bolonjski prvo- in drugostopenjski študij, se vodijo na Jamovi 2, na sedežu fakultete. Zadeve, vezane na doktorski študij, za katerega je zadolžena Monika Golobar, pa se od leta 2013, ko je bila pisarna preseljena na ločeno enoto, vodijo na Hajdrihovi 28.

The Office of Study Affairs is the face of our faculty, the first and most frequent contact point of our students, often asking our assistance also in moments of insecurity and distress. Our office strives to respond to all their issues as well as to the questions of our teachers related to education.

At the undergraduate and graduate as well as all three cycles of the Bologna study programmes, the Office of Study Affairs performs the following tasks according to the Higher Education Act, the University Statute and the UL FGG Rules at first and second cycle studies: enrolment of students, administrative tasks related to the organization and implementation of study programs, keeping of records related to students, exam applications, exams passed and other student obligations, issuing of documents and certificates, conducting procedures related to the preparation of final theses and completion of studies, care of the organisation for the award of diplomas, implementation of administrative procedures related to the defence of final theses, preparation of diploma supplements, issuing invoices for the study area, assistance in the preparation of materials for the UL FGG Study Boards and Senate, care of the implementation of student surveys, monitoring of students' study success, preparation of analyses and reports and keeping statistics for the needs of the faculty, the University and external institutions for all study related areas, cooperation with professional services of the University of Ljubljana, active cooperation with teachers related to study activities, other work that belongs to the wider professional area of study affairs, by order of the faculty management.

In the present form, the Office of Study Affairs was established in 2018 when the team was joined by the present head of the office, Iztok Lovišček. The administrative officer Teja Japelj, previously in charge of the administrative matters of economic affairs, joined in 2012. Suzana Erjavec came to work for the Office of Study Affairs a year before, in 2011, whereas Monika Golobar has been its member since 2017. The office operates at two locations. All matters related to the Bologna first- and second-cycle studies are handled at Jamova 2, at the faculty's head office. The matters related to doctoral studies, conducted by Monika Golobar, have been stationed since 2013 at the dislocated unit at Hajdrihova 28.

VISOKOŠOLSKA KNJIŽNICA HIGHER EDUCATION LIBRARY

KADER PERSONNEL

VODJA KNJIŽNICE HEAD OF LIBRARY
doc. dr. **Teja Cvetka Koler Povh**

KNJIŽNIČARKE LIBRARIANS
Elizabeta Adamlje (do januarja 2023 until January 2023),
Nina Hočevar (od marca 2023 from March 2023), **Jelka Rovanšek, Barbara Šivec**

Visokošolska knjižnica UL FGG je organizirana kot knjižnica visokošolskega zavoda članice univerze. Ima gradivo, ki je vsebinsko povezano s področji znanstvenoraziskovalne in strokovne dejavnosti visokošolskega zavoda ter področji njegovih študijskih programov.

Knjižnično zbirko sestavljajo knjižnično gradivo, ki ga knjižnica hrani sama, in elektronski informacijski viri, za katere knjižnica vsaj za določeno časovno obdobje zagotavlja dostop na daljavo.

V 28. številki Uradnega lista Republike Slovenije (3. 3. 2023, str. 1570–1599) je aktualna objava Pravilnika o pogojih za izvajanje knjižnične javne službe (dostopen je na naslovu: https://www.uradni-list.si/_pdf/2023/Ur/u2023028.pdf).

V organizacijski strukturi visokošolskega zavoda so jasno razvidni status, namen in naloge visokošolske knjižnice ter opredeljena odgovornost za njeno delovanje, nadzor in evalvacijo, tako na ravni visokošolskega zavoda kot na ravni knjižnice.

Visokošolska knjižnica uporabnikom zagotavlja:

— dostopnost učbenikov ter druge temeljne in priporočene študijske literature in zaključnih del visokošolskega študija na visokošolskem zavodu,
— dostopnost mednarodne znanstvene literature,
— posredovanje knjižničnega gradiva in informacije o njem,
— prostor za študij oziroma delo uporabnikov,
— izobraževanje ter pomoč in svetovanje za uporabo knjižnice in informacijskih virov,
— svetovanje uporabnikom pri njihovem vrednotenju del strokovne, znanstvenoraziskovalne dejavnosti ter pri vključevanju v odprto znanost,
— vnos bibliografskih podatkov o rezultatih znanstvenoraziskovalnega in strokovnega dela zaposlenih visokošolskega zavoda v nacionalni bibliografski sistem,
— javno dostopno spletno stran, ki je del spletnega mesta visokošolskega zavoda s posodobljenimi podatki o knjižnici ter njenih informacijskih virih in storitvah,

The UL FGG higher education library is organised as a library of the member of the University of Ljubljana. It has material that is related in content to the areas of scientific research and professional activity of the higher education institution and the areas of its study programs.

The library collection consists of library materials held by the library itself and electronic information resources for which the library provides remote access, at least for a certain period of time.

The 28th edition of the Official Gazette of the Republic of Slovenia (3 March 2023, 1570–1599) contains a current publication of The Rules on Conditions for Providing Library Services as a Public Service (available at: https://www.uradni-list.si/_pdf/2023/Ur/u2023028.pdf).

The organizational structure of the higher education institution clearly shows the status, purpose and tasks of the higher education library as well as the defined responsibility for its operation, control and evaluation, both at the level of the higher education institution and at the level of the library.

The higher education library offers its users:

— availability of textbooks and other basic and recommended study literature as well as final theses of the higher education studies at the higher education institution,
— availability of international scientific literature,
— provision of library material and information about it,
— space to study or work,
— education, assistance and consulting for the use of the library and its information sources,
— advising users on the evaluation of works of professional, scientific research and their integration into open science,
— entry of bibliographic data on the results of scientific research and the professional work of staff in the national bibliographic system,
— a publicly accessible website that is part of the higher education institution's website containing up-to-date information about the library and its information resources and services,

— knjižnica upravlja knjižnično zbirko v skladu s politiko upravljanja, izgradnje in razvoja knjižnične zbirke ter zagotavlja dostop do elektronskih informacijskih virov,
— praviloma v prostem pristopu temeljno referenčno knjižnično zbirko ter po najmanj en izvod učbenikov in druge temeljne študijske literature na fizičnih nosilcih. Dostop do referenčnega in študijskega gradiva v elektronski obliki zagotavlja v prostorih knjižnice in na daljavo,
— samostojno ali v sodelovanju z drugimi knjižnicami dostop do mednarodne znanstvene literature in zbirk podatkov v prostorih knjižnice in na daljavo,
— odprti dostop do zaključnih del visokošolskega študija in objav zaposlenih na visokošolskem zavodu v elektronski obliki.

V knjižnici se med drugim vrši: načrtovanje, organiziranje, koordiniranje in nadzor nad poslovanjem knjižnice, vodenje nabave, obdelave, izposoje, medknjižnične izposoje gradiva, prodaje učbenikov FGG, vodenje postopkov strokovnega posredovanja gradiv in informacij o njih, izdelava in posredovanje poročil, skrb za razvoj knjižnice, skrb za referalno dejavnost in izobraževanje uporabnikov, skrb za delovanje e-knjižnice, skrb za izobraževanje delavcev knjižnice, zagotavljanje transparentnosti dela knjižnice na spletnih straneh FGG, odgovornost za knjižnične kataloge, bibliografije raziskovalcev, strokovno obdelavo dokumentov, arhiv knjižnice ter sodelovanje z OSIC-i in INDOK dejavnostjo na CTK.

Knjižnica ima poleg centralne knjižnice na Jamovi cesti 2 tudi dislocirano enoto na Hajdrihovi ulici 28.

— the library manages the library collection in accordance with the policy of managing, building and developing the library collection and providing access to electronic information resources,
— as a rule, the higher education institution has a freely accessible basic stock of reference libraries and at least one copy of textbooks and other basic study literature on physical media. It provides access to reference works and study materials in electronic form on the library premises and remotely,
— independently or in cooperation with other libraries, access to international scientific literature and databases on the library premises and remotely,
— open access to theses from higher education studies and publications by higher education staff in electronic form.

Among other things, the library carries out planning, organizing, coordinating and supervising library operations; managing the acquisition, processing, borrowing, interlibrary loan of materials; selling FGG textbooks; managing procedures for the professional transmission of materials and information about them; preparing and forwarding reports; supervising library development; supervision of outreach activities and user training; supervision of e-library operations; supervision of library staff training; ensuring transparency of library work on the FGG websites; responsibility for library catalogues, researchers' bibliographies, professional document processing, library archives; and cooperation with Central Specialised Information Centres and Heritage Information and Documentation Centres at Central Technical Library.

In addition to the central library at Jamova Street 2, the library also has a branch at Hajdrihova Street 28.

REVIJE UL FGG UL FGG JOURNALS

GRADBENI VESTNIK

Gradbeni vestnik ima v gradbeniški stroki prav posebno mesto, saj velja za edino slovensko strokovno-znanstveno revijo, v kateri so zbrani dosežki našega gradbeništva. Revija izhaja od leta 1951, ustanovitelj in izdajatelj revije je Zveza gradbenih inženirjev in tehnikov Slovenije (ZDGITS), od leta 2002 je njen soizdajatelj Matična sekcija gradbenikov pri Inženirski zbornici Slovenije (MSG IZS). Izhaja mesečno v tiskani in digitalni obliki. Celotna vsebina posamezne številke v digitalni obliki je dostopna vsem takoj po izidu na spletni strani izdajatelja na http://www.zveza-dgits.si/gradbeni-vestnik. V digitalnem arhivu Gradbenega vestnika so objavljene vse številke revije, od leta 1951 dalje. Podatki o objavah v reviji so navedeni v bibliografskih bazah COBISS in ICONDA (The Int. Construction Database) ter na www.zveza-dgits.si.

Revija pomembno sooblikuje sloves slovenske gradbeniške stroke, saj je prostor za predstavitev podjetij in posameznikov, prav tako pa mladim strokovnjakom odpira pot v svet gradbeništva. Omogoča neprecenljivo izmenjavo strokovnih izkušenj in dviga nivo vednosti o pomembnih projektih, objektih ter dogodkih, prav tako pa prispeva k razvijanju in prenašanju slovenske strokovne terminologije ter k razvoju tehnične kulture. Zaradi vsega naštetega je publikacija nepogrešljiv del promocije znanja slovenskih gradbenikov, v globalizacijskem pogledu pa ima poleg strokovne vrednosti tudi neprecenljiv nacionalni pomen. Glede na dolgotrajnost kontinuitete izhajanja velja Gradbeni vestnik tudi za zgodovinsko dragocenost gradbeniškega stanu in stroke v Sloveniji.

GEODETSKI VESTNIK

Na UL FGG vsebinsko in deloma tudi finančno skrbimo, da redno izhaja revija Geodetski vestnik, katere glavna izdajateljica je Zveza geodetov Slovenije. Uredniki in celotna tehnična podpora že vrsto let izhajajo iz članov Oddelka za geodezijo UL FGG. Do konca leta 2021 je bila glavna in odgovorna urednica izr. prof. Anka Lisec, v letu 2022 pa sta vlogi prevzela doc. dr. Dušan Petrovič kot glavni ter doc. dr. Miran Kuhar kot odgovorni urednik.

Glavni namen revije je zbirati in strokovni javnosti ponuditi znanstvene in strokovne članke v slovenskem ali angleškem jeziku, kjer so predstavljena najnovejša dognanja na področjih geodezije, geoinformatike, prostorskega planiranja ter sorodnih področjih.

GRADBENI VESTNIK CIVIL ENGINEERING GAZETTE

Gradbeni vestnik occupies a special position in the construction profession, as it is considered the only Slovenian professional-scientific journal collecting the achievements of our construction profession. The journal has been published since 1951. Founder and publisher of the journal is the Association of Civil Engineers and Technicians of Slovenia (ZDGITS), co-publisher since 2002 is the Main Section of Civil Engineers at the Slovenian Chamber of Engineers (MSG IZS). The journal Gradbeni vestnik is published monthly in printed and digital form. The entire contents of each issue in digital form are freely available to all on the publisher's website immediately after its publication. All issues of the journal, from 1951 onwards, are kept in the digital archive. Data on publications in the journal are available in the bibliographic databases COBISS and ICONDA (The Int. Construction Database) and at www.zveza-dgits.si.

The journal occupies a special position in the construction profession, as it is considered the only Slovenian professional-scientific journal collecting the achievements of our construction profession. The journal contributes significantly to the reputation of the Slovenian construction profession, as it is a means of presenting individuals and companies, and also opens the way for young professionals to enter the world of civil engineering. It enables the presentation and invaluable exchange of scientific and professional achievements and improves the level of knowledge about important projects and events. It also contributes to the development and transfer of Slovenian technical terminology and the development of technical culture. In view of all this, the journal is an indispensable part of the promotion of the knowledge of Slovenian civil engineers, and in view of globalization, in addition to scientific and professional value, it also has an invaluable national significance. Given the long tradition and continuity of its publication, Gradbeni vestnik also has a historical value for the construction profession in Slovenia.

GEODETSKI VESTNIK GEODETIC JOURNAL

At UL FGG, in terms of content and partly also financially, we take care of the regular publication of the journal Geodetski vestnik, the main publisher of which is the Association of Surveyors of Slovenia. For many years, editors and all technical support have come from members of the Department of Geodetic Engineering, Faculty of Civil and Geodetic Engineering, University of Ljubljana. Until 2021, the Editor-in-

Vsi recenzirani članki so vključeni v mednarodne bibliografske baze preko enoličnega digitalnega identifikatorja DOI, med drugimi je revija indeksirana s Social Sciences Citation Index (SSCI). Odprtodostopna revija je v zadnjem desetletju postala zelo prepoznavna na mednarodni ravni, kar se kaže tudi na povečanem faktorju vpliva (IF JCR za leto 2020 je znašal 0,554, IF SNIP pa je za isto leto znašal 0,478). Več informacij je na voljo na spletni strani: https://www.zveza-geodetov.si/geodetski-vestnik).

ACTA HYDROTECHNICA

Znanstvena revija Acta hydrotechnica je indeksirana v bazi Scopus, mednarodno prepoznavnost in uveljavljenost pa dokazuje tudi vedno večji priliv člankov iz tujine. Objavljamo članke s področij hidrologije, hidravlike, mehanike tekočin, inženirske hidrotehnike, urejanja voda, vodnega gospodarstva, ekološkega inženirstva, hidrotehničnih objektov, izrabe vodnih moči, pregradnega inženirstva, zdravstvene hidrotehnike, zaščite in upravljanja voda ter tudi vodnega prava, inženirske geomorfologije, ekologije voda in varstva pred naravnimi nesrečami. V Sloveniji ostaja matična revija na področjih hidrotehnike, vodarstva in okoljskega inženirstva. Utrjuje tudi svoje pedagoško poslanstvo, s katerim skrbi za prenos znanj in tehnologije v prakso, hkrati pa krepi slovensko terminologijo na področjih, kjer objavljamo prispevke (https://actahydrotechnica.fgg.uni-lj.si/si/).

ACTA GEOTECHNICA SLOVENICA

UL FGG je ustanovna članica revije Acta geotechnica Slovenica (http://www.fg.uni-mb.si/journal-ags/). Iz vrst pedagogov UL FGG v uredniški skupini revije sodelujejo prof. Janko Logar, prof. Bojan Majes in izr. prof. Ana Petkovšek. Revija objavlja kakovostne teoretične članke z novih pomembnih področij geomehanike in geotehnike, ki dolgoročno vplivajo na temeljne in praktične vidike teh področij, kot so: mehanika zemljin in kamnin, inženirska geologija, okoljska geotehnika, raba geosintetikov, geotehnične konstrukcije, numerično in analitično modeliranje v geotehniki, optimizacija geotehničnih konstrukcij, terenske in laboratorijske preiskave. Revija izhaja dvakrat letno in je indeksirana v SCIE – Science Citation Index Expanded, JCR – Journal Citation Reports / Science Edition, ICONDA – The international Construction database, GeoRef.

IGRA USTVARJALNOSTI

Revija Igra ustvarjalnosti je namenjena objavi teoretičnih in praktičnih izkušenj s področja arhitekture in gradbeništva, urbanizma, prostorskega planiranja, krajinske arhitekture, sociologije ter tem raziskovalnim področjem bližnjih družboslovnih in tehničnih disciplin (https://www.iu-cg.org/).

Revija je v letu 2023 obeležila že deseto leto izhajanja, razširjena uredniška skupina pa že deluje kot usklajen tim. Članki v reviji še vedno sledijo osnovnim temam arhitekturnega in prostorsko urbanističnega snovanja. Njihovo težišče se je v zadnjih dveh letih še približalo pomenu trajnostnega prostorskega razvoja, nizkoogljični družbi in okoljsko bolj sprejemljivim rešitvam (kot je npr. t. i. reciklažni urbanizem).

Chief has been Assoc. Prof. Dr. Anka Lisec, while from 2022 her role was taken by Assist. Prof. Dr. Dušan Petrovič as the Editor-in-chief and Assist. Prof. Dr. Miran Kuhar as the Executive editor.

The main purpose of the journal is to collect and make available to the professional public scientific and professional articles in Slovenian or English, presenting the latest findings in the fields of geodesy, geoinformatics, spatial planning and related fields. All peer-reviewed articles are included in international bibliographic databases via a unique digital identifier DOI. The journal is indexed by the Social Sciences Citation Index (SSCI) and others. The open access journal has gained a high international profile over the past decade, which is also reflected in the increased impact factor (IF JCR for 2020 was 0.555 and IF SNIP for the same year was 0.478). More information is available on the website: https://www.zveza-geodetov.si/geodetski-vestnik).

ACTA HYDROTECHNICA

Acta hydrotechnica is a scientific journal indexed in the Scopus database. Its international recognition and establishment is also reflected in the constantly increasing number of articles from abroad. We publish articles in the fields of hydrology, hydraulics, fluid mechanics, hydraulic engineering, water management, ecological engineering, hydrotechnical facilities, water use, dam engineering, sanitary engineering, water protection and management as well as water policy, engineering geomorphology, water ecology and protection against natural disasters. In Slovenia, it remains the leading journal in the fields of hydraulic engineering, water resources management and environmental engineering. It also strengthens its educational mission, ensuring the transfer of knowledge and technology into practice, while at the same time strengthening Slovenian terminology in the fields in which we publish articles (https://actahydrotechnica.fgg.uni-lj.si/en/).

ACTA GEOTECHNICA SLOVENICA

UL FGG is the founding member of the journal Acta Geotechnica Slovenica (http://www.fg.unimb.si/journal-ags/). From the UL FGG teaching staff, its editorial board is represented by Prof. Janko Logar, Prof. Bojan Majes and Assoc. Prof. Ana Petkovšek. The journal publishes quality theoretical articles focusing on important areas of geomechanics and geotechnics, such as soil and rock mechanics, engineering geology, environmental geotechnics, geosynthetics, geotechnical structures, numerical and analytical modelling, field and laboratory investigations. The journal is published twice a year and is indexed in the SCIE – Science Citation Index Expanded, JCR – Journal Citation Reports / Science Edition, ICONDA – The international Construction database, GeoRef.

IGRA USTVARJALNOSTI CREATIVITY GAME

The journal Igra ustvarjalnosti (Creativity Game) is intended for the publication of theoretic findings and practical experiences from the areas of architecture and civil engineering, urbanism, spatial planning, landscape architecture, sociology and other related social and technical disciplines (https://www.iu-cg.org/).

ŠTUDENTSKI MOST

Študentski most je revija študentov UL FGG, ki že več kot 17 let izhaja štirikrat na leto v tiskani in elektronski obliki. Leta 2014 je revija prešla pod okrilje ŠS UL FGG. Od takrat naprej izhaja izključno s finančno podporo fakultete. Poslanstvo, namen in javni interes revije je obveščanje študentov in ostalih bralcev o aktualnih dogajanjih na FGG, objavljanje strokovnih in ostalih člankov s področij, ki so zanimiva študentom in zaposlenim na FGG, objavljanje vtisov študentov o študijskih in obštudijskih dejavnostih in podobno. Revija povezuje vse študijske smeri na fakulteti in spodbuja študente k raziskovanju raznolikih tematik s strokovnega področja tudi v prostem času. Izhajanje revije je močno prizadela pandemija, saj so bile v tem času izdaje večinoma v elektronski izdaji, vendar kvaliteta in obseg revije naraščata iz izdaje v izdajo. Leta 2021 je bila skupaj z vodstvom fakultete sprejeta odločitev o zvišanju honorarjev za urednike in sodelavce.

The journal celebrated its tenth year of publication in 2022, and the expanded editorial team is already working as a cohesive team. The articles in the journal continue to follow the fundamental themes of architectural and spatial planning. In the last two years, its focus has shifted even more to the importance of sustainable spatial development, a low-carbon society and more environmentally friendly solutions (such as recycling urbanism).

ŠTUDENTSKI MOST

Študentski most is a journal of UL FGG students, which has been published four times a year in printed and electronic form for more than 17 years. In 2014, the journal was placed under the auspices of the UL FGG Student Council. Since then, it has been published exclusively with financial support from the faculty. The mission, purpose and public interest of the journal is to inform students and other readers about current events at UL FGG, publish professional and other articles in areas of interest to students and staff of UL FGG, publish students' impressions of studies and study activities, etc. The journal brings together all fields of study of the Faculty and promotes students to explore diverse topics in their field of expertise, including in leisure time. The publication of the journal was greatly affected by the pandemic, as most of the issues were in electronic format at that time, but the quality and scope of the journal are growing from issue to issue. In 2021, it was decided, together with the faculty management, to increase the fees for editors and staff.greatly affected by the pandemic, as most of the issues were in electronic format at that time, but the quality and scope of the journal are growing from issue to issue. In 2021, it was decided, together with the faculty management, to increase the fees for editors and staff.

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Faculty of Civil and Geodetic Engineering

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FAKULTETE ZA GRADBENIŠTVO IN GEODEZIJO UNIVERZE V LJUBLJANI

YEARBOOK
FACULTY OF CIVIL AND GEODETIC ENGINEERING, UNIVERSITY OF LJUBLJANA

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