

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	TLA IN OKOLJE
COURSE TITLE:	SOIL AND ENVIRONMENT

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Varstvo okolja in ekotehnologije, 1. stopnja	Modul: Raba in varstvo tal	2. in 3.	2
Environmental Protection and Eco-technologies, 1 st level	Module: Land use and soil protection	2 nd and 3 rd	2

Vrsta predmeta / Course type	Modularni predmet / Modular subject
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Univerzitetna koda predmeta / University course code:	TIO
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Predavanja Lectures	Seminar Seminar	Sem. Vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
30	/	10	10	15	100	6

Nosilec predmeta / Lecturer:	izr. prof. dr. / Assoc. Prof. Borut Vrščaj
Asistent / Assistant:	Katja Črnc, mag. ekol. biod. / M. Sc.

Jeziki / Languages:	Predavanja / Lectures:	Slovenski / Slovenian
	Vaje / Tutorial:	Slovenski / Slovenian

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Pogojev ni.	No formal prerequisites.

Vsebina:	Content (Syllabus outline):
Morfologija in lastnosti tal - Izrazoslovje s področja tal - Zgradba in nastanek tal - Morfološke lastnosti tal (horizonti, struktura, agregati, konzistenca, oblike talne organske snovi, barva, itd.) - Fizikalne lastnosti tal (tekstura, gostota, voda in zrak v tleh, itd.) - Kemijske lastnosti tal (kislost, hranila, bazični kationi, kationska izmenjalna kapaciteta, itd.) - Biotske lastnosti tal (predstavniki talne mikro, mezo in makrofavne, biotska pestrost tal). Ekosistemske storitve tal Klasifikacija tal - Klasifikacija tal Slovenije 2025 - WRB klasifikacija tal Pedosekvice Slovenije: - Tla in pedosekvice; - Pedosekvice Slovenije: vrste in razprostranjenost; - Okoljske značilnosti pedosekvenc (raba tal, onesnaževanje in onesnaženost, propustnost tal in	Morphology and properties of soil - Soil terminology - Soil structure and soil formation - Morphological soil properties (i.a. horizons, structure, consistency, soil organic matter, color) - Physical soil properties (i.a. texture, density, compaction, soil water and air) - Chemical soil properties (i.a. acidity, nutrients, base saturation, CEC). - Biotic soil properties (i.a. soil micro, mezo and macro fauna; soil biodiversity). Soil ecosystem services Soil Classification - Classification of Slovenian soils 2025 - WRB soil classification Soils of Slovenia: - Soils and soils of Slovenia; - Soils of Slovenia: types and distribution.

varovanje podzemnih voda, raba blat KČN, kmetijska in gozdna raba tal, itd.) - Okoljski potenciali in tveganja v okviru pedosekvenc in različnih rab tal; Krajinske značilnosti, specifičnosti in talni tipi pedosekvenc Slovenije (tipični videzi krajin, slovenske krajinske značilnosti kot posledica lastnosti tal). Grožnje tlom in degradacije tal: - Grožnje tlom in degradacije tal in zemljišč v okviru kmetijske, gozdarske, urbane, industrijske rabe in turizma. - Onesnaženje tal. - Varovanje in trajnostna raba tal v okviru kmetijske, gozdarske ter urbane rabe tal (poselitev, promet, industrija, promet, turizem/rekreacija). - Trajnostna kmetijska raba: gnojenje ali onesnaževanje? Etika varovanja tal in drugih naravnih virov - Varovanje tal v globalnih razmerah - Trajnostna raba tal - Etika in racionalna raba tal	- Environmental characteristics of soils (land use, contamination and pollution, soil permeability and protection of groundwater, use of silt and slurries, agricultural and forest land uses etc.). - Environmental potentials and risks in the context of soils and different land uses. Landscape features, specifics, and soil types of individual soils (typical landscapes, characteristics of Slovenian landscapes as a result of soil properties). Soil Threats and Soil Degradation: - Threats to soil and soil degradation within agricultural, forestry, urban, industrial and touristic land uses. - Soil contamination. - Protection and sustainable use of soil in the context of agricultural, forestry and urban land use (housing, transport, industry, transport, tourism / recreation). Ethics of Soil Protection and other Natural Resources - Soil protection in global context - Sustainable soil use - Ethics and rational use of soil
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Temejna literatura

- Albin Stritar, Pedologija – kompendij. Univerza v Ljubljani,

Priporočena literatura

- Vrščaj B. 2017c. An Overview of Soils of Slovenia (The Soils of Slovenia). V: The Soils of Slovenia. Dordrecht, Springer Netherlands: 77–133
- Vrščaj B. 2017b. Soil Distribution (The Soils of Slovenia). V: The Soils of Slovenia. Dordrecht, Springer Netherlands: 135–155
- Repe B. 2017. Regions and Landscapes (The Soils of Slovenia). V: The Soils of Slovenia. Dordrecht, Springer Netherlands: 9–17
- Vrščaj B., Kralj T. 2017. Slovenian Soil Classification Soil classification and WRB (The Soils of Slovenia). V: The Soils of Slovenia. Dordrecht, Springer Netherlands: 61–75
- Vrščaj B., Repe B., Simončič P. 2017a. Soil Degradation (The Soils of Slovenia). V: The Soils of Slovenia. Dordrecht, Springer Netherlands: 171–198
- Vrščaj, Borut. 2018. Lastnosti, pestrost in ekosistemske storitve tal. Ljubljana, Slovenia [Slovenia]: Kmetijski inštitut Slovenije [Agricultural Institute of Slovenia].
- Food & agriculture organization. 2018. SOIL POLLUTION: A Hidden Reality. S.I.: FOOD & AGRICULTURE ORG
- .Geitner C., Freppaz M., Lesjak J., Schaber E., Stanchi S., D'Amico M., Vrščaj B. 2019b. Ekosistemske storitve tal v Alpah. Uvod v ekosistemske storitve tal za odločevalce. Vrščaj B. (ur.), Ljubljana, Kmetijski inštitut Slovenije [Agricultural Institute of Slovenia]: 78 str.
- Krajina, krajinski sistemi, Raba in varstvo tal v Sloveniji, Albin Stritar, Ljubljana, 1990;
- FAO, D. J., ur. 2015. Status of the World's Soil Resources Main report. Rome, Italy: FAO. <http://www.fao.org/documents/card/en/c/c6814873-efc3-41db-b7d3-2081a10ede50/>.

Cilji in kompetence:

Objectives and competences:

Predmetno specifični cilji in kompetence

- morfološke lastnosti tal
- kemijske in fizikalne lastnosti tal
- biotske lastnosti tal
- pedosekvenca Slovenije
- poznavanje heterogenosti tal, fizikalnih in kemijskih lastnosti, v prepletu z drugimi danostmi prostora
- poznavanje lastnosti tal, vpliva na rabo tal in namembnost prostora
- poznavanje odvisnosti tla – kulturna krajina
- vrednotenje posegov v prostor
- poznavanje po potrebah po primerni rabi in varovanju tal
- poznavanje degradacij tal
- poznavanje ukrepov za varovanje tal
- sposobnost trajnostnega upravljanja in varovanja tal v različnih sektorjih

Splošne kompetence

- zavedanja o pomenu tal kot bistvenem naravnem viru, ki omogoča življenje v kopenskih ekosistemih.
- zavedanja o pomenu varovanja tal kot dela okolja
- sposobnost usmerjanja v vzdržen prostorski razvoj
- etičnosti varovanja tal in trajnostne rabe naravnih virov

Specific goals and competencies

- soil morphology
- chemical and physical soil properties
- soil biota
- soilscape theory
- soilscape of Slovenia
- knowledge of the soil diversity, physical and chemical soil properties, in relation to landscapes
- knowledge of the soil properties, land use and soil suitability and the purpose of the space
- knowledge of dependence soil - cultural landscapes
- evaluation of spatial planning
- knowledge of the needs for sustainable use and protection of soil
- knowledge of soil degradation
- knowledge of soil protection measures
- knowledge of sustainable management and soil protection in different sectors

General competences

- awareness on the importance of soil as an essential natural resource that enables life in terrestrial ecosystems
- awareness of the importance of soil protection as part of the environmental protection
- the ability to steer into sustainable spatial development
- ethics of soil protection and sustainable use of natural resources

Predvideni študijski rezultati:**Znanja in razumevanje:**

Študent bo ob zaključku tega predmeta sposoben:

- prepoznal zgradbo in lastnosti tal
- prepoznati pedosekvenca Slovenije
- razumel tla v povezavi s fizičnim prostorom Slovenije
- poznal lastnosti tal, ki določajo potencial, primernost rabe ter tveganja v povezavi z različnimi rabami tal
- poznal odvisnosti tla – kulturna in naravna krajina
- poznal ukrepe za varovanje tla
- poznal principe in razloge za trajnostno rabo tal
- razumel etičnosti varovanja naravnih virov

Prenesljive/ključne spretnosti in drugi atributi:

- Uporaba domačih in tujih zbirk podatkov tal in spletnih GIS pregledovalnikov prostorskih podatkov
- Zbiranje in interpretacija podatkov tal in krajine
- Pisno in ustno poročanje o tleh, značilnostih, kakovosti in primernosti tal in krajin

Intended learning outcomes:**Knowledge and Understanding:**

At the completion of this course the student will be able to:

- Identify structure and properties of soil
- identify of Slovenia's soilscape
- understand soils in relation to physical space of Slovenia
- recognize of soil properties that determine soil capacities, suitability, and threats to soil within different land uses
- understand soils, cultural and natural landscapes dependencies
- know and understand soil protection measures
- learn the principles of sustainable land use;
- understand the ethics of protecting natural resources.

Transferable/Key Skills and other attributes:

- Use of national and international soil data and land use web GIS
- Collection and interpretation of soil, land use and landscape data
- Written and oral reporting about soils, landscapes

▪ Trajnostna raba naravnih virov in fizičnega prostora	▪ Sustainable use of natural resources and physical environment
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Metode poučevanja in učenja:

Oblike dela:

- predavanja
- laboratorijske vaje
- samostojno delo študentov/tk

Metode dela:

- predavanja z razlago
- dialog, diskusija
- preučevanje praktičnih primerov
- aktivno skupinsko delo
- ogledna vaja v industrijski praksi
- vključevanje strokovnjakov iz prakse
- priprava, predstavitev, zagovor seminarske naloge

Learning and teaching methods:

Forms of teaching:

- In-class lectures
- Laboratory courses
- Individual work of students

Teaching methods:

- Lectures and explanations
- Discussion, debate
- Practical demonstration
- Teamwork
- Practice in the industry
- Involvement of experts in the specific fields
- Preparation, presentation, and defence of the tutorial

Delež (v %) /

Weight (in %)

Načini ocenjevanja:

Način (pisni izpit, ustno izpraševanje, naloge, projekt)

- kolokvij iz vaj
- pisni izpit

Na vajah je obvezna vsaj 90-odstotna prisotnost. Študent mora izdelati poročila o vajah, potem lahko pristopi h končnemu pisnemu izpitu.

Ocenjevalna lestvica:

- zadostno 6: 56-67%
- dobro 7: 68-75%
- prav dobro 8: 76-83%
- prav dobro 9: 84-90%
- odlično 10: 91-100%

20

80

Assessment:

Type (examination, oral, coursework, project):

- colloquium of practical work
- written exam

At least 90% attendance at lab work is required. Students must first draw up report on their lab work, which is a prerequisite for final written examination.

Grading system:

- Sufficient D (6): 56-67%
- Good C (7): 68-75%
- Very good B (8): 76-83%
- Very good B+ (9): 84-90%
- Excellent A (10): 91-100%

Materialni pogoji za izvedbo predmeta :

- predavalnica z multimedijско opremo
- računalniška učilnica
- slike krajin Slovenije
- slike degradacij tal

Material conditions for subject realization:

- classroom with the multimedia equipment
- computer classroom
- pictures of Slovenian landscapes
- pictures of soil degradation

Obveznosti študentov:

- prisotnost na predavanjih
- prisotnost na vajah
- pisni ali ustni izpit

Student's commitments:

- Presence at lectures
- Presence at exercises
- Written or oral exam

Reference nosilca predmeta:

Pedagoško delo:

- 2021 - <sedaj> Fakulteta za varstvo okolja, Velenje, delovno mesto: izr.prof.dr. nosilec/univ. učitelj premeta Geokemija okolja
- 2021 - <sedaj> Fakulteta za varstvo okolja, Velenje, delovno mesto: izr.prof.dr. nosilec/univ. učitelj premeta Tla in okolje
- 2008 - 2020 Fakulteta za varstvo okolja, Velenje, delovno mesto: izr.prof.dr. nosilec/univ. učitelj premeta Raba in varstvo tal
- 2009 - 2017 Univerza v Mariboru, Fakulteta za kmetijstvo in biosistemske vede, delovno mesto: doc. dr., profesor, nosilec /univ. učitelj premetov Tla in okolje, Ekopedologija ter Raba in varstvo tal
- 2015 - 2017 Univerza na Primorskem, Fakulteta za matematiko, naravoslovje in informacijske tehnologije, delovno mesto: doc. dr., profesor, nosilec /univ. učitelj premeta Pedologija in raba tal
- 1984 - 2005 Univerza v Ljubljani, Biotehniška fakulteta, Center za pedologijo in varstvo okolja, delovno mesto: asistent predmetov Pedologija in Ekopedologija.

Raziskovalno delo:

- 2005 - <sedaj> Kmetijski inštitut Slovenije, Oddelek za kmetijsko ekologijo in naravne vire, Center za tla in okolje, delovno mesto: - višji znanstveni sodelavec na domačih in mednarodnih projektih s področja tal in okolja; - predstojnik oddelka.
- 2003 - 2004 EC Joint Research Centre, Institute for Environment and Sustainability, Soil Action, Ispra, Italija, delovno mesto: visiting scientist/ gostujoči znanstvenik za področje tal/pedologije in informatike tal
- 1984 - 2005 Univerza v Ljubljani, Biotehniška fakulteta, Center za pedologijo in varstvo okolja, delovna mesta: asistent za področje pedologije in ekopedologije; raziskovalec na domačih ter FP5 in drugih mednarodnih projektih; vodja laboratorija za pedološko informatiko

Pomembnejša raziskovalna dela:

- Znanstvena monografija **The Soils of Slovenia** (Springer Verlag www.springer.com/la/book/9789401785846)
- Monografija **Tla v okolju**: Lastnosti, pestrost in ekosistemske storitve tal www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/publikacije/tla_v_okolju.pdf
- VRŠČAJ, Borut. Strukturne spremembe kmetijskih zemljišč, njihova urbanizacija in kakovost v obdobju 2002-2007 = The structural changes of agricultural land, their quality and urbanization between 2002-2007. Hmeljarski bilten, ISSN 0350-0756. [Tiskana izd.], 2008, letn. 15, str. 73-84. [COBISS.SI-ID 2870632]
- VRŠČAJ, Borut, POGGIO, Laura, AJMONE MARSAN, Franco. A method for soil environmental quality evaluation for management and planning in urban areas. Landscape and urban planning, ISSN 0169-

Lecturer's references:

Teaching:

- 2021 - <present> Faculty of Environmental Protection, Velenje, Asoc. Prof., teaching Geochemistry of the environment.
- 2021 - <present> Faculty of Environmental Protection, Velenje, post: Assoc. Prof., univ.; teaching Soils and environment.
- 2008 - 2020 Faculty of Environmental Protection, Velenje, post: Assoc. Prof., univ.; teaching Land use and soil protection course.
- 2009 - 2017 University of Maribor, Faculty of Agriculture and Life Sciences, Assist. Professor, subjects: Soils and environment, Ecopedology and Land use and soil protection.
- 2015 - 2017 University of Primorska, Faculty of Mathematics, Natural Sciences and Information Technology, post: assistant professor., teaching Soil Science and land use.
- 1984 - 2005 University of Ljubljana, Biotechnical Faculty, position: teaching assistant Pedology and Ecology.

Research work:

- 2005 - <now> Agricultural Institute of Slovenia, Department of Agricultural Ecology and Natural Resources, Center for Soil and Environment, post: - senior scientific assistant on domestic and international projects in the field of soil and the environment; - Head of Department.
- 2003 - 2004 EC Joint Research Center, Institute for Environment and Sustainability, Soil Action, Ispra, Italy, workplace: visiting scientist in the field of soil science and soil informatics
- 1984 - 2005 University of Ljubljana, Biotechnical Faculty, Pedology and Environmental Protection Center, jobs: Assistant in pedology and ecology; researcher at home and FP5 and other international projects; head of the laboratory for soil informatics

Significant research work:

- Scientific monograph The Soils of Slovenia (Springer Verlag www.springer.com/la/book/9789401785846)
- Monography Soil in the environment: Properties, diversity and ecosystem services of the soil www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/publikacije/tla_v_okolju.pdf
- VRŠČAJ, Borut. Structural changes of agricultural land, their urbanization and quality in the period 2002-2007 = The structural changes of agricultural land, their quality and urbanization between 2002-2007. Hopmine Bulletin, ISSN 0350-0756. [Printed Edition], 2008, year. 15, p. 73-84. [COBISS.SI-ID 2870632]
- VRŠČAJ, Borut, POGGIO, Laura, AJMONE MARSAN, Franco. A method for soil environmental quality assessment for management and planning in urban areas. Landscape and urban planning, ISSN 0169-2046. [Print ed.], 2008, vol. 88, iss. 2, p. 81-94, doi: 10.1016/j.landurbanplan.2008.08.005. [COBISS.SI-ID 2783336],

2046. [Print ed.], 2008, vol. 88, iss. 2, str. 81-94, doi: 10.1016/j.landurbanplan.2008.08.005. [COBISS.SI-ID 2783336],

- VRŠČAJ, Borut, VERNIK, Tomaž. The structural changes of agricultural land, their quality and process of urbanisation in Slovenia between 2002 and 2007. Local land & soil news : the bulletin of the European Land and Soil Alliance (ELSA) e. V., I/09, no. 28/29, str. 28-31. [COBISS.SI-ID 3006056]

Strokovno delo:

- VRŠČAJ, Borut. Tla ali prst? Prispevek k razpravam o rabi izrazov 'tla' in 'prst' v slovenskem poljudnem in strokovnem izrazoslovju. Acta agriculturae Slovenica, ISSN 1581-9175.
- VRŠČAJ, Borut. Uredba in kmetijski ekosistemi. Embalaža, okolje, logistika : strokovna specializirana revija za embalažo, okolje in logistiko, ISSN 1855-4849, avg. 2016
- VRŠČAJ, Borut. Varovanje kmetijskih zemljišč in racionalna raba prostora sta osnova trajnostnega razvoja. Kmečki glas, ISSN 0350-4093, 27. jan. 2010
- VRŠČAJ, Borut. Hrana bo ponovno strateško blago, zato so tudi rodovitna zemljišča strateška dobrina : varovanje kmetijskih zemljišč v okviru trajnostnega gospodarskega razvoja. Delo FT : gospodarsko-finančna priloga
- VRŠČAJ, Borut, POGGIO, Laura, AJMONE MARSAN, Franco. A method of soil quality evaluation for more sustainable urban planning = Eine Methode zur Bewertung von Bodenqualitäten für eine nachhaltigere räumliche Planung. V: Bodenbewertung : Vorsorgender Bodenschutz und kommunale Planung. München: Boden-Bündnis europäischer Städte, Kreise und Gemeinden. 2006, f. 52-55. [COBISS.SI-ID 2308456]

Izpopolnjevanja v tujini na področju tal

- 2002, delavnica FAO, Global Terrestrial Observing System, Praga
- 2001, EC Joint Research Centre, Soil Action, Ispra, Italija, študijski obisk
- 2000, United States Department of Agriculture, National Resource Conservation Service-
- USDA Cochran Fellowship (štipendija ameriškega ministrstva za kmetijstvo za področje informatike tal in talnih informacijskih sistemov. Štipendija je zajemala predvsem seznanjanje z US National Soil Information System (NASIS - Talni informacijski sistem ZDA)

Članstvo v pomembnejših nacionalnih komisijah

- 2006 Ministrstvo za obrambo RS, ekspertna skupina za oceno posledic suše v Sloveniji leta 2006.
- 2000: Vlada RS, Ekspertna skupina za izdelavo Dolgoročnega prostorskega plana Republike Slovenije - področje kmetijstva.

Sodelovanje v mednarodnih organizacijah:

- Predstavnik Slovenije v FAO/Global Soil Partnership - European Soil Partnership, Pillar 2 in Pillar 4

- VRŠČAJ, Borut, VERNIK, Tomaž. Local land and soil news: the Bulletin of the European Land and Soil Alliance (ELSA) e. V., I / 09, no. 28/29, p. 28-31. [COBISS.SI-ID 3006056]

Professional work:

- VRŠČAJ, Borut. Tla ali prst? Contribution to discussions on the use of terms 'tla' and 'prst' in Slovene popular and professional terminology. Acta agriculturae Slovenica, ISSN 1581-9175.
- VRŠČAJ, Borut. Regulation and agricultural ecosystems. Packaging, environment, logistics: specialist specialized magazine for packaging, environment and logistics, ISSN 1855-4849, Aug. 2016
- VRŠČAJ, Borut. The protection of agricultural land and the rational use of space are the basis of sustainable development. Agricultural voice, ISSN 0350-4093, Jan 27. 2010
- VRŠČAJ, Borut. Food will be again strategic goods, so fertile land is also a strategic asset: the protection of agricultural land in the context of sustainable economic development. FT: economic and financial contribution
- VRŠČAJ, Borut, POGGIO, Laura, AJMONE MARSAN, Franco. A method of soil quality assessment for more sustainable urban planning = Eine Methode zur Bewertung von Bodenqualitäten für eine nachhaltigere räumliche Planung. V: Bodenbewertung: Vorsorgender Bodenschutz und kommunale Planung. Munich: Boden-Bündnis europäischer Städte, Kreise und Gemeinden. 2006, f. 52-55. [COBISS.SI-ID 2308456]

Training abroad in the field of soil science

- 2002, FAO workshop, Global Terrestrial Observing System, Prague
- 2001, EC Joint Research Center, Soil Action, Ispra, Italy, study visit
- 2000, United States Department of Agriculture, National Resource Conservation Service-
- USDA Cochran Fellowship (scholarship of the US Department of Agriculture for the field of informatics of the soil and floor information systems. The scholarship was mainly to familiarize with the US National Soil Information System (NASIS - US Information System)

Membership in major national commissions

- 2006 Ministry of Defense of the Republic of Slovenia, expert group for the assessment of the consequences of drought in Slovenia in 2006.
- 2000: Government of the Republic of Slovenia, Expert Group for the Preparation of the Long-Term Spatial Plan of the Republic of Slovenia - Agriculture.

Participation in international organizations:

- Representative of Slovenia in FAO / Global Soil Partnership - European Soil Partnership, Pillar 2 and Pillar 4
- 2014 - 2016 FAO Soil Information Consultant - Macedonian Soil Information System (MASIS)

- 2014 – 2016 FAO Soil information consultant – Macedonian Soil Information System (MASIS)
 - 2012 UNCCD 2nd Scientific Conference – UNCCD White Paper Working Group, član –(ISBN 978-92-95043-67-1)
 - 2010 Digital Soil Mapping Working Group, EC Joint Research Centre, European Soil Bureau Network.
 - 2010 European Soil Data Centre and INSPIRE WG; EC Joint Research Centre.
- Članstva in sodelovanja v nacionalnih in mednarodnih pedoloških organizacijah**
- Pedološko društvo Slovenije, predsednik
 - Slovensko partnerstvo za tla, član ustanovne skupine
 - Alpine Soil Partnership, član ustanovne skupine
 - EC Joint Research Centre European Soil Bureau Network: Technical Expert, član
 - Global Soil Partnership, član
 - International Union of Soil Sciences, član

- 2012 UNCCD 2nd Scientific Conference - UNCCD White Paper Working Group, Member - (ISBN 978-92-95043-67-1)
 - 2010 Digital Soil Mapping Working Group, EC Joint Research Center, European Soil Bureau Network.
 - 2010 European Soil Data Center and INSPIRE WG; EC Joint Research Center.
- Membership and participation in national and international soil science organizations**
- Soil Science Society of Slovenia, President
 - Slovenian Soil Partnership, member of the founding group
 - Alpine Soil Partnership, a member of the founding group
 - EC Joint Research Center European Soil Bureau Network: Technical Expert, member
 - Global Soil Partnership, member
 - International Union of Soil Sciences, member