UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	UPRAVLJANJE POPULACIJ PROSTOŽIVEČIH ŽIVALI
Course title:	MANAGEMEMENT OF WILDLIFE POPULATIONS

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Varstvo okolja in ekotehnologije, 1. stopnja	Modul: Varstvo narave	2. in 3.	/
Environmental Protection and Eco-technologies, 1st level	Module: Nature conservation	2nd and 3rd	/

Vrsta predmeta / Course type	Modularni predmet / Modular course
Univerzitetna koda predmeta / University course code:	UPPŽ

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
30	/	20	/	10	100	6

Nosilec predmeta / Lecturer:	prof. dr. Boštjan Pokorny, Zarja Platovšek, mag. / Boštjan Pokorny, Ph.D, Full Prof., Zarja Platovšek, M.sc.

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

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

Vsebina:	**Content (Syllabus outline):**
Predmet bo osredotočen na pridobitev temeljnih znanj s področja ekologije prostoživečih živali, ki so potrebna za razumevanje potrebe, namena in principov upravljanja njihovih populacij kot pomembnega obnovljivega naravnega vira. **Poglavitne teme:** • **populacije prostoživečih živali in njihove značilnosti** (velikost/gostota, prostorska razporeditev osebkov, spolna in starostna struktura, rodnost in smrtnost, priseljevanje in odseljevanje, dinamika (rast) populacije, upor okolja, nadomestna smrtnost) • **metode za ugotavljanje (oceno) velikosti populacij** (preštevanje osebkov, vzorčne metode, kontrolna metoda s kazalci v adaptivnem upravljanju, sodobne tehnologije daljinskega zaznavanja osebkov) • **nosilna zmogljivost okolja** (ekološka, ekonomska, socio-politična nosilna zmogljivost) • **medvrstni in znotrajvrstni odnosi** (zajedavstvo, plenilstvo, tekmovanje, inducirano tekmovanje	The course will be focused on acquiring basic knowledge in the field of ecology of wildlife, which is necessary for understanding the need, goals and principles of the management of wildlife populations as an important renewable natural resource. **Main topics:** • **Populations of wildlife and their characteristics** (population size/density, spatial distribution of individuals, sex and age structure, natality and mortality, immigrations and emigrations, population dynamic, environmental resistance, compensatory mortality) • **Methods for determination (assessment) of population size** (census, sampling methods, control methods with indicators in adaptive management, modern technologies for distant censusing/registering of individuals) • **Carrying capacity** (ecological, economical and socio-political carrying capacity) • **Inter- and intra-specific interactions** (parasitism, predation, competition, induced competition with

zaradi naseljevanja tujerodnih vrst; spolni odnos, kanibalizem, socialno vedenje, teritorialnost)
- **osnove ekologije in biologije ključnih vrst velikih sesalcev: prostoživeči parkljarji in zveri** (razmnoževalni potencial, prostorsko vedenje, prehranske značilnosti, variabilnost telesnih mas, demografska struktura in ocenjevanje starosti)
- **konflikti med človekom in prostoživečimi živalmi v kulturni krajini** (trki z vozili; škode na kmetijskih površinah in v gozdovih; ukrepi za zmanjšanje možnosti nastanka konfliktnih situacij)
- **divjad v urbanem okolju** (trendi, konfliktne situacije, odnos javnosti, možnosti upravljanja)
- **(invazivne) tujerodne vrste divjadi** (tujerodne vrste v Sloveniji in regiji, vzroki in problematika širjenja, ukrepi za zmanjšanje problematike)
- **principi in metode upravljanja populacij** (vzroki in pomen sistematičnega upravljanja, upravljavski cilji, zakonske osnove, značilnosti upravljanja v Sloveniji in primerjalno v tujini, načrtovanje in izvajanje odvzema)
- **podatkovne baze in velike nacionalne zbirke vzorcev o prostoživečih živalih v Sloveniji ter njihov pomen** (lovski-informacijski sistem, zbirka čeljustnic)
- **aktualni primeri upravljanja populacij izbranih vrst v slovenskem in širšem evropskem prostoru** (divji prašič, navadni jelen, evropska srna, medved, volk, šakal, nutrija itd.)

alien species; sexual relationship, cannibalism, social behaviour, territoriality)
- **Basis of ecology/biology of the keystone large mammalian species: wild ungulates, carnivores** (reproductive potential, spatial behaviour, feeding ecology, variability of body mass, demographic structure and age assessment)
- **Conflicts between humans and wildlife in cultural landscape** (traffic collisions; damages in agriculture and forestry; mitigation measures for reducing conflict situations)
- **Wildlife in urban environment** (trends, conflicts, public attitudes, management alternatives)
- **(Invasive) alien game species** (alien species in Slovenia and in region, causes for and consequences of the spreading, countermeasures for reducing the problematic)
- **Principles and methods of population management** (causes for and importance of systematic management, management goals, basic legislation, principles of game management in Slovenia and abroad, planning of the harvest)
- **Database and large national collections on wildlife in Slovenia and their importance** (hunting-information system, national collection of mandibles)
- **Actual case studies on management of selected wildlife species in Slovenia and in Europe** (wild boar, red deer, European roe deer, brown bear, grey wolf, golden jackal, coypu etc.)

Temeljna literatura in viri / Textbooks:

Obvezna / Required:

1. Leskovic B. (ed.), Pičulin I. (ed.), 2012. Divjad in lovstvo. Ljubljana, Lovska zveza Slovenije, 631 str.

Priporočena / Recommended:

1. Putman R. (ed.), Apollonio M. (ed.), Andersen R. (ed.), 2011. Ungulate management in Europe: problems and practices. Cambridge, Cambridge University Press, 398 str.
2. Putman R. (ed.), Apollonio M. (ed.), 2014. Behaviour and management of European ungulates. Dunbeath, Whittles Publishing, 293 str.

Cilji in kompetence:

Predmetno specifični cilji in kompetence:
- študente seznaniti z osnovami upravljanja s populacijami prostoživečih živali oz. z velikimi vretenčarji v kopenskih ekosistemih
- študente seznaniti z nekaterimi ključnimi, redkimi, ogroženimi in/ali lovskoupravljavsko pomembnejšimi vrstami sesalcev in ptic, s poudarkom na značilnostih, ki so pomembne za trajnostno upravljanje populacij
- študenti bodo usposobljeni za prepoznavanje in reševanje najpogostejših konfliktnih situacij med ljudmi in prostoživečimi živalmi

Objectives and competences:

Specific competences:
- to acquaint students with basis of population management, i.e. with management of large vertebrates in terrestrial ecosystems
- to acquaint students with some keystone, rare, endangered and/or important game-management species of mammals and birds, with emphasis on characteristics/traits which are important for sustainable management of populations
- students will be qualified for recognizing and mitigating the most common conflict situations between humans and wildlife

- študenti bodo usposobljeni za izvajanje nalog na področju načrtovanja in upravljanja populacij prostoživečih živali v kopenskih ekosistemih

Splošne kompetence:

- sposobnost razumevanja pomena trajnostnega upravljanja in rabe obnovljivih naravnih virov
- sposobnost analize, sinteze in obvladovanja raziskovalnih in strokovnih metod/tehnik s področja splošne ekologije in ekologije živali

- students will be qualified for executing different issues in planning and managing of wildlife populations in terrestrial ecosystems

General competences:

- ability to understand the importance of sustainable management and usage of renewable natural resources
- ability to analyse, synthesize, and to employ research and expert methods/techniques in general ecology and in animal ecology

Predvideni študijski rezultati:

Znanje in razumevanje:

Študent bo ob zaključku predmeta sposoben:

- prepoznati vse vrste divjadi
- prepoznati najpomembnejše konfliktne situacije med ljudmi in prostoživečimi živalmi ter izbrati najprimernejše omilitvene ukrepe
- razumeti in razložiti vzročno-posledične dejavnike, ki vplivajo na populacijske trende
- razumeti zakonitosti, ki vladajo med populacijami in njihovim življenjskim okoljem
- razumeti pomen lovskoupravljavskega načrtovanja in sistematičnega upravljanja populacij divjadi
- razlikovati trajnostno od ne-trajnostnega upravljanja populacij
- uporabiti pridobljeno znanje o ekologiji prostoživečih živali v interdisciplinarnem odločanju glede prioritet trajnostnega razvoja
- primerjati značilnosti upravljanja s populacijami prostoživečih živali v Sloveniji s sosednjimi državami in prepoznati vzroke za razlike
- prepoznati prednosti in slabosti različnih sistemov in pristopov k upravljanju populacij prostoživečih živali

Prenosljive/ključne spretnosti in drugi atributi:

- sposobnost uporabe domače in tuje literature, zbiranja in interpretiranja podatkov, identifikacije in iskanja rešitev za probleme
- sposobnost pisanja člankov in javnega predstavljanja rezultatov
- uporaba kompleksnih zbirk podatkov

Intended learning outcomes:

Knowledge and understanding:

At the end of the subject, student will be able:

- to recognize all game species
- to recognize the most important conflict situations between humans and wildlife, and to select the best available mitigation measures
- to understand and to explain influential factors which affect and determine population trends
- to understand relationship between populations and their environment
- to understand the importance of planning process and systematic management of wildlife populations
- to differentiate between sustainable and non-sustainable population management
- to apply knowledge achieved in wildlife ecology in the interdisciplinary decisions about the priorities of the sustainable development
- to compare characteristics in the management of wildlife populations between Slovenia and neighbouring countries, and to recognize causes for differences
- to recognize pros and cons of different population management systems and approaches

Transferable/key skills and other attributes:

- ability to use Slovene and foreign literature, to collect and interpret data, to identify and look for solutions of problems
- ability to write manuscripts and to publicly present results obtained
- ability to use complex/comprehensive database

Metode poučevanja in učenja:

Oblike dela:

- predavanja
- samostojno delo študentov
- terenske vaje
- seminarske vaje (z vključevanjem strokovnjakov iz prakse in gostujočih predavateljev iz tujine)

Metode dela:

- razlaga

Learning and teaching methods:

Forms of teaching:

- in-class lectures
- individual work of students
- fieldwork
- tutorials (provided by invited guest lectures, i.e. experts from the practice and foreign high-school teachers)

Teaching methods:

• dialog, diskusija • preučevanje praktičnih primerov	• explanation • discussion, debate • presentation and discussion on case studies

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Pogoj za pristop k izpitu: sprejeto poročilo za seminarske vaje in terensko delo. Končna ocena pri predmetu je sestavljena iz ocene ustnega ali pisnega izpita (glede načina izvedbe so študenti obveščeni na uvodnem predavanju) in ocene poročila: • **poročilo s seminarskih vaj in terena** • **izpit** Vprašanja na izpitu se nanašajo na snov, podano na predavanjih. Ocenjevalna lestvica: ▪ zadostno 6: 60–67 % ▪ dobro 7: 68–75 % ▪ prav dobro 8: 76–83 % ▪ prav dobro 9: 84–90 % ▪ odlično 10: 91–100 %	 **20 %** **80 %**	A prerequisite for access to the exam: accepted report for tutorials and fieldwork. Final evaluation consists of the mark for oral or written exam (students are informed about the type of the exam at the first lecture), and the mark for the report: • **report for tutorials and fieldwork** • **final exam** Questions for the exam are in relation to material delivered in lectures. Grading scale: ▪ Sufficient D (6): 60–67% ▪ 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 :	**Material conditions for subject realization:**
• Predavalnica z multimedijsko opremo.	• Classroom with the multimedia equipment.

Obveznosti študentov:	**Student's commitments:**
75 % prisotnost na seminarskih vajah in 100 % pri terenskem delu. Za seminarske vaje in terensko delo morajo študenti pripraviti enotno poročilo, ki mora strokovno povzeti pridobljena znanja oz. morajo v njemu smiselno odgovoriti na zastavljena vprašanja. Potrebna je izvirnost, jezikovna pravilnost in oblikovna doslednost predloženega poročila. Pozitivno opravljen izpit.	75% attendance at tutorials and 100% at fieldwork. Students must prepare joint report for both tutorials and fieldwork; the report has to professionally summarized knowledge obtained or, alternatively, has to contain relevant answers on different questions. Originality, linguistic accuracy, and editorial consistency of the report are mandatory. Positive mark at the exam.

Reference nosilca predmeta:	**Lecturer's references:**
Pedagoško delo: • dekan Visoke šole za varstvo okolja od leta 2013 naprej • nosilec predmetov *Upravljanje s populacijami prostoživečih živali* in *Bioindikacija in biomonitoring* na VŠVO • nosilec predmetov *Varstvo kopenskih ekosistemov, Biologija in varstvo velikih vretenčarjev, Okoljski monitoring* in *Ekotoksikologija* na Univerzi na Primorskem (FAMNIT) • mentor trem mladim raziskovalkam z zaključenim doktoratom, mentor in somentor večjemu številu dodiplomskih in magistrskih študentov **Znanstveno-raziskovalno delo:**	**Pedagogic activities:** • Dean of the Environmental Protection College since 2013 • Holder of courses *Management of wildlife populations*, and *Bioindication and biomonitoring* at VŠVO • Holder of courses *Protection of terrestrial ecosystems*, *Biology and conservation of large vertebrates*, *Environmental monitoring*, and *Ecotoxicology* at the University of Primorska (FAMNIT) • Supervisor of three young researchers with defended Ph.D., and supervisor of several graduated and master students **Scientific and research work:** • Leader of several tenth projects on wildlife ecology and population management (funders: ARRS, MKGP, LZS)

- vodja več deset projektov s področja ekologije in upravljanja populacij prostoživečih živali (financerji: ARRS, MKGP, LZS)
- organizator in predsedujoči znanstvenemu odboru devetih mednarodnih konferenc/simpozijev o upravljanju divjadi (Velenje in Koper, 2007–2018)

Strokovno delo in izbrane strokovne publikacije:

- članstvo v več strokovnih komisijah za izboljšanje upravljanja populacij prostoživečih živali (ekspertna komisija za velike zveri MOP; komisija za izboljšanje upravljanja parkljaste divjadi MKGP; Strokovno-znanstveni svet in Komisija za upravljanje divjadi LZS)
- več kot 30 objavljenih strokovnih člankov s področja ekologije prostoživečih živali in upravljanja populacij
- več kot 40 intervjujev o ekologiji prostoživečih živali in upravljanju populacij v vodilnih slovenskih medijih in v mednarodnih medijih z velikim dometom

Pokorny B., Jelenko Turinek I., 2018. Čeljustnice prostoživečih parkljarjev: dragocen vir informacij o osebkih, vrstah in okolju (Strokovna knjižnica, 9). Lovska zveza Slovenije, Ljubljana, 137 str.

Pokorny B., Poličnik H., Jelenko I., 2012. Osnove ekologije divjadi. V: Leskovic B., Pičulin I. (ur.). Divjad in lovstvo (Zlatorogova knjižnica, 37). Ljubljana: Lovska zveza Slovenije, str. 234-250.

Priznanja in nagrade:

- *Prometej znanosti* za odličnost v komuniciranju in za prenos znanstvenih spoznanj h končnim uporabnikom (2017)
- srebrna *Zlatorogova plaketa* za objavljene strokovne prispevke na področju upravljanja divjadi (2016)

- Organizer and Head of the Scientific Committee at nine international conferences/symposia on wildlife management (Velenje and Koper, 2007–2018)

Professional work and selected professional publications:

- Membership in several professional committees aimed to improve population management (Expert commission for large carnivores, MOP; Commission for improvement of ungulate management, MKGP; Professional-scientific council and Commission for population management, LZS)
- More than 30 published professional/expert papers on wildlife ecology and population management
- More than 40 interviews about wildlife ecology and population management in the majority of leading Slovene media, and in international media with a large coverage

Pokorny B., Jelenko Turinek I., 2018. Mandibles of wild ungulates: valuable source of information on individuals, species and their environment (Strokovna knjižnica, 9). Hunters Association of Slovenia, Ljubljana, 137 pp.

Pokorny B., Poličnik H., Jelenko I., 2012. Basis of wildlife ecology. In: Leskovic B., Pičulin I. (eds.). Wildlife and Hunting (Zlatorogova knjižnica, 37). Ljubljana: Hunters Association of Slovenia, pp. 234-250.

Awards:

- *Prometei of the science* for the excellence in communication and for the transfer of the scientific achievements to the end-users (2017)
- Silver *Gold-horn plaque* for published professional papers on population management (2016)

Izbrani znanstveni članki / Selected scientific papers:

Chirichella R., **Pokorny B.**, Bottero E., Flajšman K., Mattioli L., Apollonio M., 2019. Factors affecting implantation failure in roe deer. *Journal of wildlife management*, doi: 10.1002/jwmg.21623.

Flajšman K., Borowik T., **Pokorny B.**, Jędrzejewska B., 2018. Effects of population density and female body mass on litter size in European roe deer at a continental scale. *Mammal research*, 63:91-98, doi: 10.1007/s13364-017-0348-7.

Pokorny B., Flajšman K., Centore L., Krope S., Šprem N., 2017. Border fence: a new ecological obstacle for wildlife in Southeast Europe. *European journal of wildlife research*, 63:a1, 6 pp., doi: 10.1007/s10344-016-1074-1.

Apollonio M., Belkin V.V., Borkowski J., Borodin O.I., Borowik T., Cagnacci F., Danilkin A.A., Danilov P.I., Faybich A., Ferretti F., **Pokorny B.**, et al., 2017. Challenges and science-based implications for modern management and conservation of European ungulate populations. *Mammal research*, 62:209-217, doi: 10.1007/s13364-017-0321-5.

Flajšman K., **Pokorny B.**, Chirichella R., Bottero E., Mattioli L., Apollonio M., 2017. I can produce more offspring as you can imagine: first records on exceptionally large litters in roe deer in central/southern Europe. *European journal of wildlife research*, 63:a42, 8 pp., doi: 10.1007/s10344-017-1102-9.

Flajšman K., Jerina K., **Pokorny B.**, 2017. Age-related effects of body mass on fertility and litter size in roe deer. *PLoS one*, 12:a175579, doi: 10.1371/journal.pone.0175579.

Špur N., **Pokorny B.**, Šorgo A., 2017. Public willingness to participate in actions for crow management. *Wildlife research*, 44:343-353, doi: 10.1071/WR17004.

Špur N., **Pokorny B.**, Šorgo A., 2016. Attitudes toward and acceptability of management strategies for a population of hooded crows (*Corvus cornix*) in Slovenia. *Anthrozoös*, 29:669-682, doi: 10.1080/08927936.2016.1228766.

Massei G., **Pokorny B.**, et al., 2015. Wild boar populations up, numbers of hunters down: A review of trends and implications for Europe. *Pest management science*, 71:492-500, doi: 10.1002/ps.3965.

Pokorny B., Flajšman K., Jelenko I., 2014. The importance and impacts of crows, with emphasis on hooded crow (*Corvus cornix*), in the (sub)urban environment. *Acta silvae et ligni*, 103:47-60, doi: 10.20315/ASetL.103.4.

Jerina K., **Pokorny B.**, Stergar M., 2014. First evidence of long-distance dispersal of adult female wild boar (*Sus scrofa*) with piglets. *European journal of wildlife research*, 60:367-370, doi: 10.1007/s10344-014-0796-1.

Flajšman K., Jelenko I., Poličnik H., **Pokorny B.**, 2013. Reproductive potential of roe deer (*Capreolus capreolus* L.): review of the most important influential factors. *Acta silvae et ligni*, 102:1-20, doi: 10.20315/ASetL.102.1.

Konjević D., Jelenko I., Severin K., Njemirovskij V., Poličnik H., **Pokorny B.**, Barić J., Slavica A., 2012. Toward a reduction in tooth number: the case of P1 in roe deer from Slovenia. *The Italian journal of zoology*, 79:395-401, doi: 10.1080/11250003.2011.654271.

Konjević D., Jelenko I., Severin K., Poličnik H., Janicki Z., Slavica A., Njemirovskij V., Stanin D., **Pokorny B.**, 2011. Prevalence of mandibular osteomyelitis in roe deer (*Capreolus capreolus*) in Slovenia. *Journal of wildlife diseases*, 47:393-400.

Poglavja v znanstvenih monografijah / Chapters in scientific monographies:

Csányi S., Carranza J., **Pokorny B.**, Putman R., Ryan M., 2014. Valuing ungulates in Europe. In: Putman R., Apollonio M. (eds.). Behaviour and management of European ungulates. Dunbeath: Whittles Publishing, pp. 13-45.

Langbein J., Putman R., **Pokorny B.**, 2011. Traffic collision involving deer and other ungulates in Europe and available measures for mitigation. In: Putman R., Apollonio M., Andersen R. (eds.). Ungulate management in Europe: problems and practices. Cambridge: Cambridge University Press, pp. 215-259.