UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	Teorija odločanja
Course title:	Decision theory

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Informacijske znanosti, doktorski študijski program tretje stopnje	Računalniške znanosti	Drugi	Tretji or četrti
Information Sciences, third cycle Doctoral Study Programme	Computer Sciences	Second	Third or fourth

Vrsta predmeta / Course type	Izbirni / Elective
Univerzitetna koda predmeta / University course code:	1-IZ-DR-RZ-IP-TODL-2024-04-24

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
30	-	-	-	-	270	10

Nosilec predmeta / Lecturer:	prof. dr. Biljana Mileva Boshkoska

Jeziki / Languages:	**Predavanja / Lectures:**	Slovenski, angleški / Slovene, English
	Vaje / Tutorial:	

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisits:**
Pogoj za vključitev v delo je vpis v 1. ali 2. letnik doktorskega študija.	A prerequisite for participation is enrollment into the 1st or 2nd year of the study programme.

Vsebina:	**Content (Syllabus outline):**
● Formulacija in strukturiranje problema odločanja (odločitveni proces, pomoč pri odločanju, modeliranje procesa pomoči pri odločanju, metode strukturiranja problemov, predstavitev strukturiranja problema, oblikovanje odločitvenega problema). ● Preference in številke (vrednotenje in pomen, števila in preferencna razmerja, točkovno vrednotenje, vrednotenje na intervalni lestvici, na lestvici razmerja).	● Decision problem formulation and structuring (decision process, decision aiding, modeling decision aiding process, problem structuring methods, representation of the problem structuring, formulating a decision problem). ● Preferences and numbers (evaluation and meaningness, numbers and preference relations, pointwise

- Združevanje (agregacijske funkcije, Borda metoda, kombinirano merjenje, parametri).
- Postopki združevanja (funkcije agregacije, združevanje na preferenčnih relacijah, agregacijski mehki odnosi, združevanje tabele uspešnosti, agregacija tabele jezikovne uspešnosti).
- Modeli večdimenzionalnih preferenc (aditivni model, modeli, ki temeljijo na obrobnih sledovih).

evaluations o fan ordilan scale, on an interval scale, on a ratio scale).
- Aggregation (aggregation functions, Borda method, conjoint measurement, parameters).
- Aggregation procedures (aggregation functions, aggregation on preference relations, aggregation fuzzy relations, aggregation of a performance table, aggregation of a linguistic performance table).
- Multi'dimensional preference models (additive model, models based on marginal traces).

Temeljni literatura in viri / Readings:

- Kochenderfer, M. J., Wheeler, T. A., & Wray, K. H. (2022). *Algorithms for Decision Making.* The MIT Press.
- Papathanasiou, J., Zarate, P., & Freire de Sousa, J. (Eds.). (2021). *EURO Working Group on DSS : a tour of the DSS developments over the last 30 years.* Springer.
- Papathanasiou, J., & Ploskas, N. (2018). *Multiple Criteria Decision Aid Methods, Examples and Python Implementations.* Springer.
- Abbas, A. E., & Howard, R. A. (2016). *Foundations of Decision Analysis (Global Edition).* Pearson.
- Saaty, T. L. (2010). *Mathematical Principles of Decision Making (Principia Mathematica Decernendi): The Complete Theory of Analytical Hierarchy Process.* RWS Publications. ISBN-13: 978-1888603101.
- Bouyssou, D., Marchant, T., Pirlot, M., Tsoukias, A., & Vincke, P. (2006). *Evaluation and Decision Models with Multiple Criteria: Stepping Stones for the Analyst.* Springer.

Cilji in kompetence:

Učna enota prispeva k razvoju naslednjih splošnih in predmetno specifičnih kompetenc:

Splošne kompetence:
- Sposobnost identificiranja danega raziskovalnega problema, njegove analize, ovrednotenja ter oblikovanja možnih rešitev.
- Ustvarjanje novega znanja, ki pomeni relevanten prispevek k razvoju znanosti.
- Sposobnost obvladanja standardnih metod, postopkov in procesov raziskovalnega dela na znanstvenem področju študija.
- Sposobnost samostojnega raziskovalno-razvojnega dela in vodenje raziskovalne skupine.

Objectives and competences:

The module contributes to the following general and subject-specific competences:

General competences:

- Ability to identify a given research problem, analyze it, evaluate it, and formulate possible solutions.
- Create new knowledge that represents a relevant contribution to the development of science.
- Ability to master standard methods, procedures, and processes of research work in the specific field of stody.
- Ability to conduct independent research and development work and lead a research team.

● Prizadevanje za kakovost znanstveno-raziskovalnega ustvarjanja skozi avtonomnost, (samo)kritičnost, -(samo)refleksivnost in (samo)evalviranje. ● Zavezanost profesionalni etiki.. ● Sposobnost inovativne uporabe in kombiniranja raziskovalnih metod Predmetno-specifične kompetence: ● Sposobnost poglobljenega proučevanja teorije odločanja ter kritičnega ocenjevanja nabora metod za podporo pri odločanju ter simulacija odločitvenih modelov ● Načrtovanje ter izvedba rešitve za izvirne odločitvene znanstvene probleme s področja teorije odločanja.	● Strive for quality in scientific research work through autonomy, (self-)criticism, (self-)reflectivity, and (self-)evaluation. ● Be committed to professional ethics. ● Ability to innovatively use and combine diverse research methods. Subject-specific competences: ● In-Ability to in-depth examine decision theory, critical evaluation of a set of decision support methods, and simulation of decision models. ● Ability to design solution and implement it for the original scientific decision problems from the field of decision making.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Študent/študentka: ● Preuči, analizira, primerja, nabor metod za podporo pri odločanju; ● zna konstruirati odločitvene modele; ● je sposoben za konstruiranja rešitve konkretnih raziskovalnih problemov s pomočjo teorije odločanja.	*The student:* ● Examine, analyze, compare a set of methods to support a decision making; ● knows how to construct decision models; ● is able to construct solutions to concrete research problems with the help of decision theory.

Metode poučevanja in učenja:	**Learning and teaching methods:**
● *Predavanja* z aktivno udeležbo študentov (razlaga, diskusija, vprašanja, primeri, reševanje problemov, predstavitve); ● *Individualne in skupinske konzultacije* (diskusija, dodatna razlaga, obravnava specifičnih vprašanj).	● *Lectures* (explanation with discussions, questions, case studies, presentations); ● *Individual and group consultations* (debate, additional explanations, considering specific issues).

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Način (pisni, ustno izpraševanje, naloge, projekt)		**Type (examination, oral, coursework, project)**
● Pisni izpit, s katerim se preveri teoretično znanje	50 %	● Written exam to check the theoretical knowledge
● Praktična raziskovalna naloga prilagojena doktorski temi posameznega študenta	50 %	● Practical research assignment customized for to each student dissertation focus

Reference nosilca / Lecturer's references:

- Andonovikj, V., Boškoski, P., Evkoski, B., Redek, T., & Boshkoska Mileva, B. (2022). Community analysis in Slovenian labour network 2010-2020. *Journal of Decision Systems, 31*(1), 308–318. https://doi.org/10.1080/12460125.2022.2070944
- Hajnić, M., & Boshkoska Mileva, B. (2021). A disruptive decision support platform for reengineering the strategic transfer of employees. *IEEE Access, 9*, 9. https://doi.org/10.1109/ACCESS.2021.3059895
- Boshkoska Mileva, B., Miljković, D., Valmarska, A., Gatsios, D., Rigas, G., Konitsiotis, S., Tsiouris, K. M., Fotiadis, D., & Bohanec, M. (2020). Decision support for medication change of Parkinson's disease patients. *Computer Methods and Programs in Biomedicine, 196*, 105552. https://doi.org/10.1016/j.cmpb.2020.105552
- Hajnić, M., & Boshkoska Mileva, B. (2020). A decision support model for the operational management of employee redeployment in large governmental organizations. *Journal of Decision Systems*, 29, 204–212.