



Univerza v Mariboru

Fakulteta za naravoslovje  
in matematiko

**OPIS PREDMETA / SUBJECT SPECIFICATION**

<b>Predmet:</b>	<b>Izbrana poglavja iz filozofije tehnike in tehnologije ter filozofije duha, umetne inteligence</b>
<b>Subject Title:</b>	<b>Selected Issues in Philosophy of Technics and Technology, Philosophy of Mind, Artificial Intelligence</b>

<b>Študijski program Study programme</b>	<b>Študijska smer Study field</b>	<b>Letnik Year</b>	<b>Semester Semester</b>
Tehnika – področje izobraževanja, 3. stopnja		1	Letni
		ali	
Education in Engineering, 3 <sup>rd</sup> cycle		2	zimski
		1	Summer
		or	
		2	winter

Univerzitetna koda predmeta / University subject code:

<b>Predavanja Lectures</b>	<b>Seminar Seminar</b>	<b>Sem. vaje Tutorial</b>	<b>Lab. vaje Lab. work</b>	<b>Teren. vaje Field work</b>	<b>Samost. delo Individ. work</b>	<b>ECTS</b>
10	5				75	3

Nosilec predmeta / Lecturer:

Janez Bregant, Bojan Borstner

**Jeziki /**

**Languages:**

**Predavanja / Lecture:**

**Vaje / Tutorial:**

Slovenščina / Slovene

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

Osnovno znanje računalništva.

**Prerequisites:**

Basic knowledge of computer science.

**Vsebina:**

- Metafizika naravnih in ustvarjenih predmetov.
- Pomen "techne" v antičnem razumevanju sveta kot ustvarjenega.
- Tehnika in tehnologija v srednjem veku – kako posnemati naravo.
- Renesansa in poudarjanje človekove ustvarjalnosti v preoblikovanju sveta.
- Tehnika in tehnologija kot rezultat razvoja čiste znanosti.
- Eksperimentalna znanost in razvoj tehnike in tehnologije v 19. in 20. stoletju
- Dosežki in nevarnosti razvoja tehnike in tehnologije v sodobnem svetu.
- Razumevanje odnosa tehnike ter tehnologije in družbe – normativnost in etičnost.
- Metafizika duha: zgodovina, dualizem (substanc in lastnosti), redukcija, funkcionalizem.

**Contents (Syllabus outline):**

- Metaphysics of natural and artificial objects.
- The role of "techne" in ancient interpretation of the created world.
- Technics and technology in mediaeval times – how to imitate nature.
- The Renaissance and the importance of human creativity in the world's alteration.
- Technics and technology as an outcome of the progress in pure science.
- Experimental science and development of technics and technologies in 19. and 20. century.
- Advantages and threats of technics and technologies in modern world.
- Understanding the interaction between technics, technologies and society – normativity and ethical dimension.
- Metaphysics of mind: history, (substance and property) dualism, reduction, functionalism.

- Epistemologija duha: ali imajo tudi drugi duha, ali je njihov duh podoben našemu, ali imamo sposobnost notranjega opazovanja naših mentalnih pojavov, kaj pomeni imeti privilegiran dostop do vsebine mentalnih pojavov.
- Zavest: narava zavesti, zveza med zavestjo in svobodno voljo, vrste zavesti.
- Umetna inteligenca: začetki, cilji, pristopi, problemi.
- Nevroznanost: teorija nevronov: zgodovinski pregled, celična zgradba živčnega sistema, način delovanja nevronov, nevronske mreže.
- Filozofija nevroznanosti: kaj nevroznanost pojasnjuje, kaj je nevroznanstvena pojasnitev, s katerimi metodami nevroznanstveniki pridejo do znanja in kako to, da so njihova orodja zanesljiva in učinkovita,
- Nevrofilozofija: uporaba nevroznanstvenih dognanj pri reševanju tradicionalnih problemov filozofije duha: kje so predstave, kakšno naravo imajo čustva, kje je locirana zavest, kakšno naravo ima osebno kvalitativno izkustvo (takšnost).
- Glede na izbrano temo doktorskega študija, je del predmeta posvečen tudi uvajanju študenta v področje, ki ga bo njegova raziskava pokrivala.

- Epistemology of mind: do others also have minds, are these minds similar to ours, do we have some special capacity of internal observation of our mental states, what is to have the privileged access to contents of our minds.
- Consciousness: the nature of consciousness, a relation between consciousness and free will, concepts of consciousness.
- Artificial intelligence: beginnings, aims, approaches, problems.
- Neuroscience: theory of neurons: historical overview, cellular structure of the nervous system, how neurons work, neural networks.
- Philosophy of neuroscience: what does neuroscience explain, what is a neuroscientific explanation, what are the methods used by neuroscientists in order to gain knowledge and why are their instruments reliable and effective.
- Neurophilosophy: application of neuroscientific results to solve traditional problems in philosophy of mind: where are representations, what is the nature of emotions, what is a location of consciousness, what is the nature of subjective qualitative experiences (qualia).
- Given a topic of a PhD study, part of the subject is dedicated to an introduction of a student into the field that is going to be covered by her research.

#### **Temeljni študijski viri / Textbooks:**

Bechtel, W., Mandik, P., Mundale, J., Stufflebeam, R. (ur.) (2001). *Philosophy and the Neurosciences*. Oxford: Blackwell Publishers. Bechtel, W., Abrahamsen, A. (2002). *Connectionism and the Mind*. Oxford: Blackwell Publisher.

Bermudez, J. J. (2010). *Cognitive Science*. Cambridge: Cambridge University Press.

Borgmann, A. (1984) *Technology and the character of contemporary life: a philosophical inquiry*. Chicago/London: University of Chicago Press.

Bucciarelli, L. L. (1994) *Designing engineers*. Cambridge, Mass.: MIT Press.

Churchland, P. M. (2002). *Brain-Wise: Studies in Neurophilosophy*. Cambridge: The MIT Press.

Copeland, J. (1993): *Artificial Intelligence: A Philosophical Introduction*. Oxford: Basil Blackwell.

Davies, M. (2005) *Engineering ethics*. Aldershot/Burlington, VT: Ashgate.

Dennet, D. C. (1993). *Consciousness Explained*. London: Penguin.

Feenberg, A. (1999) *Questioning technology*. London/New York: Routledge.

Ihde, D., and E. Selinger (2003) *Chasing technoscience: matrix for materiality*. Bloomington: Indiana

University Press.

Kim, J. (2018). *Philosophy of Mind*, 3rd ed. New York: Routledge.

Markič, O., Bregant, J. (ur.) (2007). *Narava mentalnih pojavov*. Maribor: Aristej.

Meijers, A., ed. (2009) *Philosophy of technology and engineering sciences* (Handbook of the philosophy of science, volume 9). Amsterdam: North-Holland.

Mitcham, C. (1994) *Thinking through technology: the path between engineering and philosophy*. Chicago: University of Chicago Press.

Tye, M. (1997). *Ten Problems of Consciousness*. Cambridge: The MIT Press.

Verbeek, P. P. (2005) *What things do: philosophical reflections on technology, agency, and design*. Translated by R. P. Crease. University Park, PA: Penn State University Press.

**Cilji:**

Cilj predmeta je razvijati filozofske kompetence in argumentativne sposobnosti s pomočjo razumevanja izbranih poglavij iz filozofije tehnike in tehnologije, filozofije duha, tj. problem duha in telesa, zavest, umetna inteligenca in/ali nevrofilozofija, ter razpravljanja o njihovih rešitvah, ki temelji na kritičnem ocenjevanju predlaganih odgovorov in iskanju samostojnih ter izvernih rešitev.

**Objectives:**

The objective of this course is to evolve philosophical competence and argumentative capacities by the help of understanding selected issues in philosophy of technics and technology, philosophy of mind, i.e. the mind-body problem, consciousness, artificial intelligence and/or neurophilosophy, and by discussing their solutions based on a critical evaluation of proposed answers and on a search for autonomous and original solutions.

**Predvideni študijski rezultati:**

Znanje in razumevanje:

Po zaključku tega predmeta bo študent sposoben:

- Znanje in razumevanje: prepoznati filozofska vprašanja v različnih vrstah razprav, jasno in z občutkom predstaviti različno stara besedila različnih tradicij, natančno izraziti misli pri analizi in oblikovanju zapletenih ter spornih problemov.
- Uporaba in analiza: analizirati in razvijati zdrave argumente ter prepoznati v njih logične zmote, metodološke napake, metaforične trditve ali nepotrjene ljudske modrosti, izmišljati ali odkrivati primere v podporo ali zoper neko stališče in razlikovati med tistimi, ki so relevantni, in tistimi, ki niso.
- Sinteza in vrednotenje: kritično preučevati in samostojno oblikovati najboljše argumente za različna stališča ter iskati njihove najšibkeje korake, strpno in odprto vrednotiti poglede in argumente drugih,

**Intended learning outcomes:**

Knowledge and Understanding:

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

- Knowledge and understanding: identify underlying issues in all kinds of debates, sensitively interpret texts drawn from a variety of ages and traditions, express and formulate complex and controversial problems precisely.
- Use and analysis: analyse and construct sound arguments and recognise logical fallacies, methodological errors, rhetorical devices or unexamined conventional wisdom, invent or discover cases to support or challenge a position, and distinguish those that are relevant from those that are not.
- Synthesis and evaluation: critically examine and independently formulate the best arguments for variety of positions and look for their weakest parts, evaluate views and arguments of others tolerantly and openly, conceptualize her own philosophical activity.

konceptualizirati lastno filozofsko dejavnost.	
<b>Metode poučevanja in učenja:</b>	<b>Learning and teaching methods:</b>
<ul style="list-style-type: none"> <li>• Seminar z razpravo;</li> <li>• Predstavitev izbranih poglavij.</li> </ul>	<ul style="list-style-type: none"> <li>• Seminar with a discussion;</li> <li>• Presentation of chosen issues.</li> </ul>

<b>Načini ocenjevanja:</b>	Delež (v %) / Weight (in %)	<b>Assessment:</b>
Način (pisni izpit, ustno izpraševanje, naloge, projekt) <ul style="list-style-type: none"> <li>• Opravljena predstavitev;</li> <li>• Opravljen seminar.</li> </ul> Vsaka izmed naštetih obveznosti mora biti opravljena s pozitivno oceno.	50%  50%	Type (examination, oral, coursework, project): <ul style="list-style-type: none"> <li>• Completed presentation;</li> <li>• Completed seminar.</li> </ul> Each of the mentioned commitments must be assessed with a passing grade.

**Reference nosilca / Lecturer's references:**

<p>1. STOŽER, Andraž, BREGANT, Janez. The colour dilemma : a subjectivist answer. V: BORSTNER, Bojan (ur.), GARTNER, Smiljana (ur.). Thought experiments between nature and society : a festschrift for Nenad Miščević. Newcastle upon Tyne: Cambridge Scholars, 2017. Str. 274-285. ISBN 978-1-4438-8643-7, ISBN 1-4438-8643-2. [COBISS.SI-ID 23227912]</p> <p>2. STOŽER, Andraž, BREGANT, Janez. Physicalist and dispositionalist views on colour : a physiological objection. Acta analytica. [Online ed.]. 2017, vol. 32, issue 1, str. 73-93. ISSN 1874-6349. DOI: 10.1007/s12136-016-0296-x. [COBISS.SI-ID 512600376], [SNIP, WoS do 15. 3. 2020: št. citatov (TC): 1, čistih citatov (CI): 1, Scopus do 3. 12. 2019.</p> <p>3. BORSTNER, Bojan, BREGANT, Janez, GARTNER, Smiljana. Critical thinking between theory and practice : thought experiments as an element of argumentation. V: ABERŠEK, Boris (ur.), et al. Cognitive science in education and alternative teaching strategies. Newcastle upon Tyne: Cambridge Scholars. 2017, str. 161-176. [COBISS.SI-ID <a href="#">23394312</a>]</p> <p>4. BORSTNER, Bojan, GARTNER, Smiljana. Almost the same but still different : assimilation, integration and amalgamation. V: BORSTNER, Bojan (ur.), ONIČ, Tomaž (ur.), ZUPAN, Simon (ur.). <i>Od jezika k filozofiji in nazaj : Festschrift ob 75-letnici Dunje Jutronić</i>. 1. izd. Maribor: Univerzitetna založba Univerze. 2019, str. 223-239. <a href="http://press.um.si/index.php/ump/catalog/view/415/419/693-2">http://press.um.si/index.php/ump/catalog/view/415/419/693-2</a>. [COBISS.SI-ID <a href="#">24662024</a>]</p>	financer: ARRS, Programi, P6-0144, SI, Laboratorij uma: miselni eksperimenti od narave do družbe kategorija: 3B (Z, A1/2); tip dela je verificiral OSICH točke: 20, št. avtorjev: 2
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5. BORSTNER, Bojan, BREGANT, Janez, GARTNER, Smiljana. Critical thinking between theory and practice : thought experiments as an element of argumentation. V: ABERŠEK, Boris (ur.), et al. *Cognitive science in education and alternative teaching strategies*. Newcastle upon Tyne: Cambridge Scholars. 2017, str. 161-176. [COBISS.SI-ID [23394312](#)]

kategorija: 3B (Z, A1/2); tip dela je verificiral OSICH  
točke: 13.33, št. avtorjev: 3

6. BORSTNER, Bojan. Stilske vežbe ili šta to danas filozofi (treba da) rade. V: ARSENIJEVIĆ, Miloš (ur.), LAZOVIĆ, Živan (ur.). *U sećanje na Svetlanu Knjazev-Adamović : zbornik radova njenih prijatelja, učenika i kolega*. Beograd: Srpsko filozofsko društvo: Institut za filozofiju: Filozofski fakultet. 2016, str. 55-71. [COBISS.SI-ID [23175176](#)]

kategorija: 3B (Z, A1/2); tip dela je verificiral OSICH  
točke: 40, št. avtorjev: 1

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