



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		1	Letni
		ali	
Education in Engineering		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: problem duha in telesa (kakšna je relacija med mentalnimi in fizičnimi stanji).
- Epistemologija duha: ali imajo tudi drugi duha, ali je njihov duh podoben našemu,

**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: the mind-body problem (what is a relation between mental and physical states),

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.
- Problemi zavesti: problem lastništva, problem subjektivne perspektive, problem mehanizma, problem fenomenalne vzročnosti, problem superslepote, problem dvojnikov, problem obrnjenega spektra, problem transparentnosti, problem lokacije, problem tujega uda.
- Filozofija duha in umetna inteligenca: reprezentacije, intencionalnost, komputacija.
- Umetna inteligenca: začetki, cilji, pristopi, problemi.
- Filozofska vprašanja znotraj umetne inteligence: ali stroji lahko mislijo, ali se stroji zavedajo, ali stroji lahko čutijo, ali stroji ravnajo svobodno.
- Mentalna vzročnost: definicija, motivacija, vrste.
- Problemi mentalne vzročnosti: anomalni monizem, ekstrinzičnost mentalnih lastnosti, vzročna izključitev mentalnega.
- Nevroznanost: teorija nevronov: zgodovinski pregled, celična zgradba živčnega sistema, način delovanja nevronov, nevrnske mreže.
- Filozofija duha: zgodovina, dualizem (substanc in lastnosti), redukcija, funkcionalizem.
- 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.
- Problems of consciousness: the problem of ownership, the problem of subjective perspective, the problem of mechanism, the problem of phenomenal causation, the problem of super blindsight, the problem of duplicates, the problem of inverted spectrum, the problem of transparency, the problem of location, the problem of alien limb.
- Philosophy of mind and artificial intelligence: representation, intentionality, computation.
- Artificial intelligence: beginnings, aims, approaches, problems.
- Philosophical questions within artificial intelligence: can machines think, are computers conscious, can machines sense, are computers free in acting.
- Mental causation: definition, motivation, types.
- Problems of mental causation: anomal monism, extrinsicness of mental properties, causal exclusion of the mental.
- Neuroscience: theory of neurons: historical overview, cellular structure of the nervous system, how neurons work, neural networks.
- Philosophy of mind: history, (substance and property) dualism, reduction, functionalism.
- 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.
- Bermúdez, J. L. (2005). *Philosophy of Psychology: A Contemporary Introduction*. London: Routledge.
- Bermudez, J. J. (2010). *Cognitive Science*. Cambridge: Cambridge University Press.
- Bickle, J. (2003). *Philosophy and Neuroscience: A Ruthlessly Reductive Account*. Dordrecht: Kluwer Academic Publishers.
- Borgmann, A. (1984) *Technology and the character of contemporary life: a philosophical inquiry*. Chicago/London: University of Chicago Press.
- Bregant, J. (2004): *Misel kot vzrok*. Pedagoška fakulteta: Maribor.
- Bucciarelli, L. L. (1994) *Designing engineers*. Cambridge, Mass.: MIT Press.
- Churchland, P. M. (1989). *Neurophilosophy*. Cambridge: The 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.
- Hofstadter, D. R., Dennett, D. C. (ur.) (1990). *Oko duha*. Ljubljana: Mladinska knjiga.
- Ihde, D., and E. Selinger (2003) *Chasing technoscience: matrix for materiality*. Bloomington: Indiana University Press.
- Kim, J. (1996): *Philosophy of Mind*. Boulder: Westview Press.
- 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.
- Miščević, N., Markič, O. (1998). *Fizično in Psihično*. Šentilj: Aristej.
- 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 inteligence in/ali nevrofilozofija, ter razpravljanja o njihovih rešitvah, ki temelji na kritičnem ocenjevanju predlaganih odgovorov in iskanju samostojnih ter izvirnih 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 najšibkejše korake, strpno in odprto vrednotiti poglede in argumente drugih, konceptualizirati lastno filozofsko dejavnost.

**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.

**Metode poučevanja in učenja:**

- Seminar z razpravo;
- Predstavitve izbranih poglavij.

**Learning and teaching methods:**

- Seminar with a discussion;
- Presentation of chosen issues.

**Načini ocenjevanja:**

Delež (v %) /  
Weight (in %)

**Assessment:**

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

- Opravljena predstavitve;
- Opravljen seminar.

50%

50%

Type (examination, oral, coursework, project):

- Completed presentation;
- Completed seminar.

Vsaka izmed naštetih obveznosti mora biti opravljena s pozitivno oceno.

Each of the mentioned commitments must be assessed with a passing grade.

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### Reference nosilca / Lecturer's references:

1. BREGANT, Janez. Physicalism, or something near enough : good enough to be a global theory?. *Croatian journal of philosophy*, ISSN 1333-1108, 2009, vol. 9, no. 26, str. 219-232. [COBISS.SI-ID [17104904](#)]
2. BREGANT, Janez, STOŽER, Andraž, CERKVENIK, Marko. Molecular reduction : reality or fiction?. *Synthese (Dordrecht)*, 2010, 172, str. 437-450, doi: [10.1007/s11229-008-9401-z](#). [COBISS.SI-ID [16399112](#)]
3. BREGANT, Janez. Ali lahko stroj misli?. *Analiza (Ljubl.)*, 2010, letn. 14, št. 4, str. 55-72. [COBISS.SI-ID [18174728](#)]
4. BREGANT, Janez. Funkcionalizem, računalniki in "kitajska soba". *Analiza*, ISSN 1408-2969, 2013, letn. 17, št. 3, str. 67-95, ilustr. [COBISS.SI-ID [20307976](#)]
5. ABERŠEK, Boris, BORSTNER, Bojan, BREGANT, Janez. Virtual teacher : cognitive approach to e-learning material. Newcastle upon Tyne: Cambridge Scholars Publishing, 2014. XI, 289 str., ilustr. ISBN 1-4438-6524-9. ISBN 978-1-4438-6524-1. [COBISS.SI-ID [20951304](#)]
6. BORSTNER, Bojan. Sachverhalte, Eigenschaften und Kausalität. V: HÜNTELMANN, Rafael (ur.), TEGTMEIER, Erwin (ur.). *Neue Ontologie und Metaphysik*. 1. Aufl. Sankt Augustin: Academia, 2000, str. 107-129. [COBISS.SI-ID [9684488](#)]
7. CARVALHO, Joaquim, BORSTNER, Bojan. Religions, identities and citizenships. V: ISAACS, Ann Katherine (ur.). *Citizenships and identities : inclusion, exclusion, participation*, (Transversal theme, Citizenships and identities). Pisa: Edizioni Plus, Pisa University Press, cop. 2010, str. 105-138. [COBISS.SI-ID [18408712](#)]
8. BORSTNER, Bojan, GARTNER, Smiljana. Teaching ethics and critical thinking in contemporary schools. V: LAMANAUSKAS, Vincentas (ur.). *Philosophy of mind and cognitive modelling in education - 2014*, (Problems of education in the 21st century, ISSN 1822-7864, vol. 61). Siauliai: Scientific Methodological Center Scientia Educologica, 2014, str. 9-17. [COBISS.SI-ID [20941576](#)]