

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Metode znanstveno raziskovalnega dela
Course title:	Methods of Scientific Research

Študijski program in stopnja <i>Study programme and level</i>	Študijska smer <i>Study field</i>	Letnik <i>Academic year</i>	Semester <i>Semester</i>
Inženiring in avtomobilska industrija		1.	1.
Engineering and Automotive Industry		1	1

Vrsta predmeta / Course type:	Obvezni	Obligatory
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Univerzitetna koda predmeta / University course code:	MAG_21002
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Predavanja <i>Lectures</i>	Seminar <i>Seminar</i>	Sem. vaje <i>Tutorial</i>	Lab. vaje <i>Laboratory work</i>	Teren. vaje <i>Field work</i>	Samost. delo <i>Individ. work</i>	ECTS
30		45	-	-	135	7

Nosilec predmeta / Lecturer:	Doc. dr. Damjan Balabanič	Assist. Prof. Damjan Balabanič, PhD
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Jeziki / Languages:	Predavanja / Lectures:	Vaje / Tutorial:
	Slovenski, angleški	Slovenski, angleški
	Slovenian, English	Slovenian, English

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
- Vpis v 1. letnik študija.	- Enrolment in the first year of study.

Vsebina:	Content (Syllabus outline):
<ul style="list-style-type: none"> - Uvod. - Pojem znanosti. Sistematika pojmov s področja znanosti in raziskovanja. Vrste raziskovalnega dela: temeljno, aplikativno, razvojno raziskovalno delo. - Zgodovinski razvoj znanosti. - Splošne metode raziskovalnega dela. Znanstvena metoda, znanstvena hipoteza, znanstveni zakoni. Splošne raziskovalne metode. - Etika raziskovalnega dela. Plagiat. Goljufije v znanosti. 	<ul style="list-style-type: none"> - Introduction. - The concept of science. Systematic concepts in the field of science and research. Types of research: basic, applied, research and development. - Historical development of science. - General methods of research. Scientific method. Research hypothesis, research laws. General research methods. - Ethics of research. Plagiarism. Fraud in science.

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<ul style="list-style-type: none"> – Moralno etični lik raziskovalca in njegova odgovornost. Etični problemi raziskovanja. – Raziskovalni proces. – Znanost in komunikacija – Znanost v medijih – Iskalne tehnike. – Objava raziskovalnih rezultatov. Tipologija člankov. 	<ul style="list-style-type: none"> – Moral and ethical character of the researcher and responsibilities. Ethical challenges of research. – Research process. – Science and communication. – Science in the media. – Searching techniques. – Publishing research results. Typology of articles.
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Temeljna literatura in viri:

Readings:

<p>Obvezna literatura / Required reading(s):</p> <ul style="list-style-type: none"> – Blaxter, L., Hughes, C., & Tight, M. (2006). <i>How to Research</i> (4. izd.). New York: Mc Graw-Hill – Publication manual of the American Psychological Association. (2009). Washington, DC: American Psychological Association. – Thiel, D. V. (2014). <i>Research Methods for Engineers</i>. Cambridge: Cambridge University Press. – Sage handbook of survey methodology. (2016). Sage Publications. – E-gradiva predmeta E-Course material <p>Dodatna – dopolnilna / Recommended reading(s):</p> <ul style="list-style-type: none"> – Booth, W. C., Colomb, G. G., & Williams, J. M. (2008). <i>The craft of research</i>. Chicago: University of Chicago Press. – Creswell, J. W. (2014). <i>Research Design: Qualitative, Quantitative, and Mixed Methods Approaches</i> (4. izd.). Thousand Oaks, CA: SAGE Publications. – Fink, A. (2003). <i>The survey kit</i>. Thousand Oaks, CA: Sage Publications. – Kumar, R. (2011). <i>Research Methodology: A step by step guide for beginners</i>. London: SAGE Publications.

Cilji in kompetence:

Objectives and competences:

<p>Cilji</p> <p>Študent:</p> <ul style="list-style-type: none"> – pridobi temeljno znanje o znanosti, njeni strukturi in razvoju, – pridobi osnovna metodološka znanja za raziskovalno delo, – spozna splošne raziskovalne metode, – spozna raziskovalni proces in prenos raziskovalnih rezultatov v prakso, – ima posebni poudarek je na etičnem vidiku raziskovalnega dela. – pozna osnovne metode znanstvenega dela in raziskovanja, – pozna načine iskanja informacij o opravljenih raziskavah, – pozna in razume tipologijo in pristop k znanstveno raziskovalnemu delu, – je sposoben pripraviti in zagovarjati predstavitev rezultatov raziskav. <p>Učna enota prispeva predvsem k razvoju naslednjih splošnih in specifičnih kompetenc:</p> <ul style="list-style-type: none"> – Študenta usposobiti za samostojno raziskovalno delo, 	<p>Objectives</p> <p>The student will be able to:</p> <ul style="list-style-type: none"> – Acquire basic knowledge of science, its structure and development – Acquires basic methodological skills for research – Learns general research methods – Learns about the research process and transfer of research results in practice – Has a special emphasis on the ethical aspects of research – Knows the basic methods of academic work and research – Knows how to search for information on conducted studies – Knows and understands the typology and approach to academic scientific research – Is able to prepare and defend a presentation of research results. <p>Learning unit contributes mainly to the development of generic and specific competences:</p> <ul style="list-style-type: none"> – Educate and train the student for independent research work.
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<ul style="list-style-type: none"> – Študent je sposoben planirati in izvesti raziskovalno delo, ki se zaključuje s predstavitvijo rezultatov raziskave. Mora znati napisati znanstveni in strokovni članek, tudi magistrsko nalogo in jo predstaviti. 	<ul style="list-style-type: none"> – The student is able to plan and execute research that concludes with the presentation of research results. The student has to be able to write scientific and professional articles, including a Master's Thesis and defend it.
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Predvideni študijski rezultati:

Intended learning outcomes:

<p><i>Študent/študentka:</i></p> <ul style="list-style-type: none"> – Pozna in razume osnovne procese pri znanstveno raziskovalnem delu. – Pozna in razume pristop in izbire metod znanstveno raziskovalnega dela – Pozna poiskati informacije jih analizirati in izpeljati zaključke. – Pozna uporabo strokovne literature. – Pozna tehnike predstavitve raziskovalnega dela. (samostojno raziskovalno delo, znanstveni in strokovni članki, monografije, ekspertize, elaborate). 	<p><i>The student:</i></p> <ul style="list-style-type: none"> – Knows and understands the basic processes in scientific research work – Knows and understands the approach and choice of methods for scientific research – Knows how to find information, analyse it, and form conclusions – Knows how to use professional literature – Knows the techniques of presenting research work (independent research, scientific and professional articles, monographs, expertise reports, and studies).
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Metode poučevanja in učenja:

Learning and teaching methods:

<ul style="list-style-type: none"> – <i>Kratka predavanja</i> z aktivno udeležbo študentov (razlaga snovi, pogovori, vprašanja, primeri, reševanje problemov). – <i>Seminarske vaje</i> v povezavi s prakso (refleksija izkušenj, projektno delo, timsko delo, metode kritičnega mišljenja, pogovori, sporočanje povratne informacije) – <i>Individualne in skupinske konzultacije</i> (pogovori, dodatna razlaga, obravnava specifičnih vprašanj). – <i>Samostojni študij in raziskovanje.</i> (Seminarske vaje v povezavi s prakso (refleksija izkušenj, projektno delo, timsko delo, metode kritičnega mišljenja, pogovori, sporočanje povratne informacije, terensko delo, samoocenjevanje) <p>Predmet je oblikovan na kombinirani način študija, ki vključuje aktivnosti preko elektronskega (on-line) okolja:</p> <p>te aktivnosti so sestavljene iz samostojnih in skupinskih aktivnosti z uporabo učnega okolja Moodle in drugih elektronskih vsebin. Praviloma vključujejo diskusije v forumih, spletne strani, ogled posnetih predavanj in vaj, preverjanje znanja, odgovori na vprašanja, iskanje po spletu (bazah) itd.</p>	<ul style="list-style-type: none"> – <i>Short lectures</i> with active student participation (discussions, talks, questioning, cases, problem-solving). – <i>Seminar exercises</i> in connection to practice (reflections from experience, project work, teamwork, methods of critical thinking, talks, providing feedback). – <i>Individual and group consultations</i> (discussions, additional explanations, discussing specific questions). – <i>Facilitating independent study and research practice</i> (reflections from experience, project work, teamwork, methods of critical thinking, talks, providing feedback, field work, self-assessment). <p>The course is designed as blended learning that includes online activities:</p> <p>Online activities consist of independent and group activities using the LMS Moodle and other electronic or online content. Activities usually include discussions in forums, websites, viewing of recorded lectures and tutorials, assessments, answering questions, searching the web (databases), etc.</p>
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Načini ocenjevanja:**Delež/Weight (%)****Assessment:**

<p>Študent/študentka mora pred pristopom k izpitu pripraviti in zagovarjati empirično seminarsko nalogo.</p> <p>– <i>zagovor seminarske naloge</i> – <i>pisni izpit</i></p> <p>Ocenjevalna lestvica je skladna z ECTS in Pravilnikom o preverjanju in ocenjevanju znanja FINI NM.</p>	<p>50% 50%</p>	<p>The student must prepare and defend an empirical seminar paper as a prerequisite for the final exam.</p> <p>– <i>defend seminar paper</i> – <i>written exam</i></p> <p>Evaluation scale in accordance with ECTS and the Rules on the Evaluation and Assessment of Knowledge FINI NM.</p>
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Reference nosilca / Lecturer's references:**1.01 Izvirni znanstveni članek**

1. BALABANIČ, Damjan, FILIPIČ, Metka, KRIVOGRAD-KLEMENČIČ, Aleksandra, ŽEGURA, Bojana. Raw and biologically treated paper mill wastewater effluents and the recipient surface waters: cytotoxic and genotoxic activity and the presence of endocrine disrupting compounds. *Science of the total environment*, 2017, vol. 574, str. 78-89

2. KRIVOGRAD-KLEMENČIČ, Aleksandra, KRZYK, Mario, DREV, Darko, BALABANIČ, Damjan, KOMPARE, Boris. Recycling of textile wastewaters treated with various combinations of advanced oxidation processes (AOP) = Recikliranje tekstilnih odpadnih voda očiščenih z različnimi kombinacijami naprednih oksidacijskih postopkov (AOP). *Acta hydrotechnica*, 2012, 25, 42, str. 31-39

3. BALABANIČ, Damjan, HERMOSILLA, Daphne, MERAYO, Noemi, KRIVOGRAD-KLEMENČIČ, Aleksandra, BLANCO, Angeles. Comparison of different wastewater treatments for removal of selected endocrine-disruptors from paper mill wastewaters. *Journal of environmental science and health. Part A, Toxic/hazardous substances & environmental engineering*, 2012, vol. 47, no. 10, str. 1350-1363

4. BALABANIČ, Damjan, KRIVOGRAD-KLEMENČIČ, Aleksandra. Presence of phthalates, bisphenol A, and nonylphenol in paper mill wastewaters in Slovenia and efficiency of aerobic and combined aerobic-anaerobic biological wastewater treatment plants for their removal. *Fresenius environmental bulletin*, 2011, vol. 20, no. 1, str. 86-92

1.02 Pregledni znanstveni članek

5. BALABANIČ, Damjan. Ocena življenjskega cikla (LCA) papirnih izdelkov = Life cycle assessment (LCA) of paper products. *Papir : revija Društva inženirjev in tehnikov papirništva*, nov. 2013, letn. 41, št. 10, str. 30-32

6. BALABANIČ, Damjan, RUPNIK, Marjan, KRIVOGRAD-KLEMENČIČ, Aleksandra. Negative impact of endocrine-disrupting compounds on human reproductive health. *Reproduction, fertility and development*, 2011, vol. 23, no. 3, str. 403-416

1.08 Objavljeni znanstveni prispevek na konferenci

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7. BALABANIČ, Damjan, ŠUŠTARŠIČ, Matej, MRAOVIČ, Matija, VREČKO, Alen, KAPUN, Tea, MUCK, Deja. Environmental assessment of paper products. V: URBAS, Raša (ur.). Proceedings, 7th Symposium of Information and Graphic Arts Technology, sigt, 5.-6. June 2014, Ljubljana. Ljubljana: Faculty of Natural Sciences and Engineering, Department of Textiles, Chair of Information and Graphic Art Technology. 2014, str. 24-29

8. KAPUN, Tea, MRAOVIČ, Matija, BALABANIČ, Damjan, ŠUŠTARŠIČ, Matej, VREČKO, Alen, MUCK, Deja. Use of ultrasound on hardwood pulp. V: URBAS, Raša (ur.). Proceedings, 7th Symposium of Information and Graphic Arts Technology, sigt, 5.-6. June 2014, Ljubljana. Ljubljana: Faculty of Natural Sciences and Engineering, Department of Textiles, Chair of Information and Graphic Art Technology. 2014, str. 30-36

9. KAPUN, Tea, MRAOVIČ, Matija, RAVNJAK, David, BALABANIČ, Damjan, MUCK, Deja. Effect of different pre-treatments to a novel method for cellulose fibers treatment. V: TAPPI proceedings. [S. l.: s. n. 2014], str. 705-716

10. KRIVOGRAD-KLEMENČIČ, Aleksandra, BALABANIČ, Damjan, KOMPARE, Boris, KRZYK, Mario, PANJAN, Jože, GRIESSLER BULC, Tjaša, DREV, Darko, JARNI, Klara, BIERBAUM, Svenja, ESCABASSE, Jean-Yves, WELL, Andreas, HLAVINEK, Petr, PESOUTOVA, Radka, THIÉBAUM, Quentin, HOLOBAR, Andrej. Recycling of AOP-treated effluents for reduction of fresh water consumption in textile and other high water volume consuming industries. V: BALWOIS 2012, Fith International scientific Conference on water, climate & environment, Ohrid, Republic of Macedonia, 28th May - 2nd June 2012. S. l.: s. n. 2012, str. 1-11