

**UČNI NAČRT PREDMETA / COURSE SYLLABUS**

<b>Predmet:</b>	Metode znanstvenega raziskovanja
<b>Course title:</b>	Scientific Research Methods

Študijski program in stopnja / Study programme and level	Študijska smer / Study field	Letnik / Academic year	Semester / Semester
Inženiring in avtomobilska industrija Podiplomski študij (tretja stopnja)	Program nima smeri	prvi	prvi
Engineering and Automotive Industry Graduate Study– PhD (third level)	The program has no study fields	first	first

**Vrsta predmeta / Course type**

obvezni/obligatory

**Univerzitetna koda predmeta / University course code:**

31001

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
60	-	30	-	-	180	10

**Nosilec predmeta / Lecturer:**

doc. dr. Urška Florjančič / Urška Florjančič, PhD  
Assistant Professor

**Jeziki /  
Languages:**

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

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

- Vpis v prvi letnik študija

**Prerequisites:**

- Enrolment in the first year of study.

**Vsebina:**

**Content (Syllabus outline):**

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| <ul style="list-style-type: none"> <li>• Seznanitev z osnovami raziskovalnega dela</li> <li>• Prepoznavanje znanstvenega problema in njegove formulacije</li> </ul> | <ul style="list-style-type: none"> <li>• An introduction to the basics of research</li> <li>• Identifying scientific problems and its formulation</li> <li>• Setting up a research hypothesis and research process</li> </ul> |
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<ul style="list-style-type: none"> <li>• Postavitev raziskovalne hipoteze, izdelava načrta znanstvenega raziskovanja</li> <li>• Zbiranje študijskega gradiva, urejanje obstoječih virov, uporaba bibliografskih baz</li> <li>• Reševanje znanstvenega problema po izbrani metodologiji, zbiranje, predstavitev in uporaba raziskovalnih rezultatov</li> <li>• Razvrstitev znanstvenih publikacij, pomen in posebnosti doktorskih disertacij, uporaba priporočil za oblikovanje znanstvenih in strokovnih publikacij po metodologiji IMRAD</li> <li>• Etičnost in avtorske pravice znanstvenih in strokovnih objav</li> </ul>	<ul style="list-style-type: none"> <li>• Collection of study materials, organization of existing resources, use of bibliographic databases</li> <li>• Solving scientific problems using a chosen methodology, collection, presentation, and use of research results</li> <li>• Classification of scientific publications, importance and uniqueness of doctoral dissertations, using recommendations and IMRAD for writing scientific and professional articles</li> <li>• Ethics and copyright of scientific and professional publications</li> <li>• Publication of research</li> </ul>
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#### Temeljni literatura in viri / Readings:

<ul style="list-style-type: none"> <li>• Thiel, David V. (2014) <i>Research methods for engineers</i>. Cambridge: Cambridge University Press.</li> <li>• Breach, Mark (2009) <i>Dissertation writing for engineers and scientists</i>. Harlow, England: Pearson Prentice Hall.</li> <li>• McMillan, Kathleen, Weyers, Jonathan D. B. (2013) <i>How to Research &amp; Write a Successful PhD. Smarter Study Skills</i>. Harlow, England: Pearson Education.</li> <li>• Rennie, Frank; Smyth, Keith (2016) <i>How to write a research dissertation: essential guidance in getting started for undergraduates and postgraduates</i>. University of the Highlands &amp; Islands, Lews Castle College UHI; Edinburgh: Edinburgh Napier University.</li> <li>• Blaxter, Loraine, Hughes, Christina, Tight, Malcolm (2011) <i>How to Research</i>, 4<sup>th</sup> ed. Maidenhead: Open University Press.</li> </ul>
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#### Priporočljiva literatura / Recommended Textbooks

<ul style="list-style-type: none"> <li>• Roberts, C. M. (2010). <i>The dissertation journey: A practical and comprehensive guide to planning, writing, and defending your dissertation</i> (2nd ed.). Thousand Oaks, CA: Corwin Press.</li> <li>• Creswell, John W. (2014). <i>Research Design: Qualitative, Quantitative, and Mixed Methods Approaches</i>, 4<sup>th</sup> ed. Thousand Oaks: Sage Publications.</li> <li>• Kumar, R. (2011). <i>Research Methodology: A step by step guide for beginners</i>. London: SAGE Publications.</li> <li>• Cargill, Margaret; O'Connor, Patrick (2013) <i>Writing scientific research articles: strategy and steps</i>, 2<sup>nd</sup> ed. - Chichester (UK): Wiley-Blackwell.</li> <li>• Glasman-Deal, Hilary (2010) <i>Science research writing for non-native speakers of English</i>. London: Imperial College Press.</li> </ul>
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#### Cilji in kompetence:

<p><b>Cilji</b></p> <ul style="list-style-type: none"> <li>- Seznanitev z pomenom raziskovalnega dela, znanosti na splošno in pomena za razvoj.</li> <li>- Študente vpeljati v raziskovalno delo in jih seznaniti z osnovnimi metodami raziskovanja.</li> </ul> <p><b>Kompetence</b></p>
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#### Objectives and competences:

<p><b>Objectives</b></p> <ul style="list-style-type: none"> <li>☐- Become acquainted with the importance of research, science in general and its importance for development</li> <li>Introduce students to research work and to become acquainted with the basic research methods</li> </ul>
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<p>Učna enota prispeva predvsem k razvoju naslednjih splošnih in specifičnih kompetenc:</p> <ul style="list-style-type: none"> <li>- sposobnost evidentiranja problema in njegove analize,</li> <li>- sposobnost obvladanja standardnih razvojnih metod, postopkov in procesov,</li> <li>- sposobnost uporabe pridobljenega teoretičnega znanja v praksi,</li> <li>- avtonomnost v strokovnem delu s področja disertabilnih tematik,</li> <li>- sposobnost razumevanja in uporabe sodobnih teorij s področja tehniških, tehnoloških in naravoslovnih ved,</li> <li>- sposobnost matematičnega razumevanja tehničnih problemov in uporaba matematike pri reševanju le-teh,</li> <li>- sposobnost stalne uporabe informacijske in komunikacijske tehnologije na svojem strokovnem področju.</li> </ul>	<p><b>Competences</b></p> <p>Learning unit contributes mainly to the development of generic and specific competences:</p> <ul style="list-style-type: none"> <li>☒- Ability to determine a problem and its analysis,</li> <li>☒- Ability to handle standard developmental methods, procedures, and processes,</li> <li>☒- Ability to apply theoretical knowledge into practice</li> <li>☒- Autonomy in professional work in the area of topics appropriate for dissertations,</li> <li>☒- Ability to understand and use contemporary theories in the field of engineering, technology, and science,</li> <li>☒- Mathematical ability to understand technical problems and use mathematics in solving such problems,</li> <li>☒- Ability to continuously use information and communication technologies in the students' professional field.</li> </ul>
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<p><b>Predvideni študijski rezultati:</b></p> <p>Ob zaključku predmeta bo študent obvladal:</p> <p><i>Znanje in razumevanje</i></p> <ul style="list-style-type: none"> <li>• poznavanje osnov znanstveno raziskovalnega dela in napotki za izdelavo znanstvenih in strokovnih publikacij</li> <li>• seznanitev z osnovnimi pristopi raziskovanja v skupini in samostojnega raziskovalnega dela</li> <li>• obvladovanje predstavitve raziskovalnih dosežkov v pisni obliki (članki, monografije, disertacija) kakor tudi v obliki nastopa</li> </ul> <p><i>Veščine in sposobnost</i></p> <ul style="list-style-type: none"> <li>• razložiti in pojasniti razlike med različnimi raziskovalnimi metodami</li> <li>• izdelati pregled literature in relevantnih znanstvenih referenc</li> <li>• oblikovati načrt raziskave</li> </ul>	<p><b>Intended learning outcomes:</b></p> <p>On completion of the course, the student should be able to:</p> <p><i>Knowledge and understanding</i></p> <ul style="list-style-type: none"> <li>• Understand the basics of academic scientific research and guidelines for scientific and professional publications</li> <li>☒• Know the basic approaches in group and independent research</li> <li>☒• Present research results in written form (articles, monographs, dissertation) as well as presenting</li> </ul> <p><i>Skills and ability</i></p> <ul style="list-style-type: none"> <li>• Discuss and explain differences between different research methods</li> <li>• Perform literature reviews and reference relevant scientific literature</li> <li>• Formulate a research plan</li> </ul>
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**Metode poučevanja in učenja:**

**Learning and teaching methods:**

<ul style="list-style-type: none"> <li>☐ <i>Kratka predavanja z aktivno udeležbo študentov (razlaga snovi, pogovori, vprašanja, primeri, reševanje problemov)</i></li> <li>☐ <i>Seminarske vaje (refleksija izkušenj, projektno delo, timsko delo, metode kritičnega mišljenja, pogovori, sporočanje povratne informacije)</i></li> <li>☐ <i>Individualne in skupinske konzultacije (pogovori, dodatna razlaga, obravnava specifičnih vprašanj)</i></li> <li>☐ <i>Samostojni študij in raziskovanje</i></li> </ul>	<ul style="list-style-type: none"> <li>☐- <i>Short lectures with active student participation (discussions, talks, questioning, cases, problem-solving)</i></li> <li>☐- <i>Seminar exercises (reflections from experience, project work, teamwork, methods of critical thinking, talks, providing feedback)</i></li> <li>☐- <i>Individual and group consultations (discussions, additional explanations, discussing specific questions)</i></li> <li>- <i>Facilitating independent study and research practice</i></li> </ul>
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**Načini ocenjevanja:**

**Delež (v %) /  
Weight (in%)**

**Assessment:**

<ul style="list-style-type: none"> <li>• Pogoji za pristop k izpitu je pozitivno ocenjena seminarska naloga.</li> <li>☐ Predložitev in zagovor dispozicije doktorske disertacije</li> </ul>	<p style="text-align: center;">20</p> <p style="text-align: center;">80</p>	<ul style="list-style-type: none"> <li>☐ • To be able to take the final exam, the student needs to have a positively graded seminar paper.</li> <li>☐ • Submission and defense of the dissertation proposal</li> </ul>
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**Reference nosilca / Lecturer's references:**

<ul style="list-style-type: none"> <li>- FLORJANČIČ, Urška, ZUPANČIČ-VALANT, Andreja, ŽUMER, Miha. Rheological characterization of aqueous polysaccharide mixtures undergoing shear. <i>Chemical and biochemical engineering quarterly</i>, ISSN 0352-9568, 2002, vol. 16, no. 3, str. 105-118.</li> <li>- UMEK, Polona, HUSKIĆ, Miroslav, SEVER ŠKAPIN, Andrijana, FLORJANČIČ, Urška, ZUPANČIČ, Barbara, EMRI, Igor, ARČON, Denis. Structural and mechanical properties of polystyrene nanocomposites with 1D titanate nanostructures prepared by an extrusion process. <i>Polymer composites</i>, ISSN 0272-8397, 2009, vol. 30, no. 9, 1318-1325.</li> <li>- EMRI, Igor, KRAMAR, Janez, HRIBAR, Anton, NIKONOV, Anatolij, FLORJANČIČ, Urška. Time-dependent constitutive modeling of drive belts - I.: the effect of geometry and number of loading cycles. <i>Mechanics of time-dependent materials</i>, ISSN 1385-2000, 2006, letn. 10, št. 3, str. 245-262.</li> <li>- ZUPANČIČ, Barbara, NIKONOV, Anatolij, FLORJANČIČ, Urška, EMRI, Igor. Časovno odvisno vedenje pogonskih jermenov pod vplivom periodične mehanske obremenitve : analiza lokacije enojne spektralne črte = Time-dependent behaviour of drive belts under periodic mechanical loading : analysis of the location of a single line spectrum. <i>Strojniški vestnik</i>, ISSN 0039-2480, 2007, letn. 53, št. 10, str. 696-705.</li> <li>- FLORJANČIČ, Urška, EMRI, Igor. Tailoring functionality and durability of polymeric products by modifying processing conditions. <i>Strojniški vestnik</i>, ISSN 0039-2480, 2008, letn. 54, št. 7/8, str. 507-520.</li> <li>- FLORJANČIČ, Urška, ŽUMER, Miha. Influence of temperature and polymer concentration on rheological properties of rhaman. <i>Acta chimica slovenica</i>, ISSN 1318-0207. 1998, vol. 45, no. 2, str. 419-428.</li> <li>- FLORJANČIČ, Urška (urednik), MUSAR, Aleš (urednik). Raziskovalno delo podiplomskih študentov v Sloveniji - novo tisočletje, Naravoslovje in tehnika : jesen - zima. Ljubljana: Društvo mladih raziskovalcev Slovenije, 2001. III, 432 str. ISBN 961-90669-4-4.</li> </ul>
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Fakulteta za  
industrijski inženiring  
Faculty of Industrial Engineering

- ŽNIDARŠIČ PLAZL, Polona, FLORJANČIČ, Urška, PLAZL, Igor. Zbirka nalog iz kemijskega inženirstva. Univerzitetni učbenik, 1. izd. Ljubljana: Fakulteta za kemijo in kemijsko tehnologijo, 1999. 72 str. ISBN 961-6286-16-1.