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| **UČNI NAČRT PREDMETA / COURSE SYLLABUS** |
| **Predmet:** | **INDIVIDUALNO RAZISKOVALNO DELO I** |
| **Course title:** | **INDIVIDUAL RESEARCH WORK I** |
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| **Študijski program in stopnja****Study programme and level** | **Študijska smer****Study field** | **Letnik****Academic year** | **Semester****Semester** |
| **ENERGETIKA, 3. stopnja** | **-** | **1.** | **1.** |
| **ENERGY TECHNOLOGY, 3. Degree** | **-** | **1.** | **1.** |
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| **Vrsta predmeta / Course type** | Obvezni/Obligatory |
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| **Univerzitetna koda predmeta / University course code:** | D |
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| **Predavanja****Lectures** | **Seminar****Seminar** | **Vaje****Tutorial** | **Klinične vaje****work** | **Druge oblike študija** | **Samost. delo****Individ. work** |  | **ECTS** |
| **20** | **-** | **-** | **-** | **-** | **430** |  | **15** |
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| **Nosilec predmeta / Lecturer:** | **MENTOR** |
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| **Jeziki /** **Languages:** | **Predavanja / Lectures:** | **Slovenski/Slovene** |
| **Vaje / Tutorial:** | **Slovenski/Slovene** |
| **Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:** |  | **Prerequisits:** |
| Ni posebnih obveznosti |  | No prereguisites. |
| **Vsebina:**  |  | **Content (Syllabus outline):** |
| * Spoznavanje s širšo problematiko energetike, glede na izbrano temo doktorskega študija
* Iskanje virov in znanstvenih del s področja energetike
* Učinkovita raba energije
* Alternativni viri energije
* Vpliv energetskih potencialov na naravno in družbeno okolje
 |  | * Recognition of energetic problem more wide, according to area of interest
* Search of scientific sources in energetic field
* Efficient use of energy
* Alternative energy sources
* Influence of energy potentials on environment and society
 |
| **Temeljni literatura in viri / Readings:** |
| Znanstveni članki, strokovni članki, knjige, patenti in drugo gradivo s področja energetike in sorodnih vsebin. / Scientific articles, professional articles, books, patents and other materials in the field of energy and related content. |
| **Cilji in kompetence:** |  | **Objectives and competences:** |
| Študenta uvesti v samostojno raziskovalno delo. Študent se bo srečal z vsemi osnovnimi elementi znanstveno raziskovalnega dela. |  | To introduce the student to independent research work. The student will meet with all the basic elements of scientific research work. |
| **Predvideni študijski rezultati:** |  | **Intended learning outcomes:** |
| Znanje in razumevanje:Študent pridobi znanja s področja študentovega znanstveno raziskovalnega dela.  |  | Expertise and understanding:The student acquires knowledge in the field of student's scientific research work. |
| Prenesljive/ključne spretnosti in drugi atributi:Strokovno zapisovanje in izražanje vsebine, suverena predstavitev ključnih spoznanj in spretnost argumentiranja. |  | Transferable key skills:Professional recording and expressing contents, autonomous presentation of essential discoveries, and skilful presentation of facts. |
| **Metode poučevanja in učenja:** |  | **Learning and teaching methods:** |
| Samostojno delo in konzultacije |  | Individual work and consultations. |
| **Načini ocenjevanja:** | Delež (v %) /Weight (in %) | **Assessment:** |
| Poročilo o delu in zagovor z diskusijo | **100%** | Work report and Presentation with discussion |
| **Reference nosilca / Lecturer's references:**  |
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| **UČNI NAČRT PREDMETA / COURSE SYLLABUS** |
| **Predmet:** | **INDIVIDUALNO RAZISKOVALNO DELO II** |
| **Course title:** | **INDIVIDUAL RESEARCH WORK II** |
|  |  |  |  |
| **Študijski program in stopnja****Study programme and level** | **Študijska smer****Study field** | **Letnik****Academic year** | **Semester****Semester** |
| **ENERGETIKA, 3. stopnja** | **-** | **1.** | **2.** |
| **ENERGY TECHNOLOGY, 3. Degree** | **-** | **1.** | **2.** |
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| **Vrsta predmeta / Course type** | Obvezni/Obligatory |
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| **Univerzitetna koda predmeta / University course code:** | D |
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| **Predavanja****Lectures** | **Seminar****Seminar** | **Vaje****Tutorial** | **Klinične vaje****work** | **Druge oblike študija** | **Samost. delo****Individ. work** |  | **ECTS** |
| **30** | **-** | **-** | **-** | **-** | **690** |  | **24** |
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| **Nosilec predmeta / Lecturer:** | **MENTOR/RAZLIČNI NOSILCI** |
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| **Jeziki /** **Languages:** | **Predavanja / Lectures:** | **Slovenski/Slovene** |
| **Vaje / Tutorial:** | **Slovenski/Slovene** |
| **Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:** |  | **Prerequisits:** |
| Individualno raziskovalno delo II za študenta pomeni seznanitev in vključitev v projekt pod vodstvom mentorja kot pripravo za samostojno raziskovalno delo. |  | Individual research work II means that the student is involved as a member in a research project with support from a supervisor as a guideline for individual research work. |
| **Vsebina:**  |  | **Content (Syllabus outline):** |
| Znanstveno raziskovalno delo, ki zajema vse vrste raziskav (temeljne, aplikativne, raziskovalno-razvojne):* identifikacija znanstvenega problema, definiranje problema, določitev znanstvenih novosti v delu
* raziskava obstoječega stanja v znanosti in tehniki, študij problema,
* spoznavanje in delo z raziskovalno infrastrukturo,
* snovanje teoretičnega modela in znanstvenega eksperimenta ali sistema, ,
* določitev splošnih posplošitev v numeričnem in teoretičnem modelu
 |  | Scientific research work that encompasses all aspects of research actives (basic, applied, research and development):* identification of scientific problem, definition of problem, determination of scientific novelties in theoretical and experimental work
* research of current state of the art, problem analysis,
* obtaining familiarity with research infrastructure,
* designing of scientific experiment or system,
* determination of applications in theoretical and experimental future model
 |
| **Temeljni literatura in viri / Readings:** |
| Strokovna in znanstvena tekoča periodika s področja energetike oz. področja, ki ga bo študent prepoznal kot področje osebnega interesa.Professional and scientific periodical papers/articles from the broad field of energetic, with focus on area of personal interest. |
| **Cilji in kompetence:** |  | **Objectives and competences:** |
| Študenta uvesti v samostojno raziskovalno delo, iskanje in kritično razumevanje znanstvenih primarnih virov.  |  | Introducing the student the nature of individual research and scientific work with searching and critical understanding of scientific sources.  |
| **Predvideni študijski rezultati:** |  | **Intended learning outcomes:** |
| *Znanje in razumevanje:*Pridobitev in osvojitev znanja s širšega strokovnega področja.  |  | Knowledge and Understanding:Acquiring and gaining of knowledge from a broader academic field. |
| *Prenesljive/ključne spretnosti in drugi atributi*: Naučiti se samostojnega raziskovalnega dela, reševati strokovne probleme, razviti kritično distanco do trditev in razumevanja strokovne literature.  |  | Transferable/Key Skills and other attributes:Learn to undertake an individual research work, solve professional problems, and learn to maintain a critical distance towards the arguments and understanding of professional literature. |
| **Metode poučevanja in učenja:** |  | **Learning and teaching methods:** |
| Pogovor, konzultacije, diskusije. |  | Dialogues, consultations, discussions |
| **Načini ocenjevanja:** | Delež (v %) /Weight (in %) | **Assessment:** |
| Poročilo o delu in zagovor z diskusijo | **100%** | Work report and Presentation with discussion |
| **Reference nosilca / Lecturer's references:**  |
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| **UČNI NAČRT PREDMETA / COURSE SYLLABUS** |
| **Predmet:** | **INDIVIDUALNO RAZISKOVALNO DELO III** |
| **Course title:** | **INDIVIDUAL RESEARCH WORK III** |
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| **Študijski program in stopnja****Study programme and level** | **Študijska smer****Study field** | **Letnik****Academic year** | **Semester****Semester** |
| **ENERGETIKA, 3. stopnja** | **-** | **2.** | **3.** |
| **ENERGY TECHNOLOGY, 3. Degree** | **-** | **2.** | **3.** |
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| **Vrsta predmeta / Course type** | Obvezni/Obligatory |
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| **Univerzitetna koda predmeta / University course code:** | D |
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| **Predavanja****Lectures** | **Seminar****Seminar** | **Vaje****Tutorial** | **Klinične vaje****work** | **Druge oblike študija** | **Samost. delo****Individ. work** |  | **ECTS** |
| **30** | **-** | **-** | **-** | **-** | **600** |  | **21** |
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| **Nosilec predmeta / Lecturer:** | **MENTOR/RAZLIČNI NOSILCI** |
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| **Jeziki /** **Languages:** | **Predavanja / Lectures:** | **Slovenski/Slovene** |
| **Vaje / Tutorial:** | **Slovenski/Slovene** |
| **Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:** |  | **Prerequisits:** |
| Individualno raziskovalno delo III |  | Individual research work III |
| **Vsebina:**  |  | **Content (Syllabus outline):** |
| Nadgradnja individualnega raziskovalnega dela II* Znanstveno raziskovalno delo
* uporaba znanstvenih pristopov v iskanju rešitve problema,
* teoretična analiza problema,
* izvajanje numeričnih simulacij, laboratorijskih poizkusov ali načrtovanje naprav,
* zasnova eksperimentalnega sistema in zasnova teoretičnega modela
* reševanje problema z uporabo eksperimentalnega dela ali naprednih simulacijskih orodij ali izvirnih teoretičnih pristopov,
* zasnova, izvedba in analiza eksperimenta ali sistema,
* kritično ovrednotenje začetnih rezultatov,
* korekcija, ponovitev, izboljšanje,
* analiza rezultatov.
 |  | Upgrade individual research II Academic research work encompasses: * application of scientific principles in problem solving,
* theoretical analysis,
* performing of numerical simulations, laboratory experiments or design of devices,
* the start of developing theoretical model and experimental set-up
* problem solving based on experimental work or advanced simulation tools or original theoretical approaches
* design, realization and analysis of experiment or system,
* critical evaluation of first results,
* corrections, re-design, improvements,
* result analysis.
 |
| **Temeljni literatura in viri / Readings:** |
| Strokovna in znanstvena tekoča periodika s področja energetike oz. področja, ki ga bo študent prepoznal kot področje osebnega interesa.Znanstveni članki, patenti in literatura s sorodnih področij.Professional and scientific periodical papers/articles from the broad field of energetic, with focus on area of personal interest.Scientific papers, patents and textbooks from the related fields. |
| **Cilji in kompetence:** |  | **Objectives and competences:** |
| Študentu predstaviti oblike skupinskega in samostojnega raziskovalnega dela. |  | Introducing student the research work as a research team member and individual research work.  |
| **Predvideni študijski rezultati:** |  | **Intended learning outcomes:** |
| Znanje in razumevanje:Pridobitev in osvojitev znanja iz ožjega strokovnega področja študentovega znanstvenega dela. Študent mora biti sposoben predlagati nove rešitve.  |  | Knowledge and Understanding:Acquisition of knowledge from a narrower field of student scientific engagement. Student should be able to propose novel solutions. |
| Prenesljive/ključne spretnosti in drugi atributi: Iskanje in izbiranje informacij iz različnih virov.Spremljanje tehnološkega razvoja.Napisati in predstaviti znanstvene in tehniške dokumente.  |  | Transferable/Key Skills and other attributes:Find and select of information from different sources.To monitor technological development.To write and present scientific and technical documents.  |
| **Metode poučevanja in učenja:** |  | **Learning and teaching methods:** |
| Samostojno delo in konzultacije. |  | Individual work and consultations. |
| **Načini ocenjevanja:** | Delež (v %) /Weight (in %) | **Assessment:** |
| Poročilo o delu in zagovor z diskusijo | **100%** | Work report and Presentation with discussion |
| **Reference nosilca / Lecturer's references:**  |
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| **UČNI NAČRT PREDMETA / COURSE SYLLABUS** |
| **Predmet:** | **INDIVIDUALNO RAZISKOVALNO DELO IV** |
| **Course title:** | **INDIVIDUAL RESEARCH WORK IV** |
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| **Študijski program in stopnja****Study programme and level** | **Študijska smer****Study field** | **Letnik****Academic year** | **Semester****Semester** |
| **ENERGETIKA, 3. stopnja** | **-** | **2.** | **4.** |
| **ENERGY TECHNOLOGY, 3. Degree** | **-** | **2.** | **4.** |
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| **Vrsta predmeta / Course type** | Obvezni/Obligatory |
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| **Univerzitetna koda predmeta / University course code:** | D |
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| **Predavanja****Lectures** | **Seminar****Seminar** | **Vaje****Tutorial** | **Klinične vaje****work** | **Druge oblike študija** | **Samost. delo****Individ. work** |  | **ECTS** |
| **30** | **-** | **-** | **-** | **-** | **870** |  | **30** |
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| **Nosilec predmeta / Lecturer:** | **MENTOR/RAZLIČNI NOSILCI** |
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| **Jeziki /** **Languages:** | **Predavanja / Lectures:** | **Slovenski/Slovene** |
| **Vaje / Tutorial:** | **Slovenski/Slovene** |
| **Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:** |  | **Prerequisits:** |
| Individualno raziskovalno delo IV |  | Individual research work IV |
| **Vsebina:**  |  | **Content (Syllabus outline):** |
| Znanstveno raziskovalno delo, ki zajema vse vrste raziskav (temeljne, aplikativne, raziskovalno-razvojne):* aplikativne raziskave kompleksnih problemov,
* nadaljevanje reševanja problema z uporabo eksperimentalnega dela ali naprednih simulacijskih orodij ali izvirnih teoretičnih pristopov,
* analiza, iskanje novih ter izvirnih rešitev,
* izvedba in analiza sistema ali eksperimenta,
* poglobljena in kritična analiza rezultatov ter primerjava z rezultati objavljenimi v znanstveni literaturi,
* raziskava možnosti izboljšav
* dokumentiranje/pisanje znanstvenega članka in/ali patentne dokumentacije,
* predstavitev dela (domače in mednarodne konference).
 |  | Scientific research work that encompasses all aspects of research actives (basic, applied, research and development):* applied research of complex problems,
* Continuation of problem solving based on experimental work or advanced simulation tools or original theoretical approaches
* analysis and search for original solutions,
* execution and analysis of experiment,
* in-depth critical analysis of results,
* documenting/ writing of scientific paper and/or patent documentation and comparison of results obtained in scientific literature,
* determination of possibilities for improvement of mathematical model or experimental set-up
* public presentation of the work.
* presentation of accomplished work (domestic and international conferences).
 |
| **Temeljni literatura in viri / Readings:** |
| Strokovna in znanstvena tekoča periodika s področja energetike oz. področja, ki ga bo študent prepoznal kot področje osebnega interesa.Znanstveni članki, patenti in literatura s specifičnega področja.Professional and scientific periodical papers/articles from the broad field of energetic, with focus on area of personal interest.Scientific papers, patents and textbooks from the specific field. |
| **Cilji in kompetence:** |  | **Objectives and competences:** |
| Študenta uvesti v poglobljeno raziskovalno delo z vsemi elementi sodobnega raziskovalnega dela. |  | Introducing student into the independent research work with advanced methods and aspects of scientific work. |
| **Predvideni študijski rezultati:** |  | **Intended learning outcomes:** |
| Znanje in razumevanje:Pridobitev in osvojitev znanja iz ozkega strokovnega področja študentovega znanstvenega dela. Študent mora biti sposoben predlagati nove rešitve, ki jih bo obravnaval v disertaciji. |  | Knowledge and Understanding:Acquisition of knowledge from a narrower field of student scientific engagement. Student should be able to propose novel solutions that will be implemented in the dissertation. |
| Prenesljive/ključne spretnosti in drugi atributi: Iskanje in izbiranje informacij iz različnih virov.Spremljanje tehnološkega razvoja.Napisati in predstaviti znanstvene in tehniške dokumente. Planiranje izvedljivosti in udejanjanja novih idej v praksi. |  | Transferable/Key Skills and other attributes:Find and select of information from different sources.To monitor technological development.To write and present scientific and technical documents. Planning to perform and implement novel ideas. |
| **Metode poučevanja in učenja:** |  | **Learning and teaching methods:** |
| Samostojno delo in konzultacije. |  | Individual work and consultations. |
| **Načini ocenjevanja:** | Delež (v %) /Weight (in %) | **Assessment:** |
| Poročilo o delu in zagovor z diskusijo | **100%** | Work report and Presentation with discussion |
| **Reference nosilca / Lecturer's references:**  |
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| **UČNI NAČRT PREDMETA / COURSE SYLLABUS** |
| **Predmet:** | **INDIVIDUALNO RAZISKOVALNO DELO V (s prijavo teme doktorske disertacije)** |
| **Course title:** | **INDIVIDUAL RESEARCH WORK V (Applies for the approval of PhD thesis theme)** |
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| **Študijski program in stopnja****Study programme and level** | **Študijska smer****Study field** | **Letnik****Academic year** | **Semester****Semester** |
| **ENERGETIKA, 3. stopnja** | **-** | **3.** | **5.** |
| **ENERGY TECHNOLOGY, 3. Degree** | **-** | **3.** | **5.** |
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| **Vrsta predmeta / Course type** | Obvezni/Obligatory |
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| **Univerzitetna koda predmeta / University course code:** | D |
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| **Predavanja****Lectures** | **Seminar****Seminar** | **Vaje****Tutorial** | **Klinične vaje****work** | **Druge oblike študija** | **Samost. delo****Individ. work** |  | **ECTS** |
| **30** | **-** | **-** | **-** | **-** | **870** |  | **30** |
|  |
| **Nosilec predmeta / Lecturer:** | **MENTOR** |
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| **Jeziki /** **Languages:** | **Predavanja / Lectures:** | **Slovenski/Slovene** |
| **Vaje / Tutorial:** | **Slovenski/Slovene** |
| **Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:** |  | **Prerequisits:** |
| Individualno raziskovalno delo V |  | Individual research work V |
| **Vsebina:**  |  | **Content (Syllabus outline):** |
| Znanstveno raziskovalno delo iz področja doktorske disertacije:* poglobljena in kritična analiza rezultatov,
* ocenitev znanstvene vrednosti rezultatov
* dokumentiranje/pisanje patentne dokumentacije ali članka,
* ocenitev potencialne vrednosti patenta s smislu razvoja novih izdelkov
* predlogi za nadaljnje delo
* predstavitev dela.
 |  | Scientific research work from the field of PhD thesis:* in-depth critical analysis of results,
* Evaluation of scientific values of results
* documenting/ writing of patent documentation
* Evaluation of potential value of patent for developing new products in EU and world market
* Suggestions for future work
* presentation of the work
 |
| **Temeljni literatura in viri / Readings:** |
| Strokovna in znanstvena tekoča periodika s področja energetike oz. področja, ki ga bo študent prepoznal kot področje osebnega interesa.Znanstveni članki, patenti in literatura s specifičnega področja.Professional and scientific periodical papers/articles from the broad field of energetic, with focus on area of personal interest.Scientific papers, patents and textbooks from the specific field. |
| **Cilji in kompetence:** |  | **Objectives and competences:** |
| Študenta usposobiti za izdelavo in zagovor disertacije. Priprava članka za objavo v JCR reviji. |  | Student should be acquired to form dissertation. Preparation of the article for SCI journal. |
| **Predvideni študijski rezultati:** |  | **Intended learning outcomes:** |
| Znanje in razumevanje:Pridobitev in osvojitev znanja iz ozkega strokovnega področja študentovega znanstvenega dela. Študent mora biti sposoben predlagati nove rešitve, ki jih bo obravnaval v disertaciji. |  | Knowledge and Understanding:Acquisition of knowledge from a narrower field of student scientific engagement. Student should be able to propose novel solutions that will be implemented in the dissertation. |
| Prenesljive/ključne spretnosti in drugi atributi: Iskanje in izbiranje informacij iz različnih virov.Spremljanje tehnološkega razvoja.Napisati in predstaviti znanstvene in tehniške dokumente. Planiranje izvedljivosti in udejanjanja novih idej v praksi. |  | Transferable/Key Skills and other attributes:Find and select of information from different sources.To monitor technological development.To write and present scientific and technical documents. Planning to perform and implement novel ideas. |
| **Metode poučevanja in učenja:** |  | **Learning and teaching methods:** |
| Samostojno delo in konzultacije. |  | Individual work and consultations. |
| **Načini ocenjevanja:** | Delež (v %) /Weight (in %) | **Assessment:** |
| Poročilo o delu in zagovor z diskusijo | **100%** | Work report and Presentation with discussion |
| **Reference nosilca / Lecturer's references:**  |
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| **UČNI NAČRT PREDMETA / COURSE SYLLABUS** |
| **Predmet:** | **METODE ZNANSTVENO RAZISKOVALNEGA DELA** |
| **Course title:** | **METHODS OF SCIENTIFIC RESEARCH WORK** |
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| **Študijski program in stopnja****Study programme and level** | **Študijska smer****Study field** | **Letnik****Academic year** | **Semester****Semester** |
| **ENERGETIKA, 3. stopnja** | **-** | **1.** | **1.** |
| **ENERGY TECHNOLOGY, 3. Degree** | **-** | **1.** | **1.** |
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| **Vrsta predmeta / Course type** | Obvezni/Obligatory |
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| **Univerzitetna koda predmeta / University course code:** | D |
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| **Predavanja****Lectures** | **Seminar****Seminar** | **Vaje****Tutorial** | **Klinične vaje****work** | **Druge oblike študija** | **Samost. delo****Individ. work** |  | **ECTS** |
| **30** | **-** | **-** | **-** | **-** | **60** |  | **3** |
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| **Nosilec predmeta / Lecturer:** | **JURIJ AVSEC / SEBASTIJAN SEME** |
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| **Jeziki /** **Languages:** | **Predavanja / Lectures:** | **Slovenski/Slovene** |
| **Vaje / Tutorial:** | **Slovenski/Slovene** |
| **Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:** |  | **Prerequisits:** |
| Ni posebnih obveznosti |  | No prereguisites. |
| **Vsebina:**  |  | **Content (Syllabus outline):** |
| * Uvod: doktorski študij na UM, postopki prijave in potrditve teme doktorske disertacije, izdelava in oddaja doktorske disertacije, zagovor doktorske disertacije, pridobitev doktorata znanosti na UM.
* Osnovne znanstvene metode (Kvantitativne in kvalitativne metode): opazovanje in opisovanje, analiza in sinteza, hipoteza in sklepanje, računalniški modeli in simulacije.
* Znanstveni viri: knjige in članki, znanstvene podatkovne baze in storitve (Web of Science, ProQuest, Science Direct, Engineering Village 2, digitalne knjižnice strokovnih združenj (ACM, IEEE), Google Scholar, patentne baze podatkov).
* Kako in kje objaviti znastvene ali strokovne rezultate. Pisanječlanka: strktura znanstveneuga članka, jedrnatost, pregled stanja, opis lastnih rezultatov, primerjave, izpostaviti novosti, priprava končnega članka.
* Etični vidiki raziskovanja: eksperimenti, ki vključujejo ljudi ali živali ali njihove podatke, zaščita podatkov. Plagiatorstvo: kaj to je in kako se mu izogniti, citiranje, podvajanje objav. Raziskovalni kodeks: avtorstvo, raziskovalna poštenost, Kodeks raziskovalnega dela na UM.
 |  | * Introduction: doctoral study at UM, procedures for registering and confirming the topic of the doctoral dissertation, preparation and submission of doctoral dissertation, defense of the doctoral dissertation, obtaining doctorate of science at UM.
* Basic scientific methods (quantitative and qualitative methods): observation and description, analysis and synthesis, hypothesis and inference, computer models and simulations.
* Scientific resources: books and articles, scientific databases and services (Web of Science, ProQuest, Science Direct, Engineering Village 2, Digital Associations of Professional Associations (ACM, IEEE), Google Scholar, Patent Database).
* How and where to publish scientific or professional results. Writing article: the strument of scientific articles of the article, conciseness, review of the state, description of own results, comparison, to highlight the novelties, preparation of the final article.
* Ethical aspects of research: experiments involving humans or animals or their data, data protection. Plagiarism: what is it and how to avoid it, quoting, duplicating publications. Research code: authorship, research honesty, Code of research work on UM.
 |
| **Temeljni literatura in viri / Readings:** |
| * D.Pattron, Fundamentals of Scientific Research. New York: Scientific Publishers, 2000
* R.D. Jarrard: Scientific Methods, Dept. od Geology and Geophysics, University of Utah, 2001.
* H.G. Gauch, Scientific method in practice, 2002, Cambridge
* P. Dunleavy: Authoring a PhD Thesis: How to Plan, Draft, Write and Finish a Doctoral Thesis, Palgrave MacMillan, Hampshire, 2003.
* M.F. Cohen, An introduction to logic and scientiffic method Hughes Press, 2007
* R. Nola, Theories of scientific method,, McGill Univ Press, 2007
 |
| **Cilji in kompetence:** |  | **Objectives and competences:** |
| Cilj predmeta je študenta uvesti in seznaniti s postopki v znanstveno razsikovalno delo. |  | The objective of this course is to acquaint student with procedures in the scientific and experimental work. |
| **Predvideni študijski rezultati:** |  | **Intended learning outcomes:** |
| Znanje in razumevanje:Znanje širšega strokovnega področja in povezovanje znanj; metode znanstvenega raziskovanja. |  | Knowledge and understanding:Knowledge of the broader professional field; methods of empirical research. |
| Prenesljive/ključne spretnosti in drugi atributi:Strokovno zapisovanje in izražanje vsebine, obvladanje reševanja strokovnih problemov, predstavitev spoznanj in spretnost argumentiranja |  | Transferable/Key skills and other attributes:Documenting and expressing the subject in a professional way, mastering the solving of the professional problems, conclusions presentation and ability in arguing.  |
| **Metode poučevanja in učenja:** |  | **Learning and teaching methods:** |
| predavanjasamostojno delopoučevanje in učenje poteka z didaktično uporabo IKT |  | lecturesindividual work teaching and learning is done using didactic use of ICT |
| **Načini ocenjevanja:** | Delež (v %) /Weight (in %) | **Assessment:** |
| ustni izpitseminarska naloga | **50%****50%** | oral examinationcoursework |
| **Reference nosilca / Lecturer's references:**  |
| AVSEC, Jurij, WANG, Zhaolin, NATERER, Greg F. Thermodynamic and transport properties of fluids and solids in a Cu-Cl solar hydrogen cycle. Journal of thermal analysis and calorimetry, ISSN 1388-6150. [Print ed.], jan. 2017, vol. 127, issue 1, str. 961-967, doi: 10.1007/s10973-016-5875-y. [COBISS.SI-ID 1024244316], [JCR, SNIP, WoS do 2. 4. 2018: št. citatov (TC): 2, čistih citatov (CI): 2, Scopus do 1. 3. 2018: št. citatov (TC): 2, čistih citatov (CI): 2] STRUŠNIK, Dušan, MARČIČ, Milan, GOLOB, Marjan, HRIBERNIK, Aleš, ŽIVIĆ, Marija, AVSEC, Jurij. Energy efficiency analysis of steam ejector and electric vacuum pump for a turbine condenser air extraction system based on supervised machine learning modelling. Applied energy, ISSN 0306-2619, jul. 2016, vol. 173, str. 386-405, graf. prikazi, doi: 10.1016/j.apenergy.2016.04.047. [COBISS.SI-ID 1024226652], [JCR, SNIP, WoS do 2. 4. 2018: št. citatov (TC): 6, čistih citatov (CI): 5, Scopus do 29. 10. 2018: št. citatov (TC): 7, čistih citatov (CI): 6] STRUŠNIK, Dušan, GOLOB, Marjan, AVSEC, Jurij. Effect of non-condensable gas on heat transfer in steam turbine condenser and modelling of ejector pump system by controlling the gas extraction rate through extraction tubes. Energy conversion and management, ISSN 0196-8904. [Print ed.], oct. 2016, vol. 126, str. 228-246, doi: 10.1016/j.enconman.2016.07.082. [COBISS.SI-ID 19707158], [JCR, SNIP, WoS do 2. 4. 2018: št. citatov (TC): 2, čistih citatov (CI): 2, Scopus do 29. 5. 2018: št. citatov (TC): 3, čistih citatov (CI): 3] BARUKČIĆ, Marinko, HEDERIĆ, Željko, HADŽISELIMOVIĆ, Miralem, SEME, Sebastijan. A simple stochastic method for modelling the uncertainty of photovoltaic power production based on measured data. Energy, ISSN 1873-6785. [Online ed.], 2018, [31] str., doi: 10.1016/j.energy.2018.09.134. [COBISS.SI-ID 1024322140], [JCR, SNIP, Scopus do 13. 10. 2018: št. citatov (TC): 0, čistih citatov (CI): 0, čistih citatov na avtorja (CIAu): 0] SEME, Sebastijan, SREDENŠEK, Klemen, PRAUNSEIS, Zdravko, ŠTUMBERGER, Bojan, HADŽISELIMOVIĆ, Miralem. Optimal price of electricity of solar power plants and small hydro power plants : technical and economical part of investments. Energy, ISSN 0360-5442. [Print ed.], avg. 2018, vol. 157, str. 87-95, graf. prikazi, doi: 10.1016/j.energy.2018.05.121. [COBISS.SI-ID 1024307804], [JCR, SNIP, WoS do 9. 12. 2018: št. citatov (TC): 2, čistih citatov (CI): 2, čistih citatov na avtorja (CIAu): 0.40, Scopus do 30. 11. 2018: št. citatov (TC): 2, čistih citatov (CI): 2, čistih citatov na avtorja (CIAu): 0.40] SEME, Sebastijan, LUKAČ, Niko, ŠTUMBERGER, Bojan, HADŽISELIMOVIĆ, Miralem. Power quality experimental analysis of grid-connected photovoltaic systems in urban distribution networks. Energy, ISSN 0360-5442. [Print ed.], 2017, vol. 139, str. 1261-1266, graf. prikazi, doi: 10.1016/j.energy.2017.05.088. [COBISS.SI-ID 1024268124], [JCR, SNIP, WoS do 11. 11. 2018: št. citatov (TC): 6, čistih citatov (CI): 6, čistih citatov na avtorja (CIAu): 1.50, Scopus do 30. 11. 2018: št. citatov (TC): 7, čistih citatov (CI): 7, čistih citatov na avtorja (CIAu): 1.75] SEME, Sebastijan, SRPČIČ, Gregor, KAVŠEK, Domen, BOŽIČNIK, Stanislav, LETNIK, Tomislav, PRAUNSEIS, Zdravko, ŠTUMBERGER, Bojan, HADŽISELIMOVIĆ, Miralem. Dual-axis photovoltaic tracking system : design and experimental investigation. Energy, ISSN 0360-5442. [Print ed.], maj 2017, vol. 139, str. 1267-1274, graf. prikazi, doi: 10.1016/j.energy.2017.05.153. [COBISS.SI-ID 1024270172], [JCR, SNIP, WoS do 9. 12. 2018: št. citatov (TC): 2, čistih citatov (CI): 2, čistih citatov na avtorja (CIAu): 0.25, Scopus do 29. 12. 2018: št. citatov (TC): 6, čistih citatov (CI): 6, čistih citatov na avtorja (CIAu): 0.75]  |

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| **UČNI NAČRT PREDMETA / COURSE SYLLABUS** |
| **Predmet:** | **PRENOSLJIVA ZNANJA** |
| **Course title:** | **TRANSFERABLE KNOWLEDGE**  |
|  |  |  |  |
| **Študijski program in stopnja****Study programme and level** | **Študijska smer****Study field** | **Letnik****Academic year** | **Semester****Semester** |
| **ENERGETIKA, 3. stopnja** | **-** | **2.** | **3.** |
| **ENERGY TECHNOLOGY, 3. Degree** | **-** | **2.** | **3.** |
|  |
| **Vrsta predmeta / Course type** | Obvezni/Obligatory |
|  |  |
| **Univerzitetna koda predmeta / University course code:** | D |
|  |
| **Predavanja****Lectures** | **Seminar****Seminar** | **Vaje****Tutorial** | **Klinične vaje****work** | **Druge oblike študija** | **Samost. delo****Individ. work** |  | **ECTS** |
| **30** | **-** | **-** | **-** | **-** | **60** |  | **3** |
|  |
| **Nosilec predmeta / Lecturer:** | **MIRALEM HADŽISELIMOVIĆ / AMOR CHOWDHURY**  |
|  |
| **Jeziki /** **Languages:** | **Predavanja / Lectures:** | **Slovenski/Slovene** |
| **Vaje / Tutorial:** | **Slovenski/Slovene** |
| **Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:** |  | **Prerequisits:** |
| Ni posebnih obveznosti |  | No prereguisites. |
| **Vsebina:**  |  | **Content (Syllabus outline):** |
| * Definicija in namen patenta: čemu je namenjen patent, kaj lahko patentiramo in kaj ne, struktura patenta, patentni zahtevki (odvisni in neodvisni), vrste patentov, patentni uradi in njihove posebnosti (slovenski, EP, USPTO), mednarodni sporazum (PCT) in mednarodna prijava.
* Postopek pridobitve patentna: patentna raziskava, pisanje (stil, struktura patentnih zahtevkov) in predložitev patentne prijave, pridobitev prioritete, patentni preizkus in komunikacija s patentnim uradom, ugovor, faze v postopku, objava patente prijave, podelitev patenta, predhodna objava, vzdrževanje, veljavnost patenta, stroški, izumitelj in prijavitelj, patentni zastopniki, patentni odvetnik, praktični nasveti.
* Komercializacija rezultatov raziskovalnega dela: iskanje in pristop k potencialnim uporabnikom/strankam, razkrivanje informacij vezanih na intelektualno lastnino, javna objava in njene posledice, poslovna skrivnost, konzorcijske pogodbe in intelektualna lastnina, struktura in vrste pogodb o nerazkrivanju poslovne skrivnosti (NDA) ter možne pasti, finančna nadomestila (oblike in orientacijske vrednosti), ravnanje z intelektualno lastnino (laboratorijska knjiga, varovanje).
* Zakon o intelektualni lastnini: kratek povzetek (pravice in dolžnosti izumiteljev).
 |  | * Definition and purpose of the patent: the function of the patent, what can be patented and what not, patent claims (dependent in dependent), types of patents, patent offices and their specifics (Slovenian, EP, USPTO), international paten cooperation treaty (PCT) and international patent application.
* Procedure for obtaining the patent: patent research, patent preparation (style, structure of the patent claims) and patent filing, obtaining patent priority date, patent examination and communication with the patent office, objection, phases in the procedure, patent publication, patent granting, early publication, maintenance, patent validity, cost, inventor and applicant, patent agent, patent attorney, practical advices.
* Commercialization of the research work: Search and approaching the potential users/customers, disclosures of proprietary information, publication and its consequences, trade secret, consortium agreements and intellectual property, structure and types of non disclosure agreements, financial compensation (types of compensations and approximate values), handling the intellectual property (lab book, securing IP).
* Legislation related to intellectual property: short summary (rights and obligations of inventors.
 |
| **Temeljni literatura in viri / Readings:** |
| * D.Pattron, Fundamentals of Scientific Research. New York: Scientific Publishers, 2000
* R.D. Jarrard: Scientific Methods, Dept. od Geology and Geophysics, University of Utah, 2001.
* H.G. Gauch, Scientific method in practice, 2002, Cambridge
* P. Dunleavy: Authoring a PhD Thesis: How to Plan, Draft, Write and Finish a Doctoral Thesis, Palgrave MacMillan, Hampshire, 2003.
* M.F. Cohen, An introduction to logic and scientiffic method Hughes Press, 2007
* R. Nola, Theories of scientific method,, McGill Univ Press, 2007
 |
| **Cilji in kompetence:** |  | **Objectives and competences:** |
| Cilj predmeta je študenta seznaniti s postopki patentiranja in komercializacije rezultatov raziskovalnega dela.Študent lahko opravi predmet na temo prenosljiva znanja v okviru delavnic, ki jih organizira Univerza v Mariboru. |  | The aim of the course is to familiarize the student with the procedures of patenting and commercialization of the results of the research work.The student can carry out the subject on transferable knowledge in the framework of workshops organized by the University of Maribor. |
| **Predvideni študijski rezultati:** |  | **Intended learning outcomes:** |
| Znanje in razumevanje:Znanje širšega strokovnega področja in povezovanje znanj; prenosljiva znanja. |  | Knowledge and understanding:Knowledge of a wider field of expertise and networking of knowledge; transferable knowledge. |
| Prenesljive/ključne spretnosti in drugi atributi:Strokovno zapisovanje in izražanje vsebine, obvladanje reševanja strokovnih problemov, predstavitev spoznanj in spretnost argumentiranja |  | Transferable/Key skills and other attributes:Documenting and expressing the subject in a professional way, mastering the solving of the professional problems, conclusions presentation and ability in arguing.  |
| **Metode poučevanja in učenja:** |  | **Learning and teaching methods:** |
| predavanjasamostojno delopoučevanje in učenje poteka z didaktično uporabo IKT |  | lecturesindividual work teaching and learning is done using didactic use of ICT |
| **Načini ocenjevanja:** | Delež (v %) /Weight (in %) | **Assessment:** |
| ustni izpitseminarska naloga | **50%****50%** | oral examinationcoursework |
| **Reference nosilca / Lecturer's references:**  |
| HADŽISELIMOVIĆ, Miralem, CHOWDHURY, Amor, KOTNIK, Bojan. Smart fenetretation product system having renote control and management : patentna prijava WO 2015113592 (A1), 2015-08-06. Hague: European Patent Office, 2014. 31 f., ilustr. [COBISS.SI-ID 78304257]SEME, Sebastijan, SREDENŠEK, Klemen, PRAUNSEIS, Zdravko, ŠTUMBERGER, Bojan, HADŽISELIMOVIĆ, Miralem. Optimal price of electricity of solar power plants and small hydro power plants : technical and economical part of investments. Energy, ISSN 0360-5442. [Print ed.], avg. 2018, vol. 157, str. 87-95, graf. prikazi, doi: 10.1016/j.energy.2018.05.121. [COBISS.SI-ID 1024307804], [JCR, SNIP, WoS do 9. 12. 2018: št. citatov (TC): 2, čistih citatov (CI): 2, čistih citatov na avtorja (CIAu): 0.40, Scopus do 30. 11. 2018: št. citatov (TC): 2, čistih citatov (CI): 2, čistih citatov na avtorja (CIAu): 0.40]SEME, Sebastijan, LUKAČ, Niko, ŠTUMBERGER, Bojan, HADŽISELIMOVIĆ, Miralem. Power quality experimental analysis of grid-connected photovoltaic systems in urban distribution networks. Energy, ISSN 0360-5442. [Print ed.], 2017, vol. 139, str. 1261-1266, graf. prikazi, doi: 10.1016/j.energy.2017.05.088. [COBISS.SI-ID 1024268124], [JCR, SNIP, WoS do 11. 11. 2018: št. citatov (TC): 6, čistih citatov (CI): 6, čistih citatov na avtorja (CIAu): 1.50, Scopus do 30. 11. 2018: št. citatov (TC): 7, čistih citatov (CI): 7, čistih citatov na avtorja (CIAu): 1.75]CHOWDHURY, Amor, SARJAŠ, Andrej. Finite element modelling of a field-sensed magnetic suspended system for accurate proximity measurement based on a sensor fusion algorithm with Unscented Kalman Filter. Sensors, ISSN 1424-8220, 2016, vol. 16, iss. 9, str. 1-23. <https://dk.um.si/IzpisGradiva.php?id=66367>, doi: 10.3390/s16091504. [COBISS.SI-ID 19822614], [JCR, SNIP, WoS do 9. 12. 2018: št. citatov (TC): 2, čistih citatov (CI): 1, čistih citatov na avtorja (CIAu): 0.50, Scopus do 29. 12. 2018: št. citatov (TC): 5, čistih citatov (CI): 3, čistih citatov na avtorja (CIAu): 1.50] KLAMPFER, Saša, CHOWDHURY, Amor. The proposed planning method as a parallel element to a real service system for dynamic sharing of service lines. ISA transactions, ISSN 0019-0578, jul. 2015, vol. 57, str. 403-417, graf. prikazi, tabele, doi: 10.1016/j.isatra.2015.02.010. [COBISS.SI-ID 81837825], [JCR, SNIP, WoS do 21. 8. 2015: št. citatov (TC): 0, čistih citatov (CI): 0, čistih citatov na avtorja (CIAu): 0, Scopus do 19. 3. 2016: št. citatov (TC): 0, čistih citatov (CI): 0, čistih citatov na avtorja (CIAu): 0] Patenti:CHOWDHURY, Amor, IGREC, Dalibor. Smart optical tag : EP3059697 (B1), 2018-05-16. Munich: European Patent Office, 2018. 6 str., ilustr. [COBISS.SI-ID 1024306012] patentna družina: Prijavitelj Margento R&D d.o.o.; EP3059697 (A1), 2016-08-24; SI24935 (A), 2016-08-31; SI20150000036, 2015-02-19 kategorija: 2E (Z, A'', A', A1/2); tip dela je verificiral OSICT HADŽISELIMOVIĆ, Miralem, CHOWDHURY, Amor, KOTNIK, Bojan. Intelligentes fenstersystem aufweisend eine fernsteuerung : EP3097246 (B1), 2017-08-30. Berlin: European Patent Office, 2017. Loč. pag., ilustr. [https://worldwide.espacenet.com/publicationDetails/originalDocument?](https://worldwide.espacenet.com/publicationDetails/originalDocument)FT=D&date=20170830&DB=&locale=en\_EP&CC=EP&NR=3097246B1&KC=B1&ND=4#. [COBISS.SI-ID 1024284252] patentna družina: DK3097246 (T3), 2017-12-04; ES2650540 (T3), 2018-01-19; PT3097246 (T), 2017-12-07; SI3097246 (T1), 2018-01-31 kategorija: 2E (Z, A'', A', A1/2); tip dela je verificiral OSICT CHOWDHURY, Amor, URBANIJA, Miloš, KOTNIK, Bojan, ALYAMOUR, Dani. Wireless mobile transaction system and the procedure for carrying out transactions with a mobile phone : US 9189783 (B2), 2015-11-17. Alexandria: United States Patent and Trademark Office, 2015. 8 f., ilustr. [COBISS.SI-ID 1024228700] patentna družina: Prijavitelj: Margento R&D d.o.o.; PCT/SI2010/000044; US 20130029646 (A1), 2013-01-31; WO 2011112158 (A1), 2011-09-15; EP 2545505 (A1), 2013-01-16; US 2016071088 (A1), 2016-03-10; SI 23227 (A), 2011-05-31 kategorija: 2E (Z, A'', A', A1/2); tip dela je verificiral OSICT  |

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| **UČNI NAČRT PREDMETA / COURSE SYLLABUS** |
| **Predmet:** | **DOKTORSKA DISERTACIJA** |
| **Course title:** | **PhD THESIS** |
|  |  |  |  |
| **Študijski program in stopnja****Study programme and level** | **Študijska smer****Study field** | **Letnik****Academic year** | **Semester****Semester** |
| **ENERGETIKA, 3. stopja** | **-** | **3.** | **6.** |
| **ENERGY TECHNOLOGY, 3. Degree** | **-** | **3.** | **6.** |
|  |
| **Vrsta predmeta / Course type** | Obvezen / Obligatory |
|  |  |
| **Univerzitetna koda predmeta / University course code:** | D |
|  |
| **Predavanja****Lectures** | **Seminar****Seminar** | **Vaje****Tutorial** | **Klinične vaje****work** | **Druge oblike študija** | **Samost. delo****Individ. work** |  | **ECTS** |
| **30** | **-** | **-** | **-** | **-** | **870** |  | **30** |
|  |
| **Nosilec predmeta / Lecturer:** | mentor |
|  |
| **Jeziki /** **Languages:** | **Predavanja / Lectures:** | **Slovenski/Slovene** |
| **Vaje / Tutorial:** | **Slovenski/Slovene** |
| **Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:** |  | **Prerequisits:** |
| Ni posebnih obveznosti |  | No prereguisites. |
| **Vsebina:**  |  | **Content (Syllabus outline):** |
| Ovitek.2. Notranja naslovna stran 3. Izjava kandidata o avtorstvu doktorske naloge 4. Zahvala 5. Povzetek doktorske naloge v slovenskem in tujem (angleškem, nemškem) jeziku in ključne besede 6. Pregled vsebine - kazalo7. Pregled slik - kazalo.8. Pregled tabel - kazalo.9. Pregled prilog - kazalo.10.Uvod.11. Teoretične osnove.12. Praktični (problemski) del doktorske naloge13. Prispevek doktorske naloge k stroki14. Zaključek.15. Literatura in viri (Literatura mora biti navedena po stilu APA).16. Priloge (po potrebi).17. Pojmovnik (po potrebi).18. Kratice in akronimi (po potrebi)19. Življenjepis avtorja, napisan v tretji osebi; vsebuje osnovne podatke avtorja, šolanje, zaposlitve in obsega 15 do 20 vrstic. |  | 1. Cover.2. Inside title page.3. Statement of the candidate about his authorship of the PhD thesis.4. Acknowledgement.5. Summary of the PhD thesis in Slovene and in a foreign (English or German) language and key words.6. Review of the subject – index.7. Review of the tables – index.9. Review of the supplements – index.10. Introduction.11. Theoretical basis.12. Practical part of the PhD thesis concerning a problem.13. Contribution of the PhD thesis to the professional field.14. Conclusion.15. Literature and sources. (The literature should be quoted according to the APA style.)16. Supplements (if needed).17. Glossary (if needed).18. Abbreviations and acronyms (if needed)19. Biography |
| **Temeljni literatura in viri / Readings:** |
| Pravilnik o postopku priprave in zagovora doktorske disertacije na UMJužnič, S. (1992). Diplomska naloga: napotki za izdelavo. Ljubljana: Amalietti.Makarovič, J. (1984). Misel in sporočilo: Kako uspešno študirati, raziskovati in predstaviti svoje ideje. Ljubljana: DDU Univerzum.Toporišič, J. (ur.). (1990). Slovenski pravopis, I Pravila. Ljubljana: Slovenska akademija znanosti in umetnosti, Državna založba Slovenij |
| **Cilji in kompetence:** |  | **Objectives and competences:** |
| Doktorska disertacija je pisni dokument, s katerim študent dokaže sposobnost uporabe teoretičnih znanj in v praksi pridobljenih izkušenj za rešitev problema, ki si ga je izbral s prijavo teme doktorske disertacije. V doktorski disertaciji študent pokaže sposobnost izbire in uporabe domače ter tuje strokovne literature in dodatnih virov za potrebe rešitve izbranega problema.V doktorski disertaciji bo kandidat rešil vsaj en do takrat nerešen znanstven problem iz področja energetike. |  | The dissertation is a written document by means of which the student proves his ability to use the theoretical knowledge and in his practical work achieved experiences in resolving a problem chosen by applying for a theme of his PhD thesis. In his degree’s work the student presents the ability to choose and use his national and foreign professional literature and additional sources in order to solve the chosen problem. In doctoral thesis the candidat has to solve one unsolved problem from the field of energy phenomena. |
| **Predvideni študijski rezultati:** |  | **Intended learning outcomes:** |
| Znanje in razumevanje: Znanje širšega strokovnega področja, v katerega sodi doktorska disertacija in ožje znanje ter razumevanje pojmovnika, ki ga zajema tema doktorske disertacije. Poudarek je na praktičnih znanjih in enostavnejših metodologijah zajemanja, obdelovanja in prikazovanja podatkov |  | Knowledge and Understanding:Knowledge of the broader professional field to which belongs the PhD thesis and special knowledge of the glossary concerned by the thesis theme. The emphasis is on the practical skills and relatively more simple methodologies of collecting, processing and presenting data. |
| Prenesljive/ključne spretnosti in drugi atributi:Strokovno zapisovanje in izražanje vsebine, obvladanje reševanja strokovnih problemov, suverena predstavitev ključnih spoznanj in spretnost argumentiranja |  | Transferable/Key Skills and other attributes:Documenting and expressing the subject in a professional way, mastering the solving of the professional problems, independent presentation of the key conclusions and ability in arguing. |
| **Metode poučevanja in učenja:** |  | **Learning and teaching methods:** |
| Mentor na konzultacijah preverja vsebinski in strukturni vidik naloge.Mentor pripravi kandidata na predstavitev in zagovor. |  | Consultations with mentor about content and the structural aspect of the dissertation. The candidate is preparing with mentor to present and argue his dissertation. |
| **Načini ocenjevanja:** | Delež (v %) /Weight (in %) | **Assessment:** |
| * doktorska disertacija
* zagovor
 | **60%****40%** | * PhD thesis
* presentation / defense
 |
| **Reference nosilca / Lecturer's references:**  |
|  |