

# MAGISTRSKA NALOGA

## UČNI NAČRT PREDMETA/COURSE SYLLABUS

<b>Predmet:</b>	Magistrska naloga
<b>Course title:</b>	MASTER THESIS
<b>Članica nosilka/UL Member:</b>	UL FS

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Strojništvo - Razvojno raziskovalni program, druga stopnja, magistrski	Energetsko strojništvo (smer)	2. letnik	2. semester	obvezni
Strojništvo - Razvojno raziskovalni program, druga stopnja, magistrski	Mehanika (smer)	2. letnik	2. semester	obvezni
Strojništvo - Razvojno raziskovalni program, druga stopnja, magistrski	Mehatronika in laserska tehnika (smer)	2. letnik	2. semester	obvezni
Strojništvo - Razvojno raziskovalni program, druga stopnja, magistrski	Proizvodno strojništvo (smer)	2. letnik	2. semester	obvezni

<b>Univerzitetna koda predmeta/University course code:</b>	0562804
<b>Koda učne enote na članici/UL Member course code:</b>	6013-M

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
	35			70	145	10

<b>Nosilec predmeta/Lecturer:</b>	Vsi nosilci v programu
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<b>Izvajalci predavanj:</b>	
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**Izvajalci seminarjev:**

**Izvajalci vaj:**

**Izvajalci kliničnih vaj:**

**Izvajalci drugih oblik:**

**Izvajalci praktičnega  
usposabljanja:**

**Vrsta predmeta/Course  
type:**

Obvezni splošni predmet / Compulsory general course

**Jeziki/Languages:**

Predavanja/Lectures:

Slovenščina

Vaje/Tutorial:

Slovenščina

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

**Prerequisites:**

Za pristop k izdelavi magistrskega dela je potrebno imeti opravljene vse predhodne študijske obveznosti v programu (110 ECTS). Izvajanje Projektnega praktikuma je glede na vsebinsko povezavo komplementarno z magistrskim delom.

The requirement for beginning the work on the master's thesis are completed previous programme study obligations (110 ECTS). The execution of Project practicum complements the master's thesis.

**Vsebina:**

**Content (Syllabus outline):**

Študent v magistrskem delu razdela praviloma raziskovalno usmerjeno temo, ki jo realizira bodisi v raziskovalnem laboratoriju fakultete ali v spregi z industrijskim okoljem. Vsebina magistrskega dela je dogovorjena z izbranim mentorjem na UL FS ter opcionalno z mentorjem v neposredni proizvodnji, ki je za rešitev v magistrskem delu predvidene razvojno raziskovalne tematike zainteresirana. Temo in naslov magistrskega dela, ki v splošnem zajema eksperimentalne, računalniške ali analitične razvojno raziskovalne vsebine, odobri

In the master's thesis, the student elaborates on a subject that is usually research-oriented, realised either in a research laboratory at the faculty or in collaboration with the industrial sector. The topic of the master's thesis is agreed upon with the selected mentor at the UL FS and optionally with the mentor from a manufacturing company, which is interested in the solutions for the research and development problems included in the master's thesis. The topic and the title of the master's thesis, usually encompassing experimental, computer or analytical research and development subject matter, are approved by the Master's study

<p>komisija za magistrski študij.</p> <p>Ob pomoči izbranega mentorja študent oblikuje raziskovalni problem, raziskovalni problem razčleni na raziskovalna vprašanja, oblikuje hipoteze in cilje raziskave. Glede na izbrano vsebino svoje raziskave in upoštevajoč relevantna znanstveno-raziskovalna spoznanja izbere ustrezni raziskovalni pristop in naredi načrt raziskave, razmisli o najustreznejši tehniki zbiranja podatkov in o načinu njihove obdelave ter prikaza. Po izvedenih raziskavah študent rezultate svojih raziskav ustrezno predstavi v pisni obliki v magistrskem delu ter ustno na javnem zagovoru magistrskega dela pred za ta namen določeno komisijo.</p>	<p>commission.</p> <p>With the support of the selected mentor, the student forms the research problem, dissects the research problem into research questions, and shapes the hypotheses and the goals of research. According to the selected subject of research and considering the relevant scientific research findings, the student selects an appropriate research approach and prepares a plan of research, as well as ponders upon the most appropriate techniques of data collection, processing and presentation. Upon conducting the research, the student presents the results of research in written form in the master's thesis, and orally at the public defence of the master's thesis in front of a commission, appointed for this purpose.</p>
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### **Temeljna literatura in viri/Readings:**

<p>Literatura se opredeli ob definiranju teme magistrskega dela in je smiselno določena za vsakega študenta posebej. Ob literaturi, ki je dosegljiva v knjižnici laboratorija, fakultetni knjižnici ali širše, študent praviloma študira tudi iz člankov, ki obravnavajo sorodno problematiko, kot jo sam razdeluje v magistrski nalogi.</p> <p>The literature is reasonably determined for each student individually, upon defining the topic of the master's thesis. In addition to studying the literature available from the laboratory library, the faculty library and elsewhere, the student usually also studies articles dealing with the topics related to the topic discussed in the master's thesis.</p>
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### **Cilji in kompetence:**

<p>Cilji:</p> <p>Z magistrskim delom, ki ga izdela samostojno, vendar ob pomoči in vodstvu izbranega mentorja, študent dokaže, da je ob raziskovalno-metodološkem znanju in praktičnih izkušnjah, ki si jih je pridobil v času študija, sposoben k reševanju problemov s področja razvojno raziskovalnega in projektno aplikativnega strojništva pristopiti</p>	<p><b>Objectives and competences:</b></p> <p>Objectives:</p> <p>With the master's thesis, prepared independently with the support and under the guidance of the selected mentor, the student proves the research-methodological knowledge and practical experience gained during the study have made him or her fit to approach the solving of problems in the field of both research and development and project-applied mechanical engineering in an analytical and creative manner, being</p>
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analitično in kreativno ter s sposobnostjo integriranja teoretskih spoznanj, timskega in multidisciplinarnega povezovanja. Pri raziskavah študent dokaže, da se zna ustrezno opredeliti do dilem, ki se med raziskovalnim procesom in uresničevanjem zasnovanih idejnih rešitev pojavijo. Študent dokaže, da se zna do rezultatov lastne raziskave kritično opredeliti in v primeru tehniške uporabnosti le-te ustrezno tehniško razdelati in sintetizirati ter jih neposredno implementirati v realno proizvodno okolje.

#### Kompetence:

Z javnim zagovorom magistrskega dela pred komisijo in prisotno javnostjo študent dokaže, da je sposoben kreativnega reševanja posameznih nalog na področju strojništva in samostojnega izvajanja zahtevnih raziskovalnih, razvojnih, inženirskih in strokovno organizacijskih del ter da je sposoben iskanja optimalnejših rešitev na osnovi analize in sinteze. Svoja stališča zna ustrezno predstaviti in argumentirano zagovarjati. S tem potrdi, da obvlada med študijem usvojene kompetence in metode dela, katere z lastno kreativnostjo nadgradi do novih teoretičnih spoznanj ali do končnega produkta z dodano novo vrednostjo, rezultate tega dela pa zna umestiti v tehniško okolje.

able to integrate theoretical findings, teamwork and multidisciplinary networking. During the research, the student proves he or she knows to take a proper position towards the dilemmas arising during the research process and the realization of planned idea solutions. The student proves he or she is able to take a critical position towards the results of his or her own research. In case the results are of technical use, the student is able to technically elaborate and synthesise the results for direct implementation into a real production environment.

#### Competences:

By defending the master's thesis publicly in front of the commission and the members of the public, the student proves he or she is able to creatively solve specific problems in the field of mechanical engineering and to autonomously execute complex research, development, engineering or professional-organisational tasks, as well as displays the ability to find optimal solutions based on analysis and synthesis. The student is able to present his or her points of view and defend them with arguments. This proves the students masters the competences and working methods obtained during the studies, upgrading them with his or her own creativity into new theoretical findings or into a final product with new value added, and knowing how to position the results of his or her work into the technical environment.

### **Predvideni študijski rezultati:**

#### Znanje in razumevanje

Z aktivnostmi pri razdelavi tematike magistrskega dela študent potrdi, da obvlada med študijem usvojene kompetence in metode dela in da jih je sposoben z lastno kreativnostjo nadgraditi do novih teoretičnih

### **Intended learning outcomes:**

#### Knowledge and understanding

The activities on elaborating the topic of the master's thesis prove the students have mastered the competences and working methods obtained during the studies, upgrading them with their own creativity into

spoznanj ali do končnega produkta z dodano novo vrednostjo, rezultate tega dela pa zna umestiti v tehniško okolje. Svoja stališča zna ustrezno predstaviti in argumentirano zagovarjati.

#### Uporaba

Pri izdelavi magistrskega dela študent uporabi metodološke pristope k raziskovalnemu delu, teoretična in eksperimentalna znanja ter veščine, ki jih je pridobil v študijskem programu. Le-te nadgradi v celovito na osnovi lastnih raziskav temelječo teoretično ali tehniško razvojno rešitev z ustrezno aplikativno vrednostjo.

#### Refleksija

Z realizacijo magistrskega dela študent reflektira, ne glede ali gre za teoretične ali eksperimentalne ali razvojno raziskovalne ali projektno aplikativne vsebine, s študijem pridobljena znanja v praviloma nova spoznanja in tehniške rešitve. Ta spoznanja so rezultat lastnega raziskovalnega dela, ki ga je študent opravil v okviru dejavnosti pri učnih enotah Projektni praktikum in Magistrsko delo.

Prenosljive spretnosti – niso vezane le na en predmet

Z uveljavljanjem dela v laboratoriju ter s prenašanjem znanj iz enega v drug laboratorij zaradi potreb izdelave magistrskega dela se zagotovi uveljavljanje sposobnosti izmenjav in dela v timu, ki ni nujno vselej na istem mestu, marveč na različnih lokacijah. Študent ob tem pridobi sposobnost načrtovanja in kritičnega vodenja raziskav ter spremljanja njihove realizacije ter sprotne kontrole. Ob tem izpopolni pisno in ustno izražanje.

new theoretical findings or into a final product with new value added, knowing how to position the results of their work in the technical environment. The student is able to present his or her points of view and defend them with arguments.

#### Usage

In preparing the master's thesis, the students use methodological approaches to research work, theoretical and experimental knowledge and skills attained in scope of the study programme. These approaches are upgraded into a comprehensive theoretical or technical developmental solution, based on own research and having a corresponding applied value.

#### Reflection

By realising the master's thesis, regardless of whether it covers theoretical or experimental or research-and-development or project-applied subject matter, the student reflects the knowledge attained during the study into new findings and technical solutions or educational procedures. These findings are the result of own research work, conducted by the student in scope of Project practicum and Master's thesis courses.

Transferrable skills – related to more than one course

By enforcing laboratory work and by transferring knowledge between the laboratories for the purposes of creating the master's thesis, the students achieve the ability to exchange knowledge and do teamwork, not necessarily always at the same location. The student thereby obtains the ability to plan and critically manage research, supervise the realisation of research and do continuous control. The student also perfects written and oral

	communication.
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**Metode poučevanja in učenja:**
**Learning and teaching methods:**

Individualno ali skupinsko delo s posvetovanjem z mentorjem, ob uporabljenih metodah in pristopih k reševanju problematike, ki so specifični glede na tematiko magistrskega dela. Delo se praviloma izvaja ali v fakultetnem laboratoriju ali v industrijskem okolju (v razvojnem oddelku).	Individual or group work involving consultations with the mentor, and using methods and approaches for solving the problems specific to the topic of the master's thesis. The work is generally executed at a faculty laboratory or in the industrial environment (in the development department), and directly in the secondary school environment.
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**Načini ocenjevanja:**
**Delež/  
Weight**
**Assessment:**

Oceno magistrskega dela sestavljata dve oceni. Prva ocena izhaja na osnovi kakovosti magistrskega dela, ki jo oceni mentor, ki delo tudi predstavi pred magistrsko komisijo. Nadaljnje preverjanje v zvezi z magistrskim delom je kandidatova javna predstavitev dela, ki določa drugo oceno. Končna ocena celotnega študija se določi v skladu z metodologijo določanja skupne ocene, ki ob dveh pridobljenih ocenah iz naslova magistrskega dela upošteva še študentovo uspešnost skozi čas študija pri vseh predvidenih oblikah preverjanja znanja (predavanja, vaje). Metode ocenjevanja in ocenjevalna lestvica so določeni v točki 4.8 vloge za pridobitev soglasja k magistrskemu drugo-stopenjskemu študijskemu programu STROJNIŠTVO.		The grading of master's theses consists of two grades. The first grade is based on the quality of master's thesis as assessed by the mentor, who also presents the thesis to the master's study commission. The second grade is given for the candidate's public defence of master's thesis. The final grade for the whole study is determined according to the methodology for the determination of the final grade. In addition to the two grades obtained for the master's thesis, this methodology also considers the student's success in all the forms of knowledge assessment (lectures, exercises) throughout the study. The evaluation methods and the grading scale are defined in Point 4.8 of the application for approval of Level 2 masters' study programme MECHANICAL ENGINEERING.
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**Ocenjevalna lestvica:**
**Grading system:**

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

Nosilci predmeta so vsi profesorji magistrskega študija, ki imajo že predložene reference.

The course coordinators are all master's study professors who already submitted their references.