

MD-2068, CHISINAU, 9/7 STUDENTILOR STR, PHONE: 022 50-99-63, www.utm.md

## RESEARCH INTERSHIP AND MASTER'S THESIS ELABORATION

### 1. Course Unit Information

<b>Faculty</b>	Computers, Informatics, and Microelectronics				
<b>Chair/department</b>	Computer Science and Systems Engineering				
<b>Cycle of studies</b>	Master's degree studies, cycle II				
<b>Study Program</b>	<b>Data Science</b>				
<b>Year of study</b>	<b>Semester</b>	<b>Evaluation type</b>	<b>Training category</b>	<b>Optionality category</b>	<b>ECTS Credits</b>
<b>II (full-time education)</b>	4	E-examination	S – Course unit specialty	O – Obligatory course unit	28

### 2. Total estimated time

Total hours in the Curriculum Plan	Including					
	Auditory hours		Individual work			
	Course	Practice	Field research of studies	Analysis of the field of study	Writing a Scientific Article	Elaboration of the Master's Thesis
<b>840</b>	-	-	100	100	100	540

### 3. Preconditions for access to the course unit

<b>According to the Curriculum Plan</b>	Completion of semesters I, II, and III without any failed exams to be retaken. Establishing the master's project topic in semester III.
<b>According to competences</b>	Researching a field of study, identifying problems and solving them, improving processes. Designing and developing applications.

### 4. Conditions for conducting the educational process

<b>Place of internship</b>	<p>The internship can be carried out either at an enterprise or within the specialized department to achieve the goals and objectives set for the master's thesis. The intern student is guided by a faculty member who serves as the master's thesis supervisor.</p> <p>For conducting the internship within a company in the relevant field, a coordinator from the economic unit, a PC/laptop, and internet access are required.</p> <p>The analysis and validation of the internship placements chosen by students are carried out by the specialized department. The student must provide information regarding the internship location in the form of a internship contract or a certificate indicating their employment at the company where they will complete the practice. This must be submitted no later than 15 days before the start of the practice to facilitate the issuance of the internship order, which must be signed by the Vice-Rector for Practical Training.</p>
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<b>Internship tasks notebook</b>	<p>The internship tasks notebook is an integral part of the internship process and must be completed. It includes:</p> <ul style="list-style-type: none"> <li>• The internship notebook - lists the topics of the planned work and specifies the scheduled deadlines for completion, indicating the start and end dates, the number of days, and planning at least one topic for each week.</li> <li>• The individual assignment – clearly states the approved topic for the master's project, along with a concise description of the individual tasks and notes regarding their completion.</li> <li>• Weekly activity sheets – record the planned tasks, activities carried out, and personal observations for each week of the internship.</li> </ul>
<b>Internship report preparation</b>	<p>Students will prepare reports in accordance with the conditions set by the methodological guidelines. The deadline for submitting the report is one week after the completion of the practice.</p>
<b>Subject of the master's thesis</b>	<p>The process of developing the master's degree final paper should be approached as a natural continuation of the university's professional training of specialists at the appropriate level. Through their master's thesis, students demonstrate their ability to meet certain quality standards in their field of study.</p> <p>In this context, the topics of master's theses must comply with the following requirements:</p> <ul style="list-style-type: none"> <li>• They should be determined by the general field of study to which the master's program belongs.</li> <li>• They should be current, addressing interdisciplinary fields with a high degree of novelty.</li> <li>• They should tackle research issues of university, national, and international interest.</li> </ul> <p>The topics of master's theses, formulated in alignment with the areas of interest of the specialized department, are developed for each study program, approved by the Faculty Council, and published on the faculty's website. The approved topics are communicated to students in a timely manner, typically during the second semester of studies.</p> <p>The indicative list of thesis topics, formulated by the thesis advisor based on their professional expertise, is reviewed within the specialized departments and approved by the Faculty Council.</p> <p>The list of thesis topics is updated annually. The final list of master's thesis topics is approved no later than the first week after the completion of the documentation stage for the thesis, within the Faculty Council.</p> <p>The thesis title, formulated by the master's thesis advisor, must be concise, free of unestablished acronyms, and should precisely describe the subject and/or aspect under study so that it can be understood even by a non-specialist.</p> <p>The thesis title must obligatorily contain a verb indicating the area of activity covered by the project or thesis. A subtitle may follow the title to precisely define the scope of the research. The development of master's theses commissioned by economic agents, with the implementation of the obtained results, is encouraged.</p> <p>Students may propose topics for their master's thesis, which will be reviewed and, if applicable, approved during the department meeting.</p> <p>For the Software Engineering and Automation department, the thesis topics are approved within the topic</p>

	<p>approval committee for each study program based on the project proposal, no later than the last week before the master's internship evaluation (current evaluation no. 1, representing 30% of the thesis).</p> <p>Each master's thesis advisor submits the project proposal to the master's thesis topic approval committee.</p>
<b>Structure of the master's thesis writing process</b>	<p>The activity of researchers or the final project completed through the development of the master's thesis reflects the graduate's level of theoretical and practical training by demonstrating their ability to scientifically and organizationally solve a real research problem. Furthermore, the research must clearly showcase the author's contribution to the conducted scientific study.</p> <p><b>The process of developing master's theses</b> is carried out in three stages, each contributing proportionally to the final evaluation grade:</p> <ul style="list-style-type: none"> <li>• documentation stage – 30%</li> <li>• development stage – 40%</li> <li>• review and approval for defense stage – 30%</li> </ul>
<b>The Content of the Master's Thesis</b>	<p>In order to reflect the student's level of theoretical and practical training, the content of the paper must be organized distinctly on two components, namely: the theoretical or conceptual component (refers to the current state of knowledge, presenting aspects necessary to substantiate the problem addressed in the paper and the solutions adopted), respectively, the practical/applicative component (contains one or more applications made by the author, that respond to the objectives of the work).</p> <p>The <b>theoretical component</b> demonstrates the level of knowledge held by the author and provides the theoretical models used, the methods applied, the adopted criteria, the technologies employed, etc., presented in a coherent synthesis, constituting the theoretical foundation of the thesis.</p> <p>The <b>practical or applied component</b> requires the identification/formulation of applicable solutions concerning the issues addressed in the thesis and is based on a set of theoretical knowledge integrated to achieve the thesis objective.</p> <p>Considering the specifics of the study program, the content of the thesis must present a balanced approach between the two components, with an emphasis on the applied part, meaning the actual contribution of the author to the chosen topic.</p> <p>The master's thesis must demonstrate the graduate's ability to creatively apply their theoretical knowledge. Thus, it is recommended that the theoretical part occupies 40–50%, while the practical/applied part represents 50–60%. In terms of format, the applied component can also be included, beyond its dedicated chapters, in the annexes.</p>

### 5. Specific competencies acquired

<b>Professional competencies</b>	<p><b>CPM1.</b> Elaboration and design of the system architecture</p> <p><b>CPM2</b> Monitoring technology trends. Innovation. Sustainability</p> <p><b>CPM3</b> Application development. Component integration. Systems Engineering</p> <p><b>CPM4</b> Staff development</p> <p><b>CPM5</b> Process improvement.</p>
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<b>Transversal competencies</b>	<b>CTM1</b> Autonomy and responsibility <b>CTM2</b> Social interaction <b>CTM3</b> Professional and Personal Development
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## 6. Course/Module objectives

<b>General objective</b>	<p>The internship aims to expand, deepen, and integrate knowledge and understanding skills, develop competencies for applying knowledge and problem-solving abilities both in the studied field and in new or unfamiliar circumstances, as well as conduct research, documentation, and collect materials/information related to the master's thesis topic.</p> <p>The master's thesis represents an in-depth/interdisciplinary/complementary scientific or artistic research in the field of analyzing theoretical and practical issues. It must demonstrate professional and research competencies in the master's program domain, advanced scientific knowledge of the chosen topic, and include elements of novelty and originality in the development or resolution of the research problem.</p> <p>The master's thesis is an original, scientifically based work that contains theoretical and/or experimental results in the respective field of study and research.</p> <p>The main objective of the master's thesis is the multidisciplinary research and analysis of a technical, organizational, economic, or mixed subject, with the purpose of utilizing the results in areas of activity relevant to the specialization.</p>
<b>Specific objectives</b>	<p><b>Specific Objectives of the Research Practice:</b> As a result of the knowledge acquired, the student must complete the documentation phase of the master's thesis, which aims to conduct research related to the thesis topic, document and collect materials/information in accordance with these topics. This process is carried out in collaboration with the thesis supervisor within economic units or the specialized department: Software Engineering and Automation.</p> <p><b>Specific objectives of the master's thesis development</b></p> <ul style="list-style-type: none"> <li>• formulation and correct assessment of the problem proposed in the thesis for research;</li> <li>• determining the place and level of the problem formulated in the master's thesis, taking into account the current information on the development of the field of specialization.</li> <li>• selection and analysis of doctrinal, technical, economic information sources, and invention patents related to the issue or types of issues analyzed in the thesis;</li> <li>• justification of the research methods applied or developed for solving the formulated problem;</li> <li>• justification of the adopted solutions and decisions;</li> <li>• appropriate use of research tools – computing techniques, laboratory equipment – as instruments for optimization, design, analysis, synthesis, and evaluation;</li> <li>• systematization, consolidation, and expansion of practical and theoretical knowledge in the specialty and its use in solving scientific, technical, economic, and production tasks;</li> <li>• development of skills for independent work and mastery of research and experimentation methods to solve the tasks developed in the master's thesis;</li> <li>• convincingly demonstrating the ability to publicly present the results and solutions obtained during the defense of the master's thesis.</li> </ul>

## 7. Course/Module content

Syllabus of individual work	Number of hours
	Full-time education
<b>Elaboration of a scientific article.</b>	
Elaboration of a scientific article based on the research topic of the master's project	100
<b>Research practice</b>	
Analysis of the field of study and identification of the problem	50
Analysis of existing solutions	50
Definition of the proposed solution for implementation	50
Analysis and validation of technical specifications	50
<b>Total ore:</b>	<b>300</b>
<b>Master's thesis development</b>	
Research and analysis of the field of study	200
Analysis of the project's technical specifications and system design.	200
Preparation of the explanatory report	140
<b>Total hours:</b>	<b>540</b>
<b>Total hours of individual work:</b>	<b>840</b>

## 8. Using generative AI

<b>Permission to use</b>	<p>The use of generative AI in assignments and projects is permitted, provided that students adhere to the following rules:</p> <ul style="list-style-type: none"> <li>Generative AI may be used to generate ideas, text structures, or code, but all generated materials must be reviewed and adjusted by the student to ensure that they meet academic requirements.</li> <li>Any use of generative AI must be declared in the appendix section of each paper, using the phrase: "During the preparation of this paper, the author used [NAME OF TOOL / SERVICE] for the purpose of [REASON]. After using this tool / service, the author reviewed and edited the content as necessary and assumes full responsibility for the content of the paper."</li> </ul>
<b>Restrictions to use</b>	<p>Students <b><i>MUSTN'T consider generative AI as a reliable source of information</i></b>, as it does not provide clear references or documented sources.</p> <ul style="list-style-type: none"> <li><b><i>Direct citation of AI-generated content</i></b> in academic papers as if it were a primary source <b><i>isn't permitted</i></b>.</li> <li>Activities in which the use of <b>generative AI is prohibited</b> are specified by the teacher and are usually <b><i>intermediate and final assessments</i></b> or that don't involve professional competence development activities.</li> </ul>

## 9. Bibliographic references

<b>Main</b>	<ol style="list-style-type: none"> <li>Ghid de organizare și desfășurare a practicii în cadrul UTM, <a href="https://utm.md/acte_normative/interne/ghidStagiiPractica.pdf">https://utm.md/acte_normative/interne/ghidStagiiPractica.pdf</a></li> <li>Regulament privind organizarea și desfășurarea stagiilor de practică a studenților UTM, <a href="https://utm.md/wp-content/uploads/2019/03/Regulament-privind-organizarea-%C5%9Fi-desf%C4%83%C8%99urarea-stagiilor-de-practic%C4%83-a-studen%C8%9Bilor-UTM.pdf">https://utm.md/wp-content/uploads/2019/03/Regulament-privind-organizarea-%C5%9Fi-desf%C4%83%C8%99urarea-stagiilor-de-practic%C4%83-a-studen%C8%9Bilor-UTM.pdf</a></li> </ol>
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<b>Additional</b>	1. Ghid: Elaborarea și susținerea tezelor de master, <a href="https://utm.md/wp-content/uploads/2020/05/Ghid-Elaborarea-si-sustinerea-tezelor-de-master-Master.pdf">https://utm.md/wp-content/uploads/2020/05/Ghid-Elaborarea-si-sustinerea-tezelor-de-master-Master.pdf</a> 2. Ordin privind monitorizarea activității de elaborare a tezelor de licență-master <a href="https://utm.md/acte_normative/interne/ordinMonitorizareaActivitatiiElaborareTezeLicenta.pdf">https://utm.md/acte_normative/interne/ordinMonitorizareaActivitatiiElaborareTezeLicenta.pdf</a> 3. Regulament antiplagiat al UTM, <a href="https://utm.md/wp-content/uploads/2019/09/Regulament-antiplagiat_UTM-2019-_final.pdf">https://utm.md/wp-content/uploads/2019/09/Regulament-antiplagiat_UTM-2019-_final.pdf</a>
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## 10. Evaluation

### Research internship

Evaluation of the master's coordinator				Commission's assessment
Practice notebook	Writing standards	Content	Presentation	
15%	15%	15%	15%	40%
Minimum performance standard				
Completion of the practice notebook, uploaded and graded by the master's thesis coordinator on the ELSE platform; Preparation of the practice report according to the indicated requirements, uploaded and graded by the master's thesis coordinator on the platform; Completion of the practice within the established deadline, according to the university calendar, with a minimum grade of "5."				

### Development of the master's thesis.

Evaluation of the master's coordinator			Commission's assessment
Writing Standards	Content	Presentation	
10%	20%	10%	60%
Minimum performance standard			
1. The publication of the scientific article is a mandatory criterion for passing this course. 2. Preparation of the explanatory report according to the indicated requirements, uploaded and graded by the master's thesis coordinator on the ELSE platform; 3. Completion of the evaluations within the established deadline, according to the university calendar, with a minimum grade of "5." 4. The similarity rate does not exceed 30% after the plagiarism check of the explanatory report.			

## 11. Evaluation criteria

Type of evaluation	Evaluation criteria	Evaluation methods
Practice notebook	Evaluation of the completion of the practice notebook	The task notebook, individual task, and activity report for each week.
Formatting standards	Assessment of the drafting of the explanatory memorandum	Explanatory memorandum
Content	Structuring content according to the requirements of a Master's theses	Rating 30%, 70%, 100%
Presentation	Presentation in 7 minutes of the thesis project Master	Presentation
Commission's assessment	Presentation and content of the dissertation, presentation of the completed project	Presentation, Explanatory Memorandum