

University of Rijeka Department for Biotechnology

APPLICATION PROCEDURE, DESIGN AND DEFENCE OF UNDERGRADUATE AND MASTER'S THESES

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1 GENERAL NOTES

1.1 Undergraduate thesis

The thesis from an undergraduate study is a professional document written by the student, and is not obligatory to obtain a degree. If a student wants to write a thesis, it is can be credited, according to the decision of the Department Council, with 6 ECTS. The thesis may consist of a critical review of the literature of a particular field or a smaller piece of scientific research. Instructions for both types of thesis are listed below. Students whose thesis is based on experimental research in the mentor's laboratory follow the rules that apply to preparation of a master's thesis. An undergraduate thesis is smaller a master's thesis, however, in terms of the scope of the experiments conducted and the word limits per chapter. Larger theses are allowed only by agreement between the student and the mentor.

1.2 Master's thesis

A master's thesis is a scientific document based on a research project, which the student works on during the second year of study, and which is credited with 24 ECTS (for "Biotechnology for the Life Sciences", 48 ECTS for the thesis work, plus 6 ECTS for the oral thesis defence). The backbone of the work is experimental work conducted in the mentor's research laboratory or, in exceptional cases, a retrospective observational study, which should be based on a scientific approach and methods. The mentor is responsible for the quality of the thesis research.

Master's theses are mandatory and includes an oral defence before the committee. A successful thesis defence is considered to be the equivalent to passing an end of course exam. A student can start writing a master's thesis without having previously attended and passed the exams for other components of their master's study, but all such exams must be completed and passed before they are allowed to defend their thesis. If a student does not successfully defend his or her thesis or is unable to attend the defence, then he or she has the right to re-defend. After the second unsuccessful defence, the student must re-apply for a thesis topic in the next academic year, conduct research work, and write and defend a thesis.

1.3 Mentor

The mentor can only be a person with a scientific-teaching title (assistant professor, associate professor, full professor with or without tenure, professor emeritus), or an external associate of the Department of Biotechnology (OB) or the University of Rijeka (UNIRI) with such a title. If the student is working in the laboratory (at the OB, UNIRI or another institution) directly alongside a postdoctoral researcher, then that person can be a co-mentor. In the case the student conducts his/her work equally in two laboratories or research groups, then someone from one research group, who works directly with or supervises the student, is the mentor while someone with an



equivalent position in the other research group is the co-mentor. The role of a co-mentor can be performed by a postdoctoral researcher who directly guides the student in the implementation of practical work in the laboratory. In this case, the mentor must still be someone with a scientificteaching profession who guarantees the quality of practical work and the final written version of the work. If the practical work is carried out at an institution other than OB where the mentor does not hold a scientific-teaching title, then the student may have two co-mentors: a postdoctoral researcher working directly with the student, and a person with scientific-teaching from OB as another co-mentor. The thesis is defended in front of a committee (the Defence Committee) which consists of the mentors (and co-mentors) and other people holding a scientific-teaching title (assistant professor, associate professor, full professor with or without tenure, professor emeritus). In all cases where the mentor is not from the OB and is not fully familiar with the procedures for registration, design and defence of work, and does not have access to the Turnitin interface for verification of authenticity, all administrative obligations of registration, design, authentication and defence, in agreement with mentor and student, can be taken over by a person from OB with a scientific teaching title (either the co-mentor or another member of the Defence Committee).

In order to avoid doubts, listed below are possible compositions for the Defence Committee, which are also displayed in a table:

- a) Mentor with scientific teaching title form OB + 2 other members (at least 1 within OB)
- b) Mentor with scientific teaching title from OB + postdoctoral co-mentor working directly with the student + 2 other members (at least 1 within OB)
- c) Mentor with scientific teaching title from UNIRI (e.g. from the medical school, MedRi), but outside OB + 2 members from OB
- d) Mentor outside UNIRI (e.g. Ruđer Boškovoić Institute, University of Ljubljana), with scientific teaching title, who is an external associated of OB or UNIRI + 2 members within OB
- e) Mentor outside UNIRI (e.g. Ruđer Boškovoić Institute) without a scientific teaching title + comentor within OB with scientific teaching title + 2 members (at least 1 within OB)



		1 st member(s)	2 nd member	3 rd member
	Teacher with	Mentor		ОВ
	scientific teaching title	or	ОВ	or
	within OB	Mentor + Co-mentor		External
		(postdoc)		
Mentor	Teacher with scientific teaching title within UNIRI (e.g. MedRi)	Mentor or Mentor +	ОВ	ОВ
	External teacher with scientific teaching title within OB (e.g. RIB)	Co-mentor (postdoc)		
		Mentor + Co-mentor		ОВ
	Non teacher (e.g. RIB)	(Teacher with scientific teaching title	ОВ	or
		within OB)		External

The responsibilities of the mentor are:

- at the beginning of the academic year, to publish available topics for undergraduate and master's theses that they are willing to mentor in that current academic year,
- warn the student about time constraints during certain phases of preparation and writing the thesis (literature analysis, writing individual versions of the thesis, etc),
- guide the student during the preparation and writing of the thesis,
- check that the thesis is written according to the document "Application Procedure, Design and Defence of Undergraduate and Master's Theses", which is published on the OB website,



- ensure that the final version of the thesis is checked in the Turnitin system and submitted for reading to the members of the Defence Committee in a timely manner.

It is the duty of the members of the thesis defence committee to read the thesis, and to warn the student and the mentor if the thesis is not in accordance with the instructions for writing the thesis.

Poor quality mentoring and neglect of students is a disciplinary act under Article 5. paragraph 1 of the Ordinance on Disciplinary Liability of Teachers and Associates of the University of Rijeka for which disciplinary measures referred to in Article 6 of the same Ordinance may be imposed. If there is a problem in the relationship between mentor and student, the student or mentor may request termination of mentoring no later than September 1, and inform the Commission for Undergraduate and Masters Theses, which will provide new mentorship in agreement with the student.

2 RESEARCH TOPIC AND LABORATORY WORK

2.1 Selection of topics and instructions for work in the laboratory

For the most successful preparation of the undergraduate and master's thesis, it is recommended that students:

- before starting work in the laboratory, get acquainted with the schedule of activities that need to be realized for the successful defence of the thesis;
- get acquainted with the form and content of work that according to the mentor should be completed for successful defence (time of arrival and length of stay in the laboratory, interest and motivation for work, independence, etc);
- determine the working hypothesis that will be defined in the abstract of the undergraduate or master's thesis in the application form for the topic of the thesis;
- understand the purpose of the experiments they are conducting or suggest individual experiments themselves. Setting a hypothesis for each experiment will make it easier to write the thesis.

2.2 Submitting the topic

Undergraduate thesis	The topic of the thesis is either chosen by the student based on
	possible topics proposed by the mentor, or the mentor may



	select the topic if the student agrees to it. At the beginning of the final academic year of undergraduate study, the student fills out the form "Application for the Preparation of a Final Thesis" signed by the mentor.
Master's thesis	At the beginning of the second year of graduate study, the student submits a topic and a mentor according to the proposed topics published on the website of the Department of Biotechnology (OB). For students of "Biotechnology for the Life Sciences", topics will instead be agreed by the student and their mentor, who will normally have mentored them previously for a Laboratory Apprenticeship. The student should complete and submit the form "Application for Topic of Master's Thesis" to the office of the Department no later than 01.11 of that academic year. By applying for the topic of the thesis, the student has the opportunity to write and defend a thesis until the end of the current academic year.

Experimental work can be carried out at the Department, and at other scientific-teaching or scientific institutions in Croatia or abroad.

2.3 Approval of the Ethics Committee

Experimental work involving the use of animal models or human samples must be approved by the competent Ethics Committee. The mentor is responsible for obtaining the necessary approval for the experimental work. The thesis requires the approval on the basis of which the experiments were performed.

3 WORK DESIGN

One of the skills that a student needs to acquire by writing an undergraduate or master's thesis is writing scientific papers, projects and scholarships in accordance with today's scientific standards. To this end, when writing a thesis, the student should follow the instructions below. Exceptions to the described organisation of the chapters may be theses in the field of organic synthesis, according to the agreement and recommendation of the mentor.



3.1 General writing instructions

Writing a thesis that meets the requirements of submission for reading to the members of the committee requires approximately two months. Writing means: analysis of results, creation of images and related descriptions, writing of individual chapters with additional search of literature, repeated reading by the mentor and correction of the text.

General instructions are:

- respect the rules of grammar, spelling and syntax;
- explain and define professional terminology;
- explain abbreviations at the first mention;
- express yourself objectively, concisely, clearly and argumentatively;
- pay attention to the length of the sentence one thought, clear, understandable, grammatically and syntactically correct.

The text is written in paragraphs, which represent one thought unit or problem. The first sentence sets out a thought or problem, which is elaborated on later in the passage. Sentences follow logically to explain and define the problem posed.

The thesis consists of chapters that represent units with clearly defined content.

It is suggested that the order of writing be as follows: making pictures and tables with accompanying descriptions, writing materials and methods and results, writing a discussion, then an introduction and finally an abstract.

3.2 Content of the thesis and order of the chapters

The thesis consists of one-sided printed sheets. The layout and contents of the cover and the first three inner sheets are detailed at the end of this document. The order and content of the sheets are as follows:

- Cover: title of the study, title of the thesis, name of the student and year of the thesis defence;
- 1st inner page: repeated contents of the cover;
- 2nd inner page: the contents of the cover in Croatian
- 3rd inner page: name of the mentor, date of defence of the thesis, and the committee;
- 4th inner page: abstract in English, with 3-5 keywords listed below
- 5th inner page: abstract in Croatian with keywords
- 6th inner page: contents with titles and subheadings of the chapters and pages on which the chapters begin.
- the following pages, all of which should have page numbers, and using numbered chapters, each of which starts on a new page:



<u>Literature review:</u>

Thematic chapters. References. CV

Experimental work:

- 1. Introduction, 2. Objective, 3. Materials and Methods, 4. Results,
- 5. Discussion, 6. Conclusion, 7. References, 8. CV

After the CV, the thesis may contain attachments, depending on the agreement and recommendation of the mentor.

3.3 Number of words and style of writing by chapters

The number of words in each chapter of the thesis is limited, and it should be expressed concisely, clearly and argumentatively, making sure that each chapter contains information relevant to that chapter.

The main chapters of the thesis, their scope for undergraduate (UG) and master's (M) thesis and guidelines for writing are as follows.

Note that students of Biotechnology for the Life Sciences, as a result of their longer project, may exceed the word limits for all chapters, except for the Abstract as needed. However the lengths of chapters should not be more than double the figures stated here.

	Abstract	- state the main purpose of the research
	Up to 300 words	- describe the scientific context of the research
(UG & M)	- summarize the main methods and approach, and the results	
	(OG & IVI)	- state the conclusions

Literature review (UG only)

A literature review is similar to a scientific review article based on previously published results. When preparing for writing, the student agrees with the mentor on the type of review paper: organizing the literature, evaluating the literature, identifying new trends in the literature or pointing out existing shortcomings or contradictions in the literature.

Introduction About 1000 words	 define the purpose of the work and put it in a scientific context explain why a critical analysis of the literature is needed, new or different
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Aims	- state the specific purpose of the literature review
Up to 300 words	



Thematic chapters Up to 5000 words - the number of different chapters and their scope will vary, based on the number of thematic sections into which the material studied can naturally be divided - it is recommended that each chapter is not shorter than one page and contains several subchapters - the list of literature should contain sources that the student has studied and whose content is integrated into the content of the thesis

 CV

-the curriculum vitae of the student in Europass format

Experimental work (UG & M)

1. Introduction Up to approx. 2000 words for UG	 define the purpose of the research and put it in a scientific context, present literature relevant to understanding the purpose of the research write it in the form of a funnel, from general information to specific
	Discussion because it defines which literature to present in the Introduction

2. Aims Up to approx. 300 words UG & M	- may contain the purpose of the research, if it is not clearly defined in the introduction - it is desirable that it contains one or more main hypotheses to
UG & IVI	be tested in the results

3. Materials and method Up to approx. 2000 words for UG & M	- describe the procedures and methods used to obtain the results presented in the Results section - the description must be sufficiently precise and specific that the procedure can be repeated in the future on the basis of the information presented - listing all materials is not acceptable; key reagents that
	- listing all materials is not acceptable; key reagents that determine the type and quality of the detected signal are listed,
	eg antibodies, oligonucleotides



- quoting a reference which is a substitute for a description of the

	- it is recommended to write this chapter during the experiments
4. Results Excluding table, legends, pictures etc, up to 3500 words	 briefly and objectively describe the results, but DON'T interpret them each described experiment must have the described method in Materials and methods and vice versa the results do not need to be presented chronologically and it is not necessary to present all the results, especially if they do not clearly support the purpose of the research Figures and tables must have a title, eg main impact or result the description (legend) must contain all the information to understand what is shown (short description of the experiment, but without a description of the results) it is desirable that the description of an individual experiment begins with setting a hypothesis or purpose that arose from the previously described results
5. Discussion	 state the conclusions drawn from the results - first main, then secondary compare the results with other published results put the results in the context of the material presented in the introduction
Up to approx. 2000	- indicate how the results improve the area of knowledge

method is not acceptable

6. Conclusion Up to approx. 300 words	- a very concise description of the main results- how the work contributed to the knowledge in the field
for UG & M	state deficiencies or open questionsdescribe the possible application of results in everyday life

avoided

and what you attained

- suggest follow up experiments

words for UG & M

- list the problems you have encountered and how they can be

- explain the possible discrepancy between what you expected

7. References	- Citation of references should be with ordinal numbers according
Max 50	to the order in which the citation appears in the text.
for UG and M	



- The number of the cited reference in the text is enclosed in parentheses.
- The paper is cited as follows: all authors, title of the paper, journal, year of publication, volume, page from to, by example: Silva-Vargas V, Maldonado-Soto AR, Mizrak D, Codega P, Doetsch F. Age- Dependent Niche Signals from the Choroid Plexus Regulate Adult Neural Stem Cells. * Cell Stem Cell * 2016; * 19 *: 643–652. In the Zotero computer program, this citation style is called Nature Publishing Group-Vancuver

- Curriculum vitae in EU format

When writing an undergraduate or master's thesis, the student is expected to follow the instructions on the number of words, and the total number of words in the thesis is allowed to deviate by a maximum of 15% from the recommended limit.

3.4 Language and graphic elements

The thesis should be written in Croatian or English, and should agree with the topic previously submitted in English.

The font Verdana should be used to print the thesis, size 12 typographic points, 1.5 line spacing, normal margin with obligatory support of all Croatian characters. The pages are numbered from the first page of the introduction.



4 SUBMISSION, EVALUATION AND APPROVAL OF THE THESIS FOR THE DEFENCE

4.1 Appointment of the Expert Committee for evaluation of the work and determination of thesis defence dates

The Head of the Department of Biotechnology, by signing the form "Decision on the Appointment of an Expert Committee and the Date for Defence of a Thesis" approves the members of the Expert Committee and the date of defence of the thesis. The expert committee has three members (including a mentor) who will evaluate the work. The committee may include an assistant professor, associate professor and full professor from the Department of Biotechnology and other scientific institutions from Croatia and the world. A mentor who is not in a scientific-teaching position may be the fourth member of the Expert Committee. In the event that one of the members of the Expert Committee is unable to attend the defence of the thesis, an alternate member is appointed.

The time and date of the defence are advertised on the Department of Biotechnology's website or the Department's Facebook page and on the Department's bulletin boards. The expert committee for the defence of the thesis, and the date of defence is approved by the head of the Department on the basis of the completed form " Decision on the Appointment of an Expert Committee and the Date for Defence of a Thesis".

		A few weeks before the planned defence, the mentor must propose
	the members of the Defence Committee for the thesis, and propose	
	Undergraduate thesis	the time of the defence, by filling out the form "Decision on the
		appointment of the Expert Committee and the date for the defence
		of the Thesis."

		The student and the mentor fill in the form "Decision on the
		appointment of the Expert Committee and the date for the defence
	N/a ataw'a tha asia	of the Thesis " and submit it to the office of the Department of
Master's thesis	Biotechnology at least a month before the planned defence and	
		graduation, and the document is signed by the head or deputy head
		of Department.



4.2 Submission of work for evaluation

The student submits the thesis to the members of the committee for review in printed or digital form (pdf or Word version). The submission date defines the possible defence date.

Undergraduate	The thesis is submitted for reading to the members of the Expert
thesis	Committee at least 15 days before the planned defence

	At least 21 days (preferably earlier) before the planned defence, the student submits a thesis. The last day of defence in the current school year is September 30, i.e. the last working day in September. The following deadlines for surrender and possible defence are envisaged (see also the attached timetable):		
	Thesis defence Submission of thesis for evaluation		
	22.07 or later	no later than 01.07	
	05.09 or later	no later than 15.07	
	23.09 or later	no later than 02.09	
Master's thesis			
	Note, students of Biotechnology for the Life Sciences are expected to defend by the end of June in most circumstances.		
	Students can do the defence before 22.07. provided that they adhere to the above instructions and obligations. In order to coordinate the work of the Committees for the Defence of the Thesis in September, two deadlines for the defence of the thesis will be planned, one at the beginning, the other at the end of the month. The exact date for each deadline will be announced at the beginning of the current calendar		

4.3 Performance appraisal

year.

The committee is obliged to review the thesis and, if necessary, suggest changes within a maximum of 7 days after receipt. The student corrects the thesis within 3 days according to the suggestions of the committee members or argues if he or she does not agree with them. After the corrections have been made, the student sends the thesis again for inspection to the members of the Defence Committee who proposed the changes. If a student ignores the corrections requested by the Defence Committee, then scheduled date of the defence becomes invalid.



Members of the Defence Committee will assess whether the work meets the scientific quality and content according to the following points:

- adherence to instructions for writing and formatting the thesis
- relevance of information in accordance with the chapter
- a clear presentation of why and how the research was conducted, and what it revealed.

The thesis is evaluated after the presentation and defence and combines the evaluation of the written part of the work, the quality of the presentation and defence.

Members of the Defence Committee sign to give their consent that the student can may defend their thesis and receive a grade for it. The mentor does not evaluate the thesis, but confirms the authenticity of the thesis with his or her signature. The student submits the form to the office of the Department of Biotechnology (form "Consent of the Committee for the Defence of a Thesis").

5 THE THESIS DEFENCE

The student defends the thesis after passing all the exams of the study in question. The defence is open to the public.

5.1 Preparing a presentation for the defence

The student must present the thesis in a limited time (maximum 30 minutes). Due to the limited time for the presentation, it is necessary to carefully choose the type and amount of information for the presentation. It is not necessary to present all the results and it is acceptable to present content that is not presented in the thesis, if it aids in the presentation.

General notes: students should avoid using too much text, and instead have more pictures and diagrams. Font size should be large enough for everyone to read clearly and they should minimize the decoration of slides if it could distract from the content.

Students should not have a "contents" slide listing the chapters of the thesis on the first slide.

	The student presents results from the literature that support the	
Literature review purpose of the review, and images or diagrams from the literature		
(UG only)	those made by the student himself or herself to present the issue	
	more clearly.	



	- When presenting the results, it should be briefly stated by which
	procedure or method they were obtained, clarify the type of
	presentation and describe what was obtained and what it means.
Experimental work	- The results and the discussion are united into one section.
(UG & M)	- The student should show that they understand the topic they
	present, why and how they conducted the experiments, and what the
	results mean.

5.2 Submission of work for the archive

On the day of the defence, the student brings an electronic version in pdf format on a CD that will be stored in the archive. Students are required to save a version of their thesis in the archive of Department of Biotechnology the via the following https://repository.biotech.uniri.hr/pohrana. If the work is part of a larger project that is in the process of applying for a patent or if the data will be used to publish a scientific article or contain other confidential information, the level of thesis availability (open to all, limited to UNIRI, unavailable until a certain date) is set in agreement with the mentor. When stored in the archive of the Department of Biotechnology, in order to protect the privacy of data, the thesis should not contain the author's curriculum vitae. Printed versions of the thesis are not mandatory and the student brings them to the defence by prior arrangement with each individual member of the committee.

5.3 Oral presentation of the work

The student is required to give a short, structured presentation of no more than 30 minutes. After the presentation, the student answers the questions of committee members and mentors. At the defence, the student is expected to master the scientific facts related to the topic of the thesis.

5.4 Final evaluation of the work

The thesis is evaluated after the presentation and defence. The grade for the critical review of the literature (undergraduate) combines the evaluation of the written part of the thesis, the quality of the presentation and answers to questions. The grade for the experimental thesis consists of a special grade for the written part (quality of writing) and a special grade for the defence, including general commitment to the thesis.



Based on the average score awarded to the written part (evaluated by the members of the Defence Committee without a mentor) and the score awarded for the defence (evaluated by the members of the Defence Committee including the mentor), the President of the Defence Committee decides on the final grade (if the Committee concludes that the defence was failed, less than 50%, then the Defence Committee whether the student should retake the Defence with the same written thesis or conduct new research work in the next academic year, and write and defend a new thesis).

If the defence of an undergraduate literature review (undergraduate) is failed, then the student should retake the exam with the same written version of the thesis. If a defence of an undergraduate thesis based on experimental work is negatively assessed, the same rules apply as for the negative assessment of the master's thesis.



6 APPENDICES

6.1 The appearance of the cover and the first 6 inner sheets of the undergraduate thesis

UNIVERSITY OF RIJEKA

DEPARTMENT OF BIOTECHNOLOGY

Undergraduate university study

"Biotechnology and drug defence"

Full name of student

Title of thesis

Undergraduate thesis

Rijeka, year of defence

UNIVERSITY OF RIJEKA

DEPARTMENT OF BIOTECHNOLOGY

Undergraduate university study

"Biotechnology and drug defence"

Full name of student

Title of thesis

Undergraduate thesis

Rijeka, year of defence

Mentor: academic title, full name of mentor

SVEUČILIŠTE U RIJECI
ODJEL ZA BIOTEHNOLOGIJU
Preddiplomski sveučilišni studij
"Biotehnologija istraživanje lijekova"

Full name of student
Title of thesis in Croatian
Završni rad

Rijeka, year of defence

Mentor rada: academic title, full name of mentor

Thesis defended on ______
Before a committee comprised of:

1. ______

2. _____

3. _____

This thesis contains ___ pages, ___ pictures, ___ tables and ___ references.



	_	
Abstract		Sažetak
Key words		Klučne riječi

6.2 The appearance of the cover and the first 6 inner sheets of the master's thesis

UNIVERSITY OF RIJEKA

DEPARTMENT OF BIOTECHNOLOGY

Master's university study

"Title of study
e.g. Biotechnology for the life sciences"

Full name of student

Title of thesis

Master's thesis

Rijeka, year of defence

UNIVERSITY OF RIJEKA

DEPARTMENT OF BIOTECHNOLOGY

Master's university study

"Title of study
e.g. Biotechnology for the life sciences"

Full name of student
Title of thesis
Master's thesis

Rijeka, year of defence

Mentor: academic title, full name of mentor



SVEUČILIŠTE U RIJECI ODJEL ZA BIOTEHNOLOGIJU Diplomski sveučilišmi studij "Title of study in Croatian" Full name of student Title of thesis in Croatian Diplomski rad	Thesis defended on Before a committee comprised of: 1 2 3
Rijeka, year of defence Mentor rada: academic title, full name of mentor	This thesis has pages, pictures, tables and references.
Abstract	Sažetak
Key words	Klučne riječi



6.3 Graduation schedule with the most important dates (note Biotechnology for the Life Science Stzdebts should normally follow the green route)

