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|  | UNIVERSITY OF WEST ATTICASCHOOL OF ENGINEERINGDEPT. OF BIOMEDICAL ENGINEERING MSc BIOMEDICAL ENGINEERING AND TECHONOLOGY |

**Guidelines for diploma thesis**

MSc BIOMEDICAL ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BIOMEDICAL ENGINEERING

UNIVERSITY OF WEST ATTICA, EGALEO PARK CAMPUS

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# 1. General description

The successful completion of a Diploma Thesis is a mandatory requirement for all students enrolled in the MSc Program. The Diploma Thesis constitutes an independent scientific and systematic project focused on the analysis of a specific topic. It draws upon existing literature and research while utilizing the knowledge and skills acquired throughout the student's studies.

The thesis is supervised by a designated member of the teaching staff of the MSc program (referred to as the Supervisor).

The thesis involves the following components:

a) Comprehensive review of relevant literature on the thesis topic.

b) Implementation of a theoretical, computational, or experimental approach related to the thesis subject.

c) Generation, extraction, and analysis of the results obtained from the chosen approach.

d) In-depth discussion and interpretation of the results, accompanied by a comparison with similar studies found in the existing literature.

e) Summary of the most significant findings.

Under the guidance of the supervisor, the student is encouraged to develop critical and analytical thinking abilities, as well as organizational and combinatorial skills necessary for in-depth investigation of a specialized subject of interest. The systematic and scientific approach applied throughout the thesis allows for the synthesis and practical application of knowledge gained during the student's studies, promoting scientific thinking and research. Consequently, the completion of the Diploma Thesis is considered a vital component that enables postgraduate students to demonstrate their ability to integrate and utilize acquired knowledge in both theoretical and experimental contexts, fostering scientific development.

# 2. Indicative types

Indicative types of Diploma Theses may be:

* Theoretical Research: This involves the development of a new theoretical model or the extension of an existing one. The model is then applied to solve specific problems.
* Development Research: This type focuses on the design and/or construction of an experimental device, protocol, approach, or method. It may also involve conducting experimental measurements, processing data, and developing computational methodologies or algorithmic schemes.
* Empirical Investigation: In this type, a specific problem is explored through data collection, processing, analysis, and documentation.
* Technological Study: This type comprehensively investigates a technological issue. It may involve detailed computational analysis or examination within the context of a research-oriented approach.
* Independent Synthesis: This type involves the independent synthesis of a particular topic. It includes a detailed presentation of fundamental concepts, current and future trends, and a documented critique.

# 3. Content

The content of the Diploma Thesis is tailored to the specific subject of specialization being studied. The following are the key stages for the successful completion of the thesis:

* Thoroughly analyzing and understanding the scientific background of the topic of the Diploma Thesis.
* Critical examination of the relevant literature.
* Structuring and designing a research plan.
* Technical and theoretical documentation of the solution methodology.
* Completion of the required steps by the selected approach to solving the problem.
* Analysis and interpretation of the obtained results, and formulation of corresponding conclusions.
* Public defense of the Diploma Thesis.

# 4. Learning outcomes

Upon successful completion of the Diploma Thesis, the student should be able to:

• Identify and acknowledge the boundaries of the problem that needs to be solved, while fully understanding its fundamental and supplementary aspects.

• Employ a critical and analytical mindset when analyzing existing literature.

• Devise a comprehensive research plan and formulate an appropriate methodology to effectively approach and investigate the chosen topic.

• Provide sound justifications for subjective opinions and arguments.

• Demonstrate proficiency in scientific writing by effectively composing a scholarly essay.

• Assess and appraise the reliability and validity of the results obtained from problem-solving efforts.

• Deliver a thorough and comprehensive presentation of the chosen topic with success.

# 5. Assignment of Diploma Thesis

• The student, after consultation with the proposed supervisor, submits an application for a Thesis topic to the Secretariat of the MSc, for approval by the Assembly of the Department. The application is countersigned by the supervisor. The application period is set for one (1) week after the end of the period of online course registration, at the beginning of each semester.

• Before starting the thesis, the student in collaboration with the supervisor must ensure compliance with the Code of Ethics of the University of West Attica, if required (see the [website of the UNIWA Research Ethics Committee](https://research-ethics-comittee.uniwa.gr/)). In most cases, this compliance concerns the use of data obtained from human beings.

• In order to be assigned a thesis, the student must be in the 3rd semester of study.

• The typical time to complete the thesis is one academic semester. The completion time may be extended by one semester with the agreement of the supervising professor.

• In exceptional cases and at the justified request of the student, the time for completion of the thesis may be extended for a further semester.

• The student may apply to the Departmental Assembly for a change of topic or supervisor at most once.

# 6. Procedure for submitting an application for the Diploma Thesis examination

• The examination of Diploma Theses takes place exclusively after the end of each semester, or after the end of the September re-examinations within a period of two (2) weeks. In exceptional cases and following a justified request by the student, the presentation of the thesis may take place on different dates.

• Diploma thesis must be checked for plagiarism under the responsibility of the supervising professor [through the means of TurnitIn](https://bme.uniwa.gr/info/antiplagiarism-turnitin/) software available to the University to detect and capture the rate of matching academic papers with the content of other sources from its database. The check through the special software must have preceded the examination of the work. This check results in an authenticity report in which the matching percentage is indicated. The final judgement regarding the evaluation of the report is made by the supervisor. If the authenticity and originality of the work is verified through this process, the procedure for submitting an examination request can be followed as explained immediately below.

• The student, after consultation with the supervising professor and if the supervising professor deems that the Thesis is sufficient, submits a request for the examination of the Thesis to the Secretariat of the MSc, which is signed by the supervising professor, until one (1) week before the beginning of the two (2) week period of the examination of the Thesis.

• The supervisor also recommends the examination of the Thesis and proposes the members of the Examination Committee for the approval of the Thesis, one of the members of which is the supervisor. Members of the Examination Committee may be members of the Faculty, or members of other categories of teaching staff in accordance with the legislation in force, or researchers from other Departments or Research Centres of the same or related subject matter to the subject of the thesis to be carried out.

• The student is responsible for submitting a copy of the Thesis in electronic form for the examination committee and for the Secretariat of the MSc.

At least one (1) week before the beginning of the above period of two (2) weeks for the examination of Diploma Theses, based on the previous applications of the students for the examination of their Diploma Thesis, the Secretariat of the MSc must draw up an examination schedule, which must be sent to the interested students, the supervisors and announced through the web pages of the MSc and posted on the notice board of the Secretariat of the MSc.

# 7. Evaluation of Diploma Thesis

The members of the Examination Committee evaluate the Diploma Thesis presentation and pose questions to form an assessment regarding the accuracy and comprehensiveness of the approach followed and the solution provided for the problem addressed. The grade for the Diploma Thesis is determined by averaging the scores assigned by the three members of the Examination Committee. The supervising professor submits the examination report, including the scores given by the committee members, to the MSc program Secretariat.

The examination encompasses an evaluation of the deliverable of the Diploma Thesis, as well as its presentation and defense, regarding the following indicative aspects:

• Research question and objectives (10%). Comprehension of the scientific topic investigated, originality and contribution.

Literature survey (10%). Thorough review of the relevant literature.

• Methodology (20%). Organization and planning of the necessary steps for completing the Diploma Thesis.

• Results (20%). Soundness, clarity and reliability of results.

Discussion (20%). Analysis and interpretation of the results, and formulation of corresponding conclusions.

• Writing and Presentation (20%). Organization, quality, readability and clarity, formatting and citation.

If a Diploma Thesis is deemed incomplete, it is returned to the student for further revision. In such cases, the presentation re-occurs on a date determined by the three-member Examination Committee, following consultation with the student. In such cases, the examination process is repeated as described in the aforementioned paragraphs.

Should the scientific outcomes of the Diploma Thesis be subject to patenting, the applicable Greek legislation governs the rights of the individuals holding such rights.

# 8. Formatting instructions

The general formatting instructions are the following:

Margins

Margins: Normal, see Fig. 1.

Paper Length

The standard length of the diploma thesis is not predefined, but is usually between 60 - 100 pages including figures, tables, and references.

Font

General text format: Calibri, regular, size 11 or 12, space between lines = single.

Equations

Equations are numbered and presented as follows:

$$A=b+c (1) $$

Figures and Tables

Figures should be numbered (Arabic style) and mentioned at the appropriate parts of the text (e.g., ‘according to Fig. 3.4’, where the first number denotes the chapter, and the second number denotes the number of the image in the particular chapter. Thus, in the example, Figure 3.4 corresponds to the 4th image of the 3rd chapter). Figures should be of high quality (at least 300 DPI), **clear**, and **readable**. Axes, if any, should be labeled. Figure legends should be presented in Calibri regular, size 11 (e.g., see Figure 3.4):



**Figure 3.4:** Page margins

Tables should be numbered (Arabic style) and mentioned at the appropriate parts of the text (e.g., ‘according to Table 4.5’), where the first number denotes the chapter, and the second number denotes the number of the Table in the particular chapter - thus, in the example, Table 4.5 corresponds to the 5th table of the 4th chapter). Table headings/titles/legends should be in CAPS, Calibri, size 11 (e.g., see TABLE 4.5):

**TABLE 4.5:** TABLE HEADING/TITLE/LEGEND

| Table Head | Table Column Head |
| --- | --- |
| Subhead | Subhead | Subhead |
| content | content | content | content |

# 9. General structure of the thesis

The suggested general structure of the diploma thesis is as follows (for details consult the following pages):

* Title page
* Three members Examination Committee page
* Student/author declaration page
* Abstract
* Acknowledgments
* Contents
* Introduction
* Material and Methods
* Results
* Discussion
* Conclusions
* References
* Appendixes (if any)

# THESIS TEMPLATE

|  |  |  |
| --- | --- | --- |
|  | **University of West Attica****School of Engineering****Department of Biomedical Engineering****MSc program “Biomedical Engineering and Technology”** |  |



**Diploma Thesis Title**

**NAME OF STUDENT**

**Registration Number: XXXXXXXXX**

**Supervisor**

**First Name Last Name, Affiliation**

**Athens XX (day) / XX (month) / 20XX (year)**

The Three-Member Examination Committee

|  |  |  |
| --- | --- | --- |
| SupervisorFirst Name Last NameAffiliationSignature | First Name Last NameAffiliationSignature | First Name Last NameAffiliationSignature |

**DECLARATION BY THE AUTHOR OF THE DIPLOMA THESIS**

The signatory First Name Last Name of Father and Mother Names, with registration number ………………., student of the MSc Program “Biomedical Engineering and Technology” of the University of West Attica, I declare responsibly that:

"I am the author of this Diploma Thesis and any help I had for its preparation is fully recognized and referenced. Also, any sources from which I have used data, ideas, or words, whether exact or paraphrased, are listed in their entirety, with full reference to the authors, the publisher, or the journal, including any sources that may have been used by the internet. I also certify that this work has been written exclusively by me and is a product of intellectual property of both myself and the University of West Attica.

Violation of my above academic responsibility is an essential reason for the revocation of my diploma ".

Date: **XX** (day) / **XX** (month) / **20XX** (year)

 Signature

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# Abstract

This is a brief section summarizing the purpose/goal of the work, the method and material used, the results obtained, the discussion/commentary of results, and the most important/indicative findings or conclusions of the work. The size of the abstract should range between 200-400 words.

***Keywords: Diploma thesis, etc…***

# Acknowledgments

Acknowledgment to those who provided support during the implementation of the Diploma Thesis (emotionally, materially, financially, etc.)

General guidelines

The Diploma Thesis is written in a formal but not rigid language. Its overall size is not predefined, but is usually between 60 and 100 pages.

Abbreviations are not used, unless they have been explained the first time they appear in the text, i.e., Master in Science (*M.Sc.*). Avoid using multiple different abbreviations.

*SI* units are used for all measurements. Decimal number accuracy is 2 digits (i.e., 90.12%), unless the subject of the diploma requires a different definition.

When composing the Thesis texts, attention should be given to the following:

1. Plagiarism - theft of intellectual property
	* All sources should be referenced
	* All texts should be composed by the author, no copy-paste is allowed.
2. Data protection and research ethics
	* If the study involves data obtained from humans, the Diploma Thesis should comply with the Code of Ethics of the University of West Attica (see the [website of the Research Ethics Committee of the University of West Attica](https://research-ethics-comittee.uniwa.gr/)).
3. Intellectual property of results. When applicable, details should be given about all parties involved, ensuring data protection when applicable:
	* Research team.
	* The University.
	* Public.
	* *Sponsors.*
	* *Participants.*
	* *Other parties that are involved with the Thesis.*

# 1. Introduction

* Thorough analysis of the scientific background of the topic of the Diploma Thesis. Definition of the topic/problem that the Thesis attempts to investigate. Why this topic/problem is important? What is the historical development of research in the field? Which are the open research questions regarding this topic/problem? Which are the open research questions that deserve more attention?
* Critical examination of the relevant literature (presentation of similar studies that have attempted to investigate the same or a similar topic).
* Purpose, goal, and objectives of the Thesis. What questions/topics the Thesis attempts to investigate? Why the topic of the Thesis is important? What is the innovation (if any) of the Thesis as compared to existing solutions presented in literature on the same topic?

# 2. Material and Methods

## 2.1 Material

* Presentation of the material used in the Thesis with examples, annotations, protocols for data generation, etc.

## 2.2 Methods

* Structure and design of the research plan,
* Presentation of all necessary technical and theoretical documentation of the solution methodology selected.

# 3. Results

* Presentation of results. Indicative, results may be presented as:
	+ Numbers, i.e., the accuracy of the prediction is 80%,
	+ Graphs/images, e.g., the ECG signal is illustrated in Figure …., the microcalcifications are illustrated in Figure …,
	+ Tables,
	+ Text.

# 4. Discussion

* Analysis and interpretation of the obtained results, and formulation of corresponding conclusions. Moreover, discussion should address the following:
	+ interpretation of results,
	+ correlation of results to the research questions raised in the Thesis,
	+ comparison of the Thesis results to the results obtained by other similar studies that either answer the same questions or similar questions,
	+ why results may differ from those of presented by other studies,
	+ advantages, disadvantages and limitations of the Thesis,
	+ contribution of the Thesis to existing knowledge,
	+ future steps, new questions that need to be investigated.

# 5. Conclusions

* Summary of the work and presentation of most important findings. References

References should be numbered and placed at the appropriate parts of the text in brackets (e.g., ‘according to the theory of quantum physics [4], …’). Depending on the type (journal paper, conference paper, book chapter, etc.), references should be presented as follows (Font type: Calibri, Font size: 10):

[1] E.S. Bishop, et al., *3-D bioprinting technologies in tissue engineering and regenerative medicine: Current and future trends*. Genes Dis, 4(4): p. 185-195, **2017**. (for citing of journal papers)

[2] L.C. Wang, and D. Shen, *Fast histogram equalization for medical image enhancement*, Annu Int Conf IEEE Eng Med Biol Soc, pp.2217-20, **2008**. (for citing of conference papers)

[3] R. Gonzalez and R. Woods, *Digital Image Processing*, 3rd ed., Pearson, pp.124-144, **2007**. (for citing of books)

[4] World Health Organization, *Schizophrenia*, pp. 1 (if any), **2022**, [link](https://www.who.int/news-room/fact-sheets/detail/schizophrenia). (for citing of electronic sources)

[5] Who (author/organization), What (*Title)*, Where (periodical, website, etc.), Year (for citing generic sources)

# Appendix 1: Title of appendix

The appendices give the reader information in addition to the Diploma Thesis and not necessary for its understanding and documentation.

They have numbering and title, as above.