# **Diploma Process**

### Jerzy Świątek https://byes.pl/wyklady-prof-swiatka/

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## **Contact Hours**

- Room 120, building C-3
   Monday time: 12<sup>00</sup>-13<sup>00</sup>
- Tuesday (even week) time: 7<sup>00</sup>-9<sup>00</sup>
- Wednesday (by ZOOM platform) time: 9<sup>00</sup>-11<sup>00</sup>

# Agenda

- Thesis
- Taking up the topic
- Completion of the diploma thesis
- Thesis supervisor
- Presentation of work results
  - Chapters of work
  - Table of contents
  - Editorial recommendations
- Thesis review
- Diploma exam
  - Discussion of work results
  - Scope of the diploma exam
- Alumni Survey

# **Education Degrees**

### 1st - level of studies – engineer

Acquiring knowledge and skills to keep the current economy running based on current, existing modern methods with the use of current achievements of science and technology.

### 2nd - level studies – MSc

Acquiring knowledge and skills that allow for the creative use of current achievements of science and technology.

### 3rd - level – Phd

Acquiring knowledge and skills that allow the development of science and technology.

# **DIPLOMA THESIS**

### ENGINEERING THESIS

Formulation of the problem + analysis of current solutions and literature + selection of the appropriate method and tools + complete solution of the problem or subproblem (special case, simplified version)

### MASTER'S THESIS

In-depth literature studies + critical reflection (based on experience) + extension/generalization/deepening formulation of the problem + development of methods and tools (with elements of novelty) + problem solving

#### REQUIREMENTS FOR DIPLOMA THESES

AT THE FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY

CRITERION	ITERION         MASTER'S THESIS         ENGINEER'S THESIS           osis title         The title of the thesis should be unambiguous, concise, clearly defined and				
Thesis title and subject matter	The title of the thesis should be unambiguous, concise, clearly defined and adequate to the content. The subject of the work concerns a clearly separated problem or issue, the solution or development of which is undertaken by the author. The work is in line with the field of study.				
Thesis nature	Its nature can be: 1) Analytical and research through <b>obtaining new research results</b> , their qualitative and quantitative analysis, interpretation, detection of new mechanisms and dependencies, new aspects of phenomena and processes; (2) Analytical and design by <b>proposing</b> <b>new solutions or improvements</b> with respect to the current state of science and technology; (3) Review through a systematic presentation and a <b>critical discussion of</b> <b>theoretical and technical issues</b> concerning any particular part of reality in the light of current scientific literature.* * Thesis of the review nature is acceptable in fields of study whose learning outcomes allow for this form	Its nature can be: (1) Analytical and design through the use of classic solutions or their improvements with respect to the current state of technology and practice. The work may include research elements. However, they do not qualify an excellent grade.			

#### REQUIREMENTS FOR DIPLOMA THESES AT THE FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY

#### CRITERION MASTER'S THESIS

#### **ENGINEER'S THESIS**

The thesis should include **research objectives** that require the selection and application of research methods using theoretical and scientific knowledge.

It must be clear what is new in the work. We also need the discussion about the limitations and weaknesses / strengths of the developed solution (if applicable).

#### Thesis goal

The aim of the work is to answer the question whether the level of the author's knowledge and know-how ensures becoming successful by solving research problems

The thesis is a complete study, both in terms of structure and content, confirming the ability to independently solve a research problem. The thesis should include practical objectives that require the selection and application of engineering methods using technical knowledge and know-how.

The discussion on the limitations and weaknesses / strengths of the implemented solution is highly recommended.

The aim of the work is to answer the question whether the level of the author's knowledge and know-how ensures becoming successful by solving engineering problems.

#### REQUIREMENTS FOR DIPLOMA THESES AT THE FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY

	CRITERION	MASTER'S THESIS	ENGINEER'S THESIS
		It is in the form of a written monographic work, divided into sections and subsections. All parts of the work are related to the goal accomplishment.	It is in the form of a written monographic work, divided into sections and subsections. All parts of the work are related to the goal
		The structure of the work clearly distinguishes:	accomplishment.
		<ul> <li>An introduction containing defined goals of the work,</li> </ul>	The structure of the work clearly distinguishes:
		motivations behind the study and a brief description of its content.	• An introduction containing defined goals of the work, motivations behind the study and a brief
		• The literature overview referring to the topic and problems of the work, in which, in the light of the available scientific and technical literature, basic terms, current achievements, theoretical approaches and the state of the current research findings concerning the studied phenomenon are characterized.	<ul> <li>description of its content.</li> <li>The analytical and design section justifying the placement of the given issue against the background of similar solutions and source materials available. The methods, techniques, tools, concepts used to solve design problems</li> </ul>
	Thesis structure and content	• The research section, in which the research objectives, problems and questions are formulated, as well as the methods, techniques and research tools used are described. Moreover, this part of the work should contain a description of the research or a case study along with the interpretation of the findings.	of a given type are presented, as well as the justification for their selection. This part also includes a detailed description of the design, calculations, measurements, implementation, demonstration of the results and their evaluation.
		<ul> <li>A summary that provides the most important conclusions, recommendations for further work and a review of potential applications.</li> </ul>	• A summary that provides the most important conclusions, recommendations for further work and a review of practical usage.
		• A bibliography containing up-to-date, comprehensive and reliable sources, including scientific publications - at least a dozen or so references, with a predominance of journal articles, but only those works which are cited in the text. In the case of a review work, the bibliography should contain at least several dozen journal articles or conference papers.	• A bibliography containing up-to-date, comprehensive and reliable sources, including technical sources - at least a dozen references, for example books, articles, reports and technical documentation, but only those works which are cited in the text.

#### REQUIREMENTS FOR DIPLOMA THESES AT THE FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY

CRITERION	MASTER'S THESIS	ENGINEER'S THESIS			
Thesis results	The results generally should be of cognitive nature and could be of applied nature. The findings of the study should be investigated in detail. Additionally, the thesis should provide original and somewhat innovative results.	The results generally should be of applied nature and could be of cognitive nature. A technical evaluation of obtained results should be delivered.			
Thesis formatting and style guidelines	The work must meet the recommended editorial requirements agreed at the Faculty. The work is written grammatically and stylistically correct avoiding colloquial and jargon language. Keep your language factual, concise and clear. Use the correct terminology applied in computer science. Additional elements of the work, such as tables, charts, drawings, etc. all are supposed to be legible to illustrate the contents.				

### Clarification or correction of the topic

https://wit.pwr.edu.pl/en/students/graduatesn/the-topic-of-the-diploma-thesis

In the starting phase of the realization the diploma dissertation, student has a right to apply for clarification or correction of the diploma topic (Regulations governing studies at Wrocław University of Science and Technology § 35 section 9). In this case approval from the supervisor has to be submitted to the Dean's office.

In order to change of the supervisor, student has to create a request for such change, it has to contain an agreement from the former supervisor as well as a "upcoming" supervisor.

## Thesis supervisor

- Supervises the proper course of work
- Supervises the appropriate substantive level of work
- Advises, criticizes, gives opinions, evaluates
- The supervisor is not a co-author of the work !!
- A diploma thesis is a documentation of the acquired knowledge and skills of a graduate student !!

# Editing of the diploma thesis

https://wit.pwr.edu.pl/en/students/graduatesn/diploma-thesis

- Diploma Thesis
- Title page:
- Diploma thesis I-level studies (engineer's degree)
- Diploma thesis II-level studies (master's degree)
- Recommended editorial requirements
- Recommended scheme of the diploma thesis scheme of the diploma thesis in Latex
- List of the field of studies and specialization

#### Wrocław University of Science and Technology Faculty of Information and Communication Technology

Field of study: full name of the field of study (3-letters code of the field of study)

Speciality: full name of the speciality (3-letters code of the speciality)

#### MASTER THESIS

#### Title of thesis

Name and surname of the student

Supervisor Title/degree, name and surname

Keywords: 3-6 keywords

WROCŁAW (year of submission of the diploma thesis)

#### **DIPLOMA THESIS – EDITORIAL RECOMMENDATIONS**

- 1. Two-sided printing; justified text; font Times New Roman 12 pt; single spacing, first row indentation 0,7 cm.
- 2. Margins: upper, bottom, left, right: 2,5 cm; additionally binding 0,5 cm (left side of the page).
- 3. Chapter titles bolded: Times New Roman 14 pt.
- 4. Subchapter titles bolded: Times New Roman 13 pt.
- 5. Optional subsubchapter titles: Times New Roman 12 pkt.
- 6. Numbered tables:
- possibility for two-level numbering, ie. Table 2.1., where first number determines a number of the chapter and the second one follows number of the table in this chapter, Times New Roman 10 pt,
- table's title placed centrally over the table, 10 pt space from the essential text over and under the table including title,
- if the table is cited, specify a source after the title, ie. (own source), (based on [7]), (source: [1]).
- 7. Numbered figures:
- possibility for two-level numbering, ie. Figure 2.1., where first number determines a number of the chapter and the second one follows number of the figure in this chapter, Times New Roman 10 pt,
- figure's title placed centrally under the table, 10 pt space between title and the text under the figure,
- if the figure is cited, specify a source after the title (identically as in the table examples)

8. Mathematical equations – centrally, numbering given in brakets (...) aligned to the right margin; it is possible to apply a two-level numbering exaclty the same as in the case of tables and figures. Spacing before and after alignment: 10pt.

9. Literature sources (including website address) gathered in the form of a list, invoking in the text by placing a number of the source from the list in squared brackets [...]. A description of the cited literature according to the following pattern: initial of the name, surname of the author, title of the work (optionally numer of the next edition, number of volume) or article, title of the article's journal, city, publisher, year of publishing, issue numer (in case of journal), optionally page numbering. Examples

[1] Brandt A. M., *Zastosowanie doświadczalnej mechaniki zniszczenia do kompozytów o matrycach cementowych*. W: Mechanika kompozytów betonopodobnych, Wrocław, Ossolineum, 1983, 449-501

[2] Nowacki W., *Plasticity of polycrystal*, Warszawa, PWN, 1987, 687-704

[3] Spears W.M. Adapting crossover in evolutionary algorithms, 1995

htpp://citeseer.ist.psu.edu/192723.html

10. All tables, figures and literature sources included in the thesis has to be cited in the text.

#### 11. Structure of the work:

- title page
- abstract (up to 2 A4 pages) in English and Polish language
- table of contents
- content of the thesis:
  - introduction covering aim and scope of the work,
  - thesis content divided to chapters and subchapters,
  - o summary/conclusions and final remarks referring to the aim and scope of the work,
  - bibliography numbered list of the sources sorter in the alphabetical order by authors or in order of citing them in text,
  - o optional attachments.

Due to the archiving requirements, a physical example of the thesis has to be submitted in the folder – "akta studenta tom II". Diploma thesis has to be punched and tied with a tape. There is available instruction regarding submission of the documents for thesis' defense in the **Defense documents** section.

# Presentation of the results of the diploma thesis

Chapters of work (example)

- 1. Thesis topic basic concepts
- 1.1. Introduction (we introduce the topic and its location in the literature)
- $1.2.-1.N\mbox{-}1$  We introduce the concepts needed to formulate the purpose and scope of work
- 1.N. Purpose and scope of work (definition of tasks to be performed)
- 2. Theoretical (methodological) foundations
- 3. Purpose and scope of the project, experimental research, simulation research, etc.
- 4. Presentation of tools, research platform, laboratory
- 5. Discussion of the results
- 6. Summary, directions for further work
- 7. Literature
- 8. Attachments

# Identification of dynamic complex systems using neural networks

1. Identification of dynamic complex systems using neural networks – basic concepts

- 1.1. Introduction
- 1.2. Neural Network Identification Task
- 1.3. Complex systems
- 1.4 . Locally and globally optimally complex system models
- 1.5. Purpose and scope of the work
- The aim of the study is to develop algorithms for the identification of dynamic complex systems using recurrent neural networks, taking into account:
- Local evaluation of the model,

Global model evaluation,

Global evaluation of the model, including local evaluation.

In connection with this goal, the following tasks must be performed:

Develop learning algorithms for a diagonal neural network,

Develop learning algorithms for a complex network that is:

A locally optimal model,

Globally optimal,

- Globally optimal, which takes into account the quality of local models (synthetic indicator, external and internal penalty function),
- Generalization of the simple gradient method (backward propagation of errors over time) based on the ranked partial derivative,
- Perform a convergence analysis of the developed learning algorithms,

Develop a computer-based implementation of algorithms,

Conduct simulation studies

# Identification of dynamic complex systems using neural networks

- 2. Neural networks in modeling dynamic complex systems
- 2.1. Recurrent neural networks
- 2.2. Modelling of dynamic objects with serial structure using recurrent neural networks
- 2.3. Locally optimal serial system model
- 2.4. Globally optimal serial system model
- 2.5. Globally optimal serial system model, taking into account the quality of local models
- 3. Simulation study of learning algorithms design and scope of research
- 4. Discussion of simulation test results
- 5. Application of Neural Networks for Chemical Reactor Modeling
- 6. Summary, directions for further work
- 7. Literature

### WHAT SHOULD BE And what is usually not there?

Identification of alternative solution options task/problem tasks/sub-problems **Description of decision-making processes** including a justification for the choice of the solution method adopted It's not enough to answer a question "How (to accomplish the task)"? It should be clarified "Why this way and not otherwise"?

### WHAT SHOULD BE And what is usually not there?

- Description of the difficulties that occurred during the implementation of the work
- Description of the procedure for testing the correctness of the proposed solution
- Comparison of the proposed solution with other solutions
- Critical Reflection

### WHAT SHOULD BE And what is usually not there?

Accurate division of tasks in the case of work carried out by two people

Formally Lack of this element disqualifies the work – should not be assessed !!

## WHAT SHOULDN'T BE ??? And it is often

Too long introduction, unrelated to the subject of the thesis **Popular science "talk"** e.g.:- Internet history - development of mobile telephony **Description of commonly used tools** programming philosophy (introduction to the programming, object-oriented, C++, Java, php, MySQL, ...) Theoretical considerations (formulas, ...) – not used in the practical part of the work

## THE "PHILOSOPHY" OF WRITING A THESIS

Focus on describing the 'contribution of the own'

Describe not only the end result (the result but also the process of reaching the of this effec) Answer the question: "How and why is that?"

"The work should be a presentation of the logical sequence of events, thoughts and choices that led to the final solution."

.....

### Pani/Pan *tytuł imię i nazwisko opiekuna/recenzenta katedra/wydział*

w miejscu

Proszę Panią/Pana jako **opiekuna**/ **recenzenta** o ocenę załączonej pracy **magisterskiej**, której autorką/em jest studentka/student *imię i nazwisko dyplomantki/a* 

Pieczątka i podpis Dziekana.

#### Ocena pracy dyplomowej złożonej przez studenta w dniu .....

CZĘŚĆ I. CEL I ZAKRES PRACY		Tak	Nie	Częściow		
Opiekun:	tytuł imię i nazwisko opiekuna					
Specjalność:	specjalność					
Kierunek:	kierunek studiów					
Nr albumu:	nr albumu dyplomantki/a					
Autor/ka:	imię i nazwisko dyplomantki/a					
Telliat.	temat pracy dyplomowej w jęz. angielskim					
Tomot	temat pracy dyplomowej					

			0
1.	Treść odpowiada tematowi		
2.	Cel pracy jest sformułowany we wstępie i odpowiada wymaganiom stawianym pracom magisterskim		
3.	Zakres pracy jest przedstawiony we wstępie		
4.	Tematyka pracy jest zgodna z kierunkiem studiów		

Komentarz do oceny

<sup>&</sup>lt;sup>\*</sup>-W przypadku zaznaczenia "Nie" lub "Częściowo" należy uzas<u>adnić ocenę.</u>

Część	II. STRUKTURA PRACY	Tak	Nie	Częściow o
1.	W strukturze pracy wyraźnie wyodrębniono: Wstęp, Część literaturową, Część badawczą, Zakończenie, Bibliografię			
2.	Tytuły rozdziałów/podrozdziałów są adekwatne do ich treści			
3.	Wewnętrzna struktura pracy jest logicznie uporządkowana			
4.	Sformułowano problem/problemy badawcze			
5.	W zakończeniu odniesiono się do celu pracy oraz podsumowano osiągnięte wyniki			
Część	III. Część literaturowa	Tak	Nie	Częściow o
1.	Część literaturowa jest powiązana z realizacją celu			
2.	Wyjaśniono terminy i pojęcia potrzebne do realizacji celu i zakresu pracy			
3.	Zaprezentowano wyniki badań literaturowych w sposób logiczny i wystarczający			
3.	Sformułowano problem/problemy badawcze			
4.	Podsumowano przegląd literaturowy			
Kome	ntarz do oceny ≟			

<sup>\*</sup> W przypadku zaznaczenia "Nie" lub "Częściowo" należy uzasadnić ocenę.

Część	IV. Część badawcza	Tak	Nie	Częściow o
1.	Część badawcza jest powiązana z realizacją celu pracy i częścią literaturową			
2.	Sformułowano cel części badawczej / opisano problem badawczy do rozwiązania			
3.	Opisano zastosowane metody/techniki/narzędzia oraz sposób rozwiązania problemu badawczego			
4.	Zaprezentowano wyniki części badawczej i dokonano ich interpretacji (jeżeli dotyczy)			
5.	Oceniono proponowane rozwiązania/ zastosowane narzędzia badawcze i sformułowano wnioski			
6	Zadeklarowany cel części badawczej został osiągnięty			
0.				
7. Kome	Praca jest dojrzała i oryginalna**			
7. Kome Część	Praca jest dojrzała i oryginalna** entarz do oceny - V. Źródła i redakcja pracy	Tak	Nie	Częściow
0. 7. Kome Część	Praca jest dojrzała i oryginalna <sup>**</sup> entarz do oceny  V. ŹRÓDŁA I REDAKCJA PRACY Źródła bibliograficzne zostały właściwie dobrane	Tak	Nie	Częściow
0. 7. Kome Część 1. 2.	Praca jest dojrzała i oryginalna**         entarz do oceny         entarz do oceny         V. ŹródŁA I REDAKCJA PRACY         Źródła bibliograficzne zostały właściwie dobrane         Sposób powołania się na źródła jest właściwy	Tak	Nie	Częściow o
0. 7. Kome CzĘść 1. 2. 3.	Praca jest dojrzała i oryginalna <sup>**</sup> entarz do oceny  V. ŹRÓDŁA I REDAKCJA PRACY  Źródła bibliograficzne zostały właściwie dobrane Sposób powołania się na źródła jest właściwy Praca jest napisana poprawnie stylistycznie i gramatycznie, bez używania kolokwializmów i języka żargonowego	Tak	Nie	Częściow o
0. 7. Kome CzĘść 1. 2. 3. 4.	Praca jest dojrzała i oryginalna <sup>**</sup> entarz do oceny V. ŹRÓDŁA I REDAKCJA PRACY Źródła bibliograficzne zostały właściwie dobrane Sposób powołania się na źródła jest właściwy Praca jest napisana poprawnie stylistycznie i gramatycznie, bez używania kolokwializmów i języka żargonowego Praca jest napisana z zachowaniem zalecanych wymogów edytorskich	Tak	Nie	Częściow o

OCENA PRACY DYPLOMOWEJ (Słownie oraz cyfrą):

# digression - PLAGIARISM

#### **COPYRIGHT INFRINGEMENT**

the use of a fragment of text or a graphic element in an opinion, commentary, news, lecture, seminar, teaching materials (with manuscript rights), a scientific report (with manuscript rights) or an internal document, indicating the source, a clear highlight (in the case of a text – quotation marks) and, alternatively, an appropriate note (acknowledgment).

the use of a piece of text or a graphic element in a commercial document (book, product advertising materials)

Attribution + permission from the copyright owner (in writing)

# Diploma theses – deadlines (to be announced)

- Dates of diploma exams xx.xx.2024 (1 to 9.07.2023) Please note: we have only 12 weeks to complete the thesis xx.xx.2024 (until 11.06.2023)
- Submission of the diploma thesis in ASAP by xx.xx.2024 (until 11.06.2023) after prior approval by the supervisor.
- The student, in consultation with his/her tutor, submits a set of signed documents by xx.xx.2024:

# Submission of a diploma thesis

- Before passing the last "diploma thesis" course until XX (11.06.2023) the student enters the diploma thesis via the ASAP portal. The facilitator enters the grade after receiving information from the reviewer about the positive grade.
- Submission of a diploma thesis is understood as submission of a set of documents: :

■On XX (18-21.06.2023)

## Remark!

Study Regulations § 24 Section 11 Failure to submit a diploma thesis by a student on time, is a prerequisite for removal from the list of students, in accordance with § 19 section 1 point 3.

# "Unsatisfactory/failing" (2.0) grade

The supervisor of the diploma thesis is obliged to give an "unsatisfactory/failing" (2.0) grade from the last course "diploma thesis" in each of the following cases:

- the student has **not submitted**, within the deadline and in the procedure referred to in paragraph 11, a diploma thesis,
- the student's diploma thesis was found to be plagiarism (section 12),
- both grades (supervisor and reviewer) from the diploma thesis (section 13) are unsatisfactory (2.0),
- the final grade of the diploma thesis determined by the
   Dean in accordance with the procedure described in section
   13b is "unsatisfactory/failing" (2.0).

# Diploma Seminar 20 min. presentation + 5 min. discussion

Presentation I

Formulation of the thesis topic

Purpose and scope of work, motivation

Tasks to be performed (including project tasks, research tasks)

**Presentation II** 

State of the art. Location against the background of existing solutions,

Problem location at the literature (literature study),

Presentation III

Purpose and scope of work

Originality of the solution

Original results obtained

Deployment (publishing) capabilities

Summary: Directions for further work

After each presentation, you should send a presentation called: Name\_prezentation\_1; Name\_prezentation\_2 Name\_prezentation\_3 to the following address: jerzy.swiatek@pwr.edu.pl

### Harmonogram seminarium

	Diploma Semin	nar <u>II-level studies (master's deg</u>	<u>ree)</u> Tuesda <u>y</u>	y Hours: 11 <sup>15</sup> - 13 <sup>00</sup>
Seminar	Date	First Name Last Name	Signature	Comments
Seminar term 1	5.03.2024	Dean's hours		
Seminar term 2	12.03.2024	Teacher		
Seminar term 3	19.03.2024	Musa Adamu Bilal Al-Dabbagh Dawid Galik		
Seminar term 4	26.03.2024	Jakub Gałązka Mateusz Guściora Jakub Ozierski		
Seminar term 5	9.04.2024	Damian Pokrywka Dominika Rzepka Nathanaël Costes Louis Marceron		
Seminar term 6	16.04.2024	Shambhavi Sinha Artur Urzędowski Oleksandr Yanchenkov		

### Harmonogram seminarium

	Diploma Semin	ar <u>II-level studies (master's dec</u>	<u>ree)</u> Tuesda	ay Hours: 11 <sup>15</sup> - 13 <sup>00</sup>
Seminar	Date	First Name Last Name	Signature	Comments
Seminar term 7	23.04.2024	Musa Adamu Bilal Al-Dabbagh Dawid Galik		
Seminar term 8	30.04.2024	Jakub Gałązka Mateusz Guściora Jakub Ozierski		
Seminar term 9	7.05.2024	Damian Pokrywka Dominika Rzepka Shambhavi Sinha		
Seminar term 10	14.05.2024	Artur Urzędowski Oleksandr Yanchenkov Nathanaël Costes Louis Marceron		

### Harmonogram seminarium

Di	Diploma Seminar Line States and Tuesday Hours: 11 <sup>15</sup> - 13 <sup>00</sup>							
Seminar	Date	First Name Last Name	Signature	Comments				
Seminar term 11	21.05.2024	Musa Adamu Bilal Al-Dabbagh Dawid Galik						
Seminar term 12	28.05.2024	Jakub Gałązka Mateusz Guściora Jakub Ozierski						
Seminar term 13	4.06.2024	Damian Pokrywka Dominika Rzepka Shambhavi Sinha						
Seminar term 14	11.06.2024	Artur Urzędowski Oleksandr Yanchenkov Nathanaël Costes Louis Marceron						
Seminar term 15	18.06.2024	Passing		Attendance is mandatory				

# Thank you for your attention

