



# Engineering thesis: Architecture

## RA 2023-24 (Sokrates system)

Methodological guide for graduate students\*

### SUMMARY

A methodological guide discussing the basic issues related to the preparation of an engineering thesis, from the selection of a thesis supervisor to the defense of the diploma at the Faculty of Architecture, Poznan University of Technology.

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Poznan 2024

\* Prepared on the basis of: Law 2.0.(Law on Higher Education and Science dated July 18, 2018, published in the Journal of Laws, Item 1668, dated August 30, 2018) and the Regulation of the Minister of Science and Higher Education dated July 18, 2019 on the standard of education preparing for the profession of architect (Item 1359) and based on: PUT Study Regulations, the curriculum of the Bachelor's degree program for the Architecture (Faculty of Architecture, PUT).

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## 1. Purpose of the work - engineering thesis

The engineering diploma thesis is a summary of the entire training cycle of the first degree program. The engineering diploma thesis is a work of a design nature, in which the diploma student presents architectural, structural and other industry solutions adequate to the scope of knowledge and learning outcomes obtained during the entire cycle of training in the first degree program.

The diploma thesis is a confirmation of the acquired learning outcomes in accordance with the training standard preparing for the profession of architect<sup>1</sup>:

### **In terms of knowledge, the graduate knows and understands:**

- E.W1. problems concerning architecture and urbanism in solving design problems;
- E.W2. problems concerning architecture and urban planning useful for designing architectural objects and urban complexes in the context of social, cultural, natural, historical, economic, legal and other non-technical conditions of engineering activity, integrating the knowledge gained during the studies;
- E.W3. principles, solutions, constructions, construction materials used in the performance of engineering tasks in the field of architectural and urban design;
- E.W4. the problems of architecture and urban planning in the context of the multi-discipline nature of architectural and urban design and the need to cooperate with other specialists;
- E.W5. the principles of professional presentation of architectural and urban planning concepts.

### **In terms of skills, the graduate is able to:**

- E.U1. analyze the existing conditions, valorize the state of land use and development, and formulate conclusions for design;
- E.U2. design an architectural object or urban complex, creating and transforming the space so as to give it new values - in accordance with the adopted program, taking into account non-technical aspects and integrating interdisciplinary knowledge and skills acquired during the studies;
- E.U3. prepare an advanced graphic, written and oral presentation of their own design concepts in the field of architecture and urban planning, meeting the requirements of the Journal of Laws - 14 - Item 1359 - 13 - professional writing appropriate for architectural and urban design.

### **In terms of social competence, the graduate is ready to:**

- E.S1. effectively use imagination, intuition, creative attitude and independent thinking and creative work to solve design problems;
- E.S2. accept criticism of the solutions they present and respond to it in a clear and factual manner;
- E.S3. use information technology to integrate with other participants in processes and projects, including the presentation of projects and communicate opinions in a commonly understood manner.\

Note that the diploma should confirm that the student has mastered practical professional skills - design and workshop (note: the diploma engineering project is not strictly a construction project; it is **a detailed conceptual design with technical elements supplemented by a written part with a description of the project**).

A detailed description of the diploma process is included in the document: Procedure - diploma process.

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<sup>1</sup> REGULATION OF THE MINISTER OF SCIENCE AND HIGHER EDUCATION of July 18, 2019 on the standard of education preparing for the profession of architect.

## 2. Activities preceding work on the diploma thesis

### 2.1. Choosing a thesis supervisor

At the last meeting preceding the selection of the Promoter, the Vice-Dean presents the Faculty Council with a list of promoters for approval, in accordance **with the Internal Regulations of FA PUT**. The selection of the Promoter takes place no later than one month before the end of the semester preceding the graduation semester.

Promoter selection is made in a dedicated course on the platform [ekursy.put.poznan.pl](http://ekursy.put.poznan.pl), according to the schedule posted on [www](http://www):

The Student uploads his/her portfolio to the assignment module and selects the Promoter from the list of available  
The Promoter approves or rejects the Student

A Student whose selection was not approved by a given Promoter has the right to participate in the next round of selection.

The Promoter selection schedule includes three rounds of selection. Promoters whose limit of places has been exhausted are not available in the next round. At the end of the indicated period, a Student who has not been approved is randomly assigned to a free Promoter.

### 2.2. Selection of the topic of work

Topics for engineering diploma theses are approved by the Faculty Council no later than one month before the beginning of the diploma semester.

Materials for the engineering diploma thesis (basic map, zoning decision/local plan, functional program) are made available to diploma students on the platform: [ekursy.put.poznan.pl](http://ekursy.put.poznan.pl).

The thesis topic should be indicated before the beginning of the diploma semester.

For this purpose, you need to submit to the Dean's Office an acknowledgment of receipt of the topic (deadline - before the beginning of the diploma semester), then submit a topic card by the end of March. The card is filled out by the Student and sent back to the thesis Promoter. The Promoter sends the completed card to the e-mail address of the secretariat of the diploma unit.

In the case of engineering diplomas, it is not possible to implement own topics.

### 3. Scope of the thesis work

The diploma thesis consists of two parts, i.e. a graphic part in the form of charts and a written part, in the form of an essay.

Both parts are obligatory and make up the entire diploma project. A diploma student prepares a written thesis and a graphic part in a digital version, additionally the charts should be printed on a rigid board and delivered to the WA PP on the appointed day (date and place are determined each time in the diploma semester schedule). The Diplomate shall also make a mock-up of the designed object together with the nearest context.

Photographs of the mock-up are uploaded by the Graduate together with the thesis into the system.

#### 3.1. The written part of the diploma thesis

The written part should be an essay of an estimated volume of approximately 50 pages in A4 format, vertically arranged. The number of pages may be increased in justified cases and after agreeing the scope with the thesis supervisor.

The Graduate prepares two versions of the thesis - an editable and a non-editable one (digital printout in pdf format). Both versions of the thesis must be identical. The Diplomate is not required to print the written thesis.

List of necessary elements of the written thesis:

- Title page according to the template (template: appendix no. 1),
- Table of contents,
- Abstract of the work in Polish and English,
- **Analytical part of the work** (including an analysis of sun exposure, building height, function, greenery, communication, composition and character of existing buildings, etc.). Graphic solution of the analytical part is allowed (on the first board presented), their placement is not mandatory and is left to the decision of the graduate,
- **Description of the project** - the main assumptions, including a description of the basic aesthetic, compositional and functional solutions, including the land development project (graphic and written part) of the land development with a clear legend and balance of the area containing (among others. plot/land area, building area, % built-up, net intensity, total area, net area, usable area, volume, number and type of apartments (in the case of a residential building), number of parking spaces (including on-site and underground garage) on a scale of 1:500. The descriptive part should also explain how the building is accessible to the disabled (universal design) and indicate the climate-friendly solutions used,
- **Technical description of the project**, i.e. a description of the technical solutions adopted in the work; it should include the most important material and technological solutions of the various elements of the building, the principles of fire protection; in addition, the basic construction and installation solutions should be discussed. It should include material and technological solutions, balances, principles of fire protection and solutions for construction, installations, roads, infrastructure, energy savings, etc.,
- List of illustrations (sources),
- List of tables,
- Bibliography (model appendix 2)
- Boards reduced to A4 format
- others: the study may contain annexes in the form of separate studies, sketches and other elements that affect the presentation of the results of the thesis.

Text editing should conform to accepted thesis norms and standards in terms of font selection and size (max.12) and spacing (1.15 or 1.5). Chapters and subchapters of the thesis should be distinguished graphically. The paper should demonstrate the ability to use bibliographic footnotes. All citations and photographs should be described with reference to the source.

### 3.2. Graphic part

The graphical part of the thesis should be presented on boards of format 100x70 in a vertical arrangement, in the number of 4-6 pieces. The boards should be stiffened to enable their presentation (e.g. printing on foam). The number of boards may be increased with the approval of the thesis supervisor.

The charts should include:

- land development plan (graphic part with a legend and site balance, all signs and contents of the PZT should be in accordance with the current law), scale 1:500
- projections of all above- and underground storeys with room list and roof plan, scale 1:100
- minimum two cross-sections, carried out at characteristic locations (vertical communication), scale 1:100
- designed elevations (if it results from the subject of the work, the elevations should be juxtaposed with the existing buildings)
- axonometrics (minimum one, maximum three) showing spatially the building or group of buildings
- technical drawing - plan and section fragments dimensioned and described in detail (on a scale of 1:50)
- architectural or urban detail with technical solutions (scale 1:20, 1:10, 1:5). The detail should relate to the solution of the fragment characteristic for the designed building - building details found in the literature or on the Internet should not be redrawn
- visualisations of the project, showing its scale, the context of the existing buildings, the designed materials and the colour scheme of the building.
- necessary descriptions and textual information

In addition, the boards may include elements presented in the written part, e.g. analyses, diagrams, etc. Each board should be marked with a consecutive number, clearly indicating the layout and composition of the boards. The layout of all the charts should be clear, consistent and in accordance with the principles of appropriate composition of graphic works.

Each board must include:

- title of the work
- author's name and surname
- academic title, name and surname of the supervisor
- name of faculty and university
- date of preparation.

### 3.3. Mock-up

The graduating student agrees with the thesis supervisor on the scale of the mock-up, its detail and the execution technique.

The Graduate uploads into the system such a number of views as to show all sides of the designed object, of which at least one view should be made from above. The actual model should be delivered by the Graduate to the Department on the day of the defence.

The mock-up should be made by the Graduate's own hand; mock-ups made by professional offices are not acceptable. Its character should be working - the scope should allow for the assessment of the adopted formal and compositional solutions placed in the immediate context of the study area.

## 4. Completion of work on the diploma thesis

### 4.1 Submission of the thesis - Socrates system

The diploma thesis shall be submitted in an electronic form. The date of approval of the thesis in the system by the Promoter is considered the date of submission. If a Diplomate uploads the thesis on time and the Promoter's approval of the thesis is later, the Diplomate is obliged to submit an application to the Dean's Office for an extension of the deadline for the thesis submission.

Before uploading the thesis to the system, the Diplomate should have passed all courses and closed all semesters.

The diploma thesis is uploaded to the system in two identical versions: the editable version of the diploma thesis (.doc) and the non-editable version of the diploma thesis (.pdf).

Uploaded files are automatically uploaded to JSA (unified anti-plagiarism system). The system checks the work and sends a report to the thesis Promoter. Waiting time 12- 48h, depending on the busy nature of the servers. **The thesis graduate should take into account the time needed to examine the thesis and to analyse and accept the examination result and upload the thesis early enough before the statutory deadline for the submission of the thesis.**

Upon completion of the examination, the Promoter shall inform the Diplomate of the result. If the similarity of the work is higher than 60%, the Promoter must justify in writing the decision to approve the work for defence. The Diplomate has the right to substitute files twice, provided that the thesis has not been accepted in the system by the Promoter. In each case the thesis is checked again by the JSA. (The Diplomate should take into account the working time of the system - hence the safe deadline for uploading the finished thesis is about 3-4 days before the final submission date).

The Diplomate also uploads graphic attachments to the system:

- diploma boards - vertical format 100x70, each board in a separate file, resolution: 300dpi, file size: up to 20MB,
- photographs of the mock-up or visualisations of the virtual model,
- statement of consent for participation of the work in competitions.

Changing graphic attachments (replacing, adding more, etc.) does not generate a thesis check by the JSA. Lack of graphic attachments makes it impossible to defend the diploma thesis.

- The diploma student additionally submits to the Dean's Office the documents required in a given academic year: The Thesis Card - to be signed in person at the Dean's Office.
- Statement on uploading the thesis - to be printed out after uploading the thesis to the e-account and signed (original to be delivered to the Dean's Office).
- Application for Diploma.
- Supplementary information to the Diploma Supplement in English (if applicable) with attachments confirming the above information.
- If there is a fee for issuing the diploma for the academic year in question, please enclose proof of payment.

**The defence schedule** is set by the Vice-Dean for Student Affairs and sent by e-mail no later than two days before the planned defence. The schedule includes information on the time and place of the diploma defence - please arrive early enough, taking into account the time needed to set up the project boards and mock-ups in the designated room.

### 4.2. Thesis evaluation criteria

The diploma thesis is subject to evaluation by the thesis supervisor and by a reviewer indicated by the Dean for Student Affairs. The thesis supervisor confirms a positive assessment of the thesis by approving it in the system. Before approving the thesis, the thesis supervisor should check its completeness.

A condition of admittance to the thesis defence is obtaining a positive assessment from the thesis reviewer. In the case of a negative review, the Pro Dean appoints an additional reviewer:

- in case of a positive opinion of the second reviewer, the diploma examination takes place according to the schedule.
- in the event of a negative opinion of the second reviewer, the diploma examination does not take place. The diploma student is removed from the list of students. The diploma student may resume studies in the final semester.

When assessing the diploma thesis, the supervisor and the reviewer take into account the following criteria:

- A. Analysis and assessment of the existing condition, correctness of the formulation of design proposals.
- B. Application of regulations arising from the Building Law and relevant regulations and standards, including in the design of the site. Assessment of the degree of accessibility (universal design).
- C. Assessment of the formal solutions adopted, including the relationship with the built and undeveloped surroundings (spatial order, development context).
- D. Evaluation of the functional solutions applied, in accordance with the adopted utility programme.
- E. Evaluation of the applied structural, installation and building material solutions, in the context of the multi-discipline nature of the architectural design.
- F. Evaluation of the applied solutions taking into account the requirements of sustainable development and climate protection (water, renewable energy), design of greenery and biologically active areas, impact of the investment on society.
- G. Written work: legibility of the description, ability to logically present the design process, use of footnotes, proper selection of sources, correct bibliographic description, selection of illustrative material. Scope in accordance with the guidelines.
- H. Graphic presentation/charts - application of principles of professional presentation of architectural and urban design concepts, legibility and composition of design charts.
- I. Substantive quality of technical drawings, architectural detailing - application of principles and standards current in the production of technical drawings: dimensioning, graphic designations, descriptions.
- J. REAL/VIRTUAL MODEL - degree of representation of adopted formal solutions in relation to the existing context - built and undeveloped surroundings.

### **4.3. Thesis defence**

The engineering thesis defence consists of two parts - the presentation of the project (this part is open and invited guests can also attend) and the thesis examination (this part is closed to the public).

#### **Project presentation.**

On behalf of the Dean of WA PP, the Chair of the Commission opens the public part of the engineering diploma defence.

The presentation of the project is oral and lasts about 10-15 minutes. The main assumptions of the thesis should be presented and the structure of the designed building should be discussed (context, land development, mass, function, technical solutions). The student may use the previously made graphic presentation or design charts during the discussion of the thesis. Elements of the design (visualisations, technical drawings, etc.) which were made after the submission of the diploma thesis may not be shown in the presentation. An exception to this rule is the possibility to present a physical model of the designed building.

After the presentation of the project by the Diplomate, the Chair of the Committee gives the floor to the thesis reviewer. The reviewer reads the prepared thesis review. The Committee Chairperson then asks the Diplomate to respond orally to the reviewer's comments and concerns.

After the Graduate has responded, the Chair of the Committee opens a discussion on the thesis. Participation in the discussion is open to all present, gathered in the room. When the discussion is over, the Chair closes the open part of the Diploma Defence and asks all guests to leave the room.



### **Examination part**

The Diploma Committee asks the Student three questions based on the current examination questions. (No later than before the beginning of the diploma semester, the Faculty Council approves the list of current diploma questions. The list of issues is published on the website).

A positive result in this part of the examination is conditional on obtaining positive marks for at least two questions. In justified cases (two negative marks, one positive mark), the Commission may ask the Graduate another two questions. The number of positive marks should be greater than the number of negative marks. After all questions have been answered, the Chairperson asks the Student to leave the room and opens the discussion of the thesis presented for defence by the members of the Committee.

Once the grades have been determined, the Chair asks the Diplomate to return to the room and presents the result of the defence to the Diplomate.

During the defence, the Diplomate obtains the following grades comprising the final result of the studies:

- the mark for the presentation of the diploma thesis (the mark depends on the manner of the presentation, the readability of the message, the Diplomate's behaviour during the presentation and when answering the reviewer's questions)
- evaluation of the diploma thesis (according to the evaluation criteria, point 4.2)
- separate marks for each examination question (the mark relates to the range of knowledge of the Diplomate).

The final result of the studies is determined by the Diploma Examination Board, calculating it with rounding to two decimal places on the basis of the sum of:

- 0.6 the weighted average of the marks from the course of study;
- 0.2 the grade for the diploma thesis;
- 0.2 the grade from the diploma examination.

A diploma student who has obtained a mark of 5.0 for his/her diploma thesis is required to submit the boards to the Dean's Office on the day of the defence.

### **4.4. Competitions**

Theses can be submitted independently or through the Faculty Authorities to thesis competitions, in accordance with separate regulations and competition rules. Announcements of current competitions are regularly posted on the Faculty website and Facebook page. For a period of six months from the date of defence, the faculty (dean's office) must be informed of the fact of participation in a competition<sup>2</sup>.

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<sup>2</sup> Pursuant to the Rules and Regulations for First and Second Degree Studies adopted by the Academic Senate of Poznań University of Technology Resolution No. 42/2020-2024 of 31 May 2021, the diploma thesis is subject to copyright. The University shall have priority in publishing the student's thesis. If the University has not published the diploma thesis within 6 months of its defence, the student who prepared it may publish it, unless it is part of a collective work

## List of annexes

1. The example of the front page
2. Bibliography - rules for creating a literature list and bibliographic footnotes