



T.C.
KARADENİZ TECHNICAL UNIVERSITY
Faculty of Engineering

Department of Electrical and Electronics Engineering

Engineering Design and Graduation Project

Template File

(Engineering Design / Graduation Project)

Student No Name SURNAME
Student No Name SURNAME
Student No Name SURNAME

Supervisor Title Name Surname

January 2026
TRABZON



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UNDERGRADUATE GRADUATION PROJECT APPROVAL FORM

The undergraduate graduation project titled “.....”,
prepared by under the supervision of
....., was examined and accepted as an Undergraduate
Graduation Project in terms of its scope and quality.

Supervisor : Title Name and SURNAME

Jury Member 1 : Title Name and SURNAME

Jury Member 2 : Title Name and SURNAME

Head of Department : Title Name and SURNAME

FOREWORD

This guide has been prepared to assist in the preparation of the Graduation Workbook to be prepared by the students of Karadeniz Technical University, Faculty of Engineering, Department of Electrical and Electronics Engineering. Carefully reading and applying this guide will enable our students to prepare a good thesis.

Acknowledgments should be given to the lecturer who supervised the Graduation Study in the Foreword, and to other lecturers, technicians and staff if they were helpful. Fellow students and other people who have helped should be thanked. Special thanks should be given to the Head of the Department for allowing the use of the Department's facilities in Graduation Studies, the Dean of the Faculty of Engineering and the Rector of KTU for their support.

In addition, family members who supported them during their education should be thanked.

January 2026

The names and surnames of the students in the group are written one under the other.

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SUMMARY

This guide has been prepared in order to ensure unity in the written presentations of the graduation studies to be prepared in the Department of Electrical and Electronics Engineering of the Faculty of Engineering.

While preparing the project report, it should be considered that the summary, introduction and conclusion sections are the most read sections. These three sections give the reader general information about the subject. For this reason, the subject of the project and important results should be clearly written in these sections.

While writing the summary, it should be noted that the aim is to give the reader a general idea about the project. The first paragraph of the summary should describe the topic of the project. In other paragraphs, the content and aims of the project should be explained and the methods and results used should be mentioned.

Since the summary describes a finished project, the passive structure such as "done, completed, implemented" should be used in the narrative.

SYMBOLS AND ABBREVIATIONS

LIST OF FIGURES

LIST OF TABLES

1. INTRODUCTION

1.1. General Information

In the introduction, a general description of the study is given, its subject, purpose, scope, method and stages are summarized. Subheadings are given in detail and more detailed explanations are made. For example, under the subheading of **1.1. General Information**

- A general description of the study should be given.
- An explanation should be given as to why this study was chosen.
- The innovations that will be provided to the relevant subject should be mentioned.
- Information should be given about where, how and why this subject or application is used today.

1.2. Literature Review

Information is given about similar research, studies and applications made by others on this subject by citing the source.

- It is obligatory to refer to at least 5 publications in this section, including IEEE Xplore Digital library, TUBITAK Turkish Journal of Electrical Engineering & Computer Sciences, YÖK Thesis Library, International or national peer-reviewed journals and publications in KTU Thesis Library. At least 2 of these citations must be in English.

1.3. Novelty

The differences from the similar studies should be explained. If it is a repetition of a previous study, this should be stated. Originality is not sought in Undergraduate Design and Graduation Projects. However, originality and innovation are always preferred. It should not be forgotten that a project written to provide financial support must have an innovative aspect and a unique value.

Even if a previous study is repeated in Design and Graduation Projects, there must be structural and dimensional differences and every stage from the design to the realization must be done by the students working on the project. These structural and design differences should be explained in this section.

1.4. Method

In all stages of the Design and Graduation project (creation of the idea, literature review, design, simulation and implementation), which methods will be used and how it will be used should be briefly explained under this title. Details should be given under the headings of the relevant sections.

1.5. Widespread Impact and Relation to Sustainable Development Goals

What will be the benefits it will provide when the work or project is completed? Which problem will it solve on a national, international or local basis? What aspects will it draw attention to? What kind of effects will it have on employment, production, economy, health, environment and social aspects? Does it have the potential to publish? Where can it be published?

Relationship with the United Nations Sustainable Development Goals (SDGs)

You are expected to explain how your design/graduation project is directly or indirectly related to the United Nations Sustainable Development Goals (17 SDGs).

In this context, you should clearly state which of the SDGs your project contributes to and explain **how** this contribution is achieved, considering the problem addressed, the technical features of the project, its functionality, and its expected impact.

Please explicitly indicate the relevant SDG numbers (SDG 1–SDG 17) associated with your project (e.g., Industry, Innovation and Infrastructure; Affordable and Clean Energy; Good Health and Well-being).

(You may refer to the supporting documents and explanations provided under the title “United Nations Sustainable Development Goals and Türkiye’s 12th Development Plan (2024–2028)” available at the link below:

<https://www.ktu.edu.tr/eee/dersmuhendisliktasarimi>)

Relationship with Türkiye’s 12th Development Plan (2024–2028)

You are also expected to explain how your design/graduation project is directly or indirectly related to the objectives of **Türkiye’s 12th Development Plan (2024–2028)**.

Please specify which of the Development Plan’s main objectives (O1–O5) your project contributes to, and describe the nature of this contribution.

Please explain the problem addressed by your project, its technical specifications, function, and its contribution to the area(s) (O1–O5) (e.g., O2 – Competitive Production with Green and Digital Transformation, O3 – Qualified People, Strong Family, Healthy Society, ...) and targets (Clearly state the number of Development Plan’s main objectives (O1–O5) related to your work).

(You may refer to the supporting documents provided under the title “United Nations Sustainable Development Goals and Türkiye’s 12th Development Plan (2024–2028)” at the link below):

<https://www.ktu.edu.tr/eee/dersmuhendisliktasarimi>)

1.6. Standards

The standards to be followed in the study should be listed in this section with their numbers and standard names. For example, if the standards are required on X, when "Standards in X" is typed into the Google search engine, you will see many standards related to that subject. Examine them and list the appropriate ones here. In particular, search for TSE, IEC and IEEE Standards.

1.7. Work Schedule

A work plan under this heading is placed at the end of the introduction. This work plan is organized in the form of a work-time chart. Who will take part in the work packages defined in the work-time graph and what will be done are briefly summarized. What will be achieved when each work package is completed is briefly explained in a few sentences.

The tasks in the work packages are shared so that each of the students in the team is the leader in at least one work package. The student responsible for a work package follows the work of the other students and ensures that the work package is completed so that that work package is completed in the planned time with the planned result.

In the work packages, in case of disruption in the process, a “Plan B” should be created and “Plan Bs” should be added to each work package so that the progress is not disrupted. Plan B is not required for work packages that are assured that there will be no disruption. However, for situations where disruption may occur, a plan B should be created, and the project should be completed at the specified time. An example Work-Time graph is also given in Table 1.1.

Table 1.1. Work-Time Table

WP No	Name and Purpose of the Work Package	Students Responsible	Time Range	Contribution to the Project
1	Creation of the project idea, literature review and revealing the original idea	Student 1 (L) Student 2 Student 3	October 2022	The project idea is created, and originality is supported by literature review. The formation of the original idea also clarifies what to do in the next steps.
2	Determining the methods to be applied and carrying out related theoretical studies. Moving to the design phase	Student 2 (L) Student 3 Student 1	October- November 2022	The methods to be applied are supported by theoretical explanations. Continuing the design depends on the theoretical knowledge proficiency.
3	Completion of design calculations and drawings, financial analysis and budget creation and investigation of legal responsibilities	Student 3 (L) Student 1 Student 2	November- December 2022	Design calculations and technical drawings of the project are made. Connection diagrams are created according to the dimensions of the table, case, box, etc. components. Connection diagrams are an indication of how the prototype works.
4	Creating the simulation model and doing the simulation studies, evaluating the results and writing the Engineering Design Project	Student 1 (L) Student 2 Student 3	December 2022 -January 2023	A simulation model of the designed system is created and simulated with package programs or software to be developed. The simulation is important as it will allow to know beforehand whether the prototype will work or not.
5	Final exams and Engineering Design presentations,	Student 2 (L) Student 3 Student 1	January 2023	The prepared Engineering Design is evaluated by the jury during the presentations. It is important to complete the presentations successfully, as Engineering Design is a prerequisite for the Graduation Project.

Table 1.1. Work-Time Table (continuing)

WP No	Name and Purpose of the Work Package	Responsible Students	Time Range	Contribution to the Project
6	Ordering materials required for prototype production and starting the production	Student 3 (L) Student 1 Student 2	January-February 2023	Procurement of the material to be used in the project is an important step. If the materials are not available, the project cannot be realized.
7	Creation of electrical-electronic circuits required for prototype manufacturing in accordance with the design	Student 1 (L) Student 2 Student 3	February-March-April 2023	Creation of electrical-electronic circuits required for prototype production in accordance with the design
8	Completion of prototype installation, performing tests, evaluation of test results	Student 2 (L) Student 3 Student 1	March-May 2023	Completion of installation is necessary in order to carry out tests. The test results are also important as they are indicators of whether the study has achieved its purpose or not.
9	Writing and submitting the Graduation Project,	Student 3 (L) Student 1 Student 2	May-June 2023	It is important that the study is written and explained in an appropriate format, as it is the final report of the project. A poorly prepared project book may prevent the project from being completed.
10	Final exams, Graduation Project Exhibition and presentations and completion of the project	Student 1 (L) Student 2 Student 3	June 2023	At the Graduation Project Exhibition, the prototype is displayed in working condition and evaluated by the Jury. A passing score is required.

Table 1.2. Risk analysis and B plans

WP No	Contribution to the Project	Risk analysis
1	The project idea is created, and originality is supported by literature review. The formation of the original idea also clarifies what to do in the next steps.	Original value is recommended in undergraduate projects, re-projecting an existing idea can be implemented as plan B.
2	The methods to be applied are supported by theoretical explanations. Continuing the design depends on the theoretical knowledge proficiency.	If there is lack of information on the subject, it can be eliminated by doing additional studies.
3	Design calculations and technical drawings of the project are made. Connection diagrams are created according to the dimensions of the table, case, box, etc. components. Connection diagrams are an indication of how the prototype works.	Connection diagrams of the study will be drawn using technical drawing programs. In the absence of a licensed programs, open-source programs will be used.
4	A simulation model of the designed system is created and simulated with package programs or software to be developed. The simulation is important as it will allow to know beforehand whether the prototype will work or not.	The simulation of the project will be done using package programs. If a licensed simulation program cannot be found, open-source software or students' own software can be used.
5	The prepared Engineering Design is evaluated by the jury during the presentations. It is important to complete the presentations successfully, as Engineering Design is a prerequisite for the Graduation Project.	It is obligatory to prepare and present the project book in accordance with the spelling rules. If this work package cannot be completed, the project is considered unsuccessful. Therefore, it must be done.
6	Procurement of the material to be used in the project is an important step. If the materials are not available, the project cannot be realized.	If the necessary materials are not found at the nearby vendors, the materials can be obtained by ordering online.
7	Creation of electrical-electronic circuits required for prototype production in accordance with the design	No disruption is expected in this work package. However, if necessary, support can be obtained from the technical personnel in the department.
8	Completion of installation is necessary in order to carry out tests. The test results are also important as they are indicators of whether the study has achieved its purpose or not.	Prototype installation is done by project students. If necessary, support is also obtained from the technical personnel of the department. Measurement devices can also be obtained from the department.
9	It is important that the study is written and explained in an appropriate format, as it is the final report of the project. A poorly prepared project book may prevent the project from being completed.	It is obligatory to prepare and present the project book in accordance with the spelling rules. If this work package cannot be completed, the project is considered unsuccessful. Therefore, it must be done.

10	At the Graduation Project Exhibition, the prototype is displayed in working condition and evaluated by the Jury. A passing score is required.	Participation in the Graduation Project exhibition and exhibiting the prototype is mandatory. This work package is a must.
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1.8. Organization of Work Packages and Work Management

The first 5 work packages are related to Engineering Design, and the last 5 work packages are related to the Graduation Project. Students taking part in the project should lead these work packages in turn and warn the other students in that work package to complete the work package they are responsible for on time. Each student should take a leadership role in at least one work package and take responsibility and explain to the other students what they need to do to ensure that it ends.

Who will lead which work package, who will do which job and for how long among the other students assigned in that work package should be given in detail under this sub-heading.

2. THEORETICAL BACKGROUND

2.1. General Information

A brief information on the subject can be given in **2. Theoretical Background** section. This information should be limited to the subject of the study and the part used. For example, if the speed control of a direct current motor is made, a few pages should be briefly mentioned about how the DC motor and its speed can be controlled, and how this speed control process is done in the study should be expressed with mathematical equations. The chapters of the books about DA engines should not be transferred to the final book with the copy-paste logic. **NO PROJECTS WILL BE ACCEPTED WITHOUT DISCLOSURE OF THE THEORY.**

In the subsection **2.1. General Information**, a general framework of the project and what to do and how to do it are explained briefly, and then in other subsections, the theoretical information is given by going into detail. This information is generally classical theoretical information of a book type and does not require citation. However, when a theorem, formula, algorithm, method, etc. information developed by a certain person is used, the source should be cited.

The studied subject may consist of one or more parts. In this case, theoretical information about that part should be given by using a subsection for each sub-topic. While giving theoretical information, only the resultant equations related to the subject studied should be given, not how the equations are obtained and their proofs. For example, if the study topic "*A Grid Connected Wind Energy System*" is chosen, the main subsection will be *wind turbines, electric generators, power electronics elements that will provide the interconnection, and the grid*. If there is a study on "*Wireless Robot Control*", then *the robot's equations of motion, the motors that provide the robot movement, wireless data transmission, and control* can be used as sub-titles as follows.

In a Grid Connected Wind Energy System,

2.2. Wind Turbines

By giving information about wind turbines, the mechanical torque or mechanical power equations produced by the turbine depending on the wind speed are written and explained.

2.3. Electrical Generators

Generator types used in wind energy systems are briefly mentioned. The electrical generator to be used in the project studied and why it was chosen are mentioned, briefly explaining how this generator converts the mechanical energy applied to its shaft into electrical energy, and the related equations are given. Explains how to control power and voltage.

2.4. Power Electronics Elements

Power electronics circuits and elements used in wind energy systems are mentioned. Elements such as rectifier, inverter, frequency converter and chopper that will be used in the study are mentioned and briefly theoretical information about the working principles of each of them is given.

2.5. Control Methods

In the study, if a design is to be made for the control of turbine, generator and power electronics circuit elements, brief information is given about the control methods and theories that are thought to be used or used.

In Wireless Robot Control,

2.6. Robots and Motion

Information about the flexibility of motions of robots is given. Its moving parts and equations of motion are explained by writing.

2.7. Driving Motors of Robots

How robots are moved is explained. The types of driving motors used are explained and the torque and velocity equations produced by these motors to drive the robots are given. How they are checked is explained.

2.8. Wireless Data Transmission

Information about wireless data transmission used in robots is given. Wireless data transmission to be used in the study is explained and theoretical information is given. The data communication protocols used, if any, are explained.

2.9. Microprocessors

If a microprocessor will be used in the study, general information about microprocessors is given and the microprocessor to be used is explained. Putting a photo of the microprocessor does not mean explaining it. It needs to be explained how it works. Its inputs, outputs, processor, speed, software features, how it is programmed should be explained.

2.10. Control Methods

Information is given about the control methods used in the control of the robot. The theory of these methods is briefly explained.

2.11. Wired-Wireless Communication

Necessary technical information, communication protocols, distance, frequency, communication power, energy, wavelength, etc. necessary calculations should be made according to the type of communication and their relations with the project should be explained.

2.12. Biomedical Applications

Those who work on this subject should explain the necessary theoretical knowledge, image and signal processing techniques under this section.

2.13. Human-Machine Interaction

Those who work on this subject should explain the necessary theoretical knowledge under this section.

2.14. Smart Systems

Smart device or system developers should explain in this section how this intelligence is gained.

2.15. Miscellaneous

Theoretical information about other topics not listed here but used in the project should be given in this section.

NOTE: Catalog information, product introduction information should not be used in this section. Using such information may result in the project being deemed unsuccessful.

3. DESIGN

3.1. General Information

In the design part, the calculations made in the study must be explained based on the relevant theory and theorems. Depending on the theoretical background of the project to be made, necessary calculations and drawings, if any, should be made. The numerical values used in the calculations should be given in tables, and the calculation results should be shown either in tables or figures. In design drawings, there should be a title (caption) on the drawing paper, information should be included when, by whom and by whom the drawing was made, under whose consultancy, and within which project. All dimensioning must be given numerically in the design drawings. At the end of the design section, all the details of the work to be done should be revealed, a list of materials to be used and purchased should be listed and **a preliminary cost calculation should be made**. In addition, the legal problems that may arise during the implementation and later use of the project should be investigated and discussed.

Design-related sections may have the following subsections.

3.2. Dimensions

Materials such as table, box, mounting bed etc. to be used are dimensioned. Parts such as the outer box and mounting bed to be used are sized by taking into account the dimensions of the elements to be placed and the gaps between them.

3.3. System Components and Selections

The subsystem components to be used and how they are selected can be explained in this section. Giving photos of selected components does not mean explaining them. It should not be forgotten that this written report is a Design Project Report or a Graduation Project Thesis Book. It is not a product catalogue. The elements used should be explained not with photographs, but by highlighting their technical features and why and how they are used in the project. How they were selected should also be explained.

3.4. Applied Methods

The methods applied at different stages of the study should be explained in this section. Circuit design methods, control methods, numerical analysis methods, communication methods, any application method specific to the subject should be explained here.

3.5. Software

If any software has been developed in the study, the flow chart of this software should be given here and necessary explanations should be made. Do not give the code

of the software here. If the thesis advisor and faculty member wants the software code to be included, then it can be added as a separate annex in the appendices.

If there is a package program type software used for the simulation of the study, that software can be briefly mentioned here. Do not describe the simulation study here. The next section is already for direct simulation studies.

3.6. List of Materials and Economic Analysis

The full list of materials to be used in the study is given in this section. In a table similar to Table 3.1, the name of the material, where and why it will be used, the unit price and how many pieces are required are written. The general budget is created by summing the prices of all materials and compared with the project budget. It also explains what kind of considerations and choices were made to create a budget-friendly bill of materials. The positive and negative effects of the price and quality of the material

Table 3.1. List of Materials

Material Name	Purpose of Usage	Unit Prize (TL)	Number	Prize (TL)
TOTAL				

3.7. Legal Issues

Legal problems that may be encountered during the realization of the project, depending on the subject, should be evaluated under this heading. Legal problems that may be encountered after the completion of the project should also be included here. Regulations and legislation related to the project subject are also included here. In this regard, the web address **mevzuat.gov.tr** may be useful.

4. SIMULATION STUDIES

4.1. General Information

A simulation of each study must be made. Simulation studies are the part that can be done within the scope of the Design Project. Simulation software can be developed by the students doing the study or package programs can be used. How the modeling to be used in the simulation study is done should be explained and the mathematical model equations should be given based on the studies done in the previous sections. If a ready-made package program is used, it should be explained how the study is used in this package program, how it is modeled for this package program, and which data is simulated using. The simulation results should be given in the Results section.

Possible subsections that can be used in this section may be as follows.

4.2. Simulation Software

Information about the simulation software developed or ready to be used within the scope of the study is given. The software is briefly introduced and how to use it in this study is explained.

4.2. System Modelling

How the system to be simulated is modeled is explained and model equations or model form are given. Necessary explanations are made and how the model works is explained.

4.3. Simulation

Simulation diagrams and how the simulation is performed are explained in this subsection.

5. EXPERIMENTAL STUDIES

(This section does not exist in the Engineering Design Project.)

5.1. General Information

Experimental Studies are given under this section. Since the Design Project does not include this part, the Design Project Final Report does not include this part either. This section is included in the Graduation Project Book.

How the established mechanism or the practical work carried out should be explained in this section. Information should be given about the difficulties and conveniences experienced during this realization, how the practical setup works, and how someone else can use it. In the practical work, it should be stated which security measures are taken within the standards. All necessary markings should be made on the work and warnings should be placed, if any. These markings and warnings should be on the practical work and should also be included in this part of the graduation book. If there are too many security warnings, it can also be edited as a separate section. **In this section, connection diagrams of the practical work, printed circuit drawings and photographs of the system should be given. A clear connection diagram must be drawn and put. The photo is not a connection diagram.**

In the General Information subsection, after briefly explaining what will be mentioned in this section, the details are passed. Details are explained under the following subsections. For example, if the Wind Energy System example used in Chapter 2 is taken before, other subsections may be as follows.

5.2. Mounting Wind Turbine and Generator System

After briefly introducing the wind turbine and generator used in the study, it is explained how they are combined. The technical features of the turbine and generator used during their introduction should be explained and how they are used in this study should be explained. Photographs of individual and/or combined versions may also be used. However, the correct thing is that the technical drawing and the joint diagram are given in the 3rd Chapter, where the design is explained. The content of this subsection should be arranged according to the project subject and scope. The subject given here is just an example.

5.3. Implementation of Interface Elements

The interface elements used in combining the different systems in the study and how they are used and how they are implemented in practice should be explained in this

section. The title of the title may change depending on the subject and scope of the study. In the study about Wind Energy Systems, which is given as an example, how the power electronics elements (rectifier, inverter, chopper, etc.) that connect the generator to the network or loads are realized and mounted in this section can be explained. If necessary, new subsections such as 5.3.1, 5.3.2 can be created and the implementation of different elements can be explained in detail. For example, if we consider the study titled Wind Energy System again, these subsections may be as follows.

5.3.1. Inverter and Driver Circuits

5.3.2. Control of the Inverter

5.3.3. Loads

When talking about the components in the intermediate elements used in this section, their technical features should be explained. For example, when describing a diode used, the photograph of the diode should not be passed over, the characteristic features of this diode should be explained over the operating curve.

5.4. Tests Performed

After the implementation of the designed system is completed, it should be tested whether it works in accordance with the production (production) purpose and how these tests are done should be explained in this section. The conditions under which the tests were carried out, taking into account which special circumstances, the acceptances etc. should be given here. Connection diagrams of the test system, if any, should be given and explained. Listing, plotting, and interpretation of results should be given in the next section, not in this section.

6. RESULTS

6.1. General Comments

The results section should include the outputs showing whether the desired goal has been achieved in the study and their explanations. Photograph of practical or experimental work is not the result. The result is graphics, figures, charts, etc. outputs that show whether the study is working according to its purpose or not. In other words, they are numerical values or visual graphics. If you're doing a motor speed check, the result is not a photo of the motor, but velocity versus time graphs that show whether that motor is running at the reference speeds you've given. If you have made an RF-based communication project, the result is not a photograph of the RF circuit, but a chart or graph of the measurement results showing how far it can communicate in open or obstructed areas. All figures, graphics and charts in which the results are shown should be referenced in the text and necessary explanations should be made.

The axes of the graphs must be written with their units. See Engineering Design or Graduation Project Writing Guide for graphic format.

Possible subsections of the Results section may be as follows.

6.2. Simulation Results

The results of the simulation studies carried out within the scope of Engineering Design are included in this subsection. The data obtained should be given with charts or graphs and it should be explained whether the designed system achieves the intended goals. Simulation results should be interpreted and expectations from experimental studies should be given.

6.3. Experimental Results

The test and measurement results obtained from the practical studies should be given in this subsection and it should be explained whether the designed system achieves the targeted objectives. Experimental results should be compared with simulation results, and their similarities and differences should be explained, and the reasons for the differences, if any, should be explained. **The photo of the system made is not the result.** Such a photo can be placed. But this is not the result. **The result is to show whether that system provides the reason for being made.** For this reason, numerical data obtained by performing tests should be explained and discussed with graphs and charts.

7. CONCLUSION

Comments and Conclusions is the last section. In this section, the achievements of the study should be interpreted and evaluated. These evaluations can also include what can be done about this study in the future.

What problems the study will solve or facilitate the processes should be explained. Who will be the customers of the prototype produced in this study should be explained.

The differences between the budget calculated during the design and the actual budget should be emphasized.

8. REFERENCES

The thesis book ends with a list of references. References are written according to the rules explained in the Design/Graduation Book Writing Guide. According to these rules.

1. The first and middle names of the authors are shortened, and their surnames are written clearly. Only the first letters are capitalized.
2. After the names of the authors are listed, a comma is placed, and the title of the article or book is written in quotation marks.

After the title, the spelling rules below are followed, depending on the type of source.

3. If the reference is a journal, a comma is placed after the title, and the name of the article and the journal in which the article is published, the number, the chapter number, the year of publication, and the numbers of the beginning and ending pages of the article are written.
4. If the reference is a symposium or conference, a comma is placed after the title and the name of the symposium or conference in which the article was published is written. Then, the year and place where it was edited, the year of publication and the numbers of the beginning and ending pages of the article are written.
5. If the reference is a book, the name of the publisher, the year of publication of the book and the number of editions is given.
6. If reference is a thesis, a comma is placed after the title and the type of this thesis (Graduation Project, Master Thesis or Doctoral Thesis) is given. The name of the university and department where the thesis was made is written. The year of publication of the thesis is written.
7. If the web page is cited, the name of the web page and link address are given.

Examples:

Authored Book

- [1]. M. Buresch, "*Photovoltaic Energy Systems Design and Installation*", McGraw-Hill, New York, 1983.

- [2]. I. Boldea and Syed A. Nasar, "*Linear Electric Actuators and Generators*", Cambridge University Press, 1997.

Editorial Book

- [3]. J. Breckling, Ed., "*The Analysis of Directional Time Series: Applications to Wind Speed and Direction*", Lecture Notes in Statistics. Berlin, Germany: Springer, 1989, vol. 61.
- [4]. A. A. Author1, B. B. Author2 and C. C. Author3, "Title of chapter or article", *Name of the edited book*, A. A. Editor1 and B. B. Editor2 (Eds.), Publisher, Location, Year.

Journal

- [5]. L.A. Zadeh, "Fuzzy sets", *Information and Control*, 8, 1965, pp. 338-353.
- [6]. W.Z. Fam and M.K. Balachander, "Dynamic Performance of a DC Shunt Motor Connected to a Photovoltaic Array", *IEEE Trans. Energy Conversion*, Vol. EC-3, No.3, September 1988, pp.613-617.

If the number of authors is more than 3:

- [7]. M. DeYong et al., "Fuzzy and adaptive control simulations for a walking machine", *IEEE Control Systems*, Volume:12, Issue:3, June 1992, pp. 43-50.
- [8]. A. A. Author1 et al, "Name of Article", *Name of journal*, Chapter No (If any), Issue, Year, Pages: 65-72.

Symposium or Conference

- [9]. İ. H. Altaş, "A Fuzzy Logic Controlled Tracking System For Moving Targets", *12th IEEE International Symposium on Intelligent Control, ISIC'97*, July 16-18, 1997, Istanbul, Turkey, pp. 43-48.

Patent

- [10]. R. E. Sorace, V. S. Reinhardt, and S. A. Vaughn, "High-speed digital-to-RF converter," U.S. Patent 5 668 842, Sept. 16, 1997.

Web Page

- [11]. International Energy Agency, "Electricity and Heat for 2011", website. [Online]. (www.iea.org/statistics/statisticssearch/report/?country=TURKEY=&product=electricityandheat&year=Select), Available as of June 22, 2014.
- [12]. E-Mevzuat, "Elektrik İç Tesisleri Yönetmeliği", Mevzuat Geliştirme ve Yayın Genel Müdürlüğü, Mevzuat bilgi Sistemi, Web [Online]. (<http://www.mevzuat.gov.tr/Metin.Aspx?MevzuatKod=7.5.10391&sourceXmlSearch=&MevzuatIliski=0>), Erişim tarihi: 22 Haziran 2014.

Data Sheet (Veri Sayfası)

- [13]. *FLEXChip Signal Processor (MC68175/D)*, Motorola, 1996.
- [14]. "PDCA12-70 data sheet," Opto Speed SA, Mezzovico, Switzerland.

Thesis

- [15]. A. Karnik, “Performance of TCP congestion control with rate feedback: TCP/ABR and rate adaptive TCP/IP,” M. Eng. Thesis, Indian Institute of Science, Bangalore, India, Jan. 1999.

Technical Report

- [16]. J. Padhye, V. Firoiu, and D. Towsley, “A stochastic model of TCP Reno congestion avoidance and control,” Univ. of Massachusetts, Amherst, MA, CMPSCI Tech. Rep. 99-02, 1999.

Standards

- [17]. *Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specification*, IEEE Std. 802.11, 1997.

APPENDICES

In the graduation book, ethical forms, data sheets, product description, software list and theory detail are given in the appendices.

The main appendices that should be included are listed below.

Appendix-1. IEEE Etik Kuralları (Türkçe) ve IEEE Code of Ethics (English)

Appendix-2. Restrictions Form

In this form, the installation and application constraints related to the work, their effects on health, environment and safety in universal and societal dimensions should be listed.

Appendix-3. Interdisciplinary Study

The experiences gained in the interdisciplinary workshops or courses organized by the Department Head which are compulsory to attend should be included and explained here. **This part is mandatory. The projects of those who do not participate in the mentioned studies will not be accepted.**

In addition, how the activities are done by others outside the department or by working with others during the design / graduation studies should be explained. Information should be given about the amount of time devoted to the non-departmental studies and the professions of the people contacted.

Appendix-4. Other Appendices

Appendices such as data sheets, product descriptions, software list and theory detail are listed starting from Appendix 5. The following suffix numbers need to be updated as more suffixes are added in between.

Appendix-5. CVs

Appendix-6. Engineering Design Submission Conditions Form

After the necessary markings are made on this form, it is signed and added by scanning. Those who cannot answer all the questions on this form with YES cannot submit the Engineering Design. If the conditions are met, the form is added to the Engineering Design book. After the Graduation Project is written, it remains where it is.

Appendix-7. Graduation Project Submission Conditions Form

After the necessary markings are made on this form, it is signed and added by scanning. Those who cannot answer all the questions on this form with YES cannot submit the Engineering Design. If the conditions are met, the form is added to the Graduation Project book after the Engineering Design Submission Conditions Form. This form is not added during the Engineering Design phase.

Appendix-8. TÜBİTAK project closure form

After the completion of the projects such as 2209/B supported by TÜBİTAK, the closing form downloaded from TÜBİTAK project page should be signed by the supervisor and students and only be added to the Graduation Project as a suffix.