



جامعة الأمير سّطام بن عبدالعزيز  
PRINCE SATTAM BIN ABDULAZIZ UNIVERSITY

**PRINCE SATTAM BIN ABDULAZIZ UNIVERSITY  
FACULTY OF ENGINEERING, WADI ADDAWASIR  
ELECTRICAL ENGINEERING DEPARTMENT  
GRADUATION PROJECT HANDBOOK**

No.	Students names	Students numbers
1		
2		
3		
4		

Academic year and Term (1 or 2)	
Project title	
Supervisor name	

## **1. General**

The senior design project course provides an integrated assessment of the progress of the students toward the desired electrical engineering competency. It is therefore important to design fair and broad guidelines for better assessment of this course. The ABET Criterion 5 (Curriculum) includes the following statement “A culminating major engineering design experience that 1) incorporates appropriate engineering standards and multiple constraints, and 2) is based on the knowledge and skills acquired in earlier course work”.

A senior design project in the Department of Electrical Engineering (EE) in the Faculty of Engineering in Wadi Addawasir comprises two courses that span two semesters, EE 4980 Project I, and EE 4990 Project II. Students should form teams usually of 3 members, select a design project and are supervised by a faculty member. Project I can start in the first semester or second semester of an academic year. The students are expected to discuss their progress with their supervisors in regular weekly meetings. The students submit two interim written reports during the semester (in week 4 and in week 8), and a final written report at week 13. Students present and defend their work at the end of each semester.

The main purpose of the project is to improve the students' technical skills, communication skills by integrating writing, presentation and teamwork opportunities. The design project is comprehensive and focuses on professional practice and includes a variety of non-technical issues such as economic factors, safety, reliability, environment and social impacts. The topics are normally chosen by the department faculty members. The students are required to demonstrate their ability to: conduct a literature survey; perform the relevant design and calculations, propose a solution to the problem, and implement their design.

Externally sponsored projects are welcome and benefit the industry and guarantee a strong educational experience for our students. Sponsored projects can be tailored to meet the requirements for EE Senior Project students.

This document presents guidelines for management and assessment of Project I and Project II. The prerequisite for a student to register for Project I is the successful completion of 207 credit hours. The prerequisite for a student to register for Project II is the successful completion of Project I.

## **2. Graduation Project Coordinator**

One faculty member is assigned by the head of the EE Department to be the Graduation Project Coordinator. The Graduation Project Coordinator works closely with the head of the EE Department, and under his supervision, to arrange all the necessary arrangements for successful graduation projects. The role of the Graduation Project Coordinator is:

- Announce all dates and deadlines regarding the graduation project.
- Distribute and collect all necessary forms.
- Collect graduation project topics from faculty members and arrange for their review.
- Announce the graduation project topics to students and collect their Graduation Project Selection forms.
- Assign student groups to graduation projects.
- Collect and revise the format of graduation project final reports at the end of the semester.
- Arrange the examination committees.
- Collect the marks from the examination committees and the supervisors.
- Help the students for any administrative matters during the semester.
- Update this “Graduation Project Handbook” based on the recommendations of the EE Dept.

## **3. Project Assignment to Students**

The Graduation Project Coordinator helps students to select their Graduation Project topic. The procedure to assign students to Project I supervisor is as follows:

- Each semester faculty members submit topics for Project I, together with project summaries, to the Graduation Project Coordinator.
- The submitted topics are revised by a committee from the EE Department faculty members.
- Revised and approved topics are announced to the students. Students may discuss the topics with the relevant faculty members to have a clear understanding of the topic.
- Students form groups of usually 3. Each group fill-out a Graduation Project Selection form in which they select the graduation projects they prefer in order. The form is available with the Graduation Project Coordinator.
- Based on student selections and the load of the faculty members the Graduation Project Coordinator assigns each group of students to a faculty member to be their Graduation Project Supervisor.
- The same supervisor continues with the same group of students for Project II.

#### **4. Prerequisite and Credit Hours**

The prerequisite for EE 4980 Project I is the successful completion of 125 credit hours. Project I is one credit hour. The prerequisite for EE 4990 Project II is the successful completion Project I. Project II is three credit hours.

#### **5. Objectives of Graduation Project**

The objectives of the Graduation Project are:

- To create an environment for the undergraduate students to use the skills acquired in the other courses to solve real engineering and technical problems.
- To enhance creativity of the students in analyzing and solving electrical engineering and technical problems in general.
- To create an environment to promote teamwork approach to problem solving.
- To develop the ability of self-learning.
- To prepare students to be successful in their industrial careers.

In EE 4980 Project I the students will focus on the design part of the project. This may include:

- An introduction to the project and its importance.
- A background about the subject.
- The different methods and approaches in treating this subject.
- The selected approach.
- The design equations, flow charts and graphics.
- Timeline of the project.
- The cost of the project.
- The societal and environmental impact.

In EE 4980 Project II the students will focus on the implementation part of the project. This may include:

- Possible refinement or updates to the design in Project I.
- Steps and procedure of implementation.
- Problems that needed to be solved.
- Results and measurements from the implemented project.
- Graphs or videos of a prototype.
- Shortcomings of the design.
- Possible future enhancements.
- Useful engineering applications.
- Final cost and final timetable of implementation.
- Design Constraint and Engineering Standards

## 6. Design Constraints

Consideration of most of the following is required during the project work of EE 4980 Project I and EE 4990 Project 2: economic, environmental, ethical, health & safety, social, political, sustainability, and manufacturability constraints. The project report must include a section on the design constraints incorporated in the project. These constraints may include:

**Economic** - relating to the cost, production, distribution, and consumption of goods and having practical or industrial significance.

**Environmental** – relating to preserving and possibly improving the surrounding environment.

**Ethical** – relating to appropriate professional conduct including the principles of honesty, fairness, caring, and respect for others

**Health and Safety** – relating to the health and safety concerns of a product’s manufacture, use, and disposal.

**Manufacturability** – relating to how a product can be manufactured efficiently and economically.

**Political** – pertaining to public policy or relating to affairs of state or administration.

**Social** – concerned with a broad grouping of people having common traditions, institutions, or collective activities and interests.

**Sustainability** – relating to the use of a resource so that the resource is not depleted or permanently damaged.

They may incorporate other constraints as well if appropriate.

## 7. Engineering Standards

Engineering standards should be incorporated in the design project. This incorporation helps the students be aware of realistic engineering life and practice. A separate section in the project report should be devoted to present the incorporation of engineering standards. This section should emphasize and clarify which engineering standards may be relevant to this graduation project. The design of the project should show how it complies and conforms with these standards. Some of the well-known sources of standards are:

IEEE Standards website: <http://standards.ieee.org/>

IEEE Standards University: <https://www.standardsuniversity.org/>

American National Standards Institute (ANSI): <https://webstore.ansi.org>

International Organization for Standardization (ISO): <https://www.iso.org/standards.html>

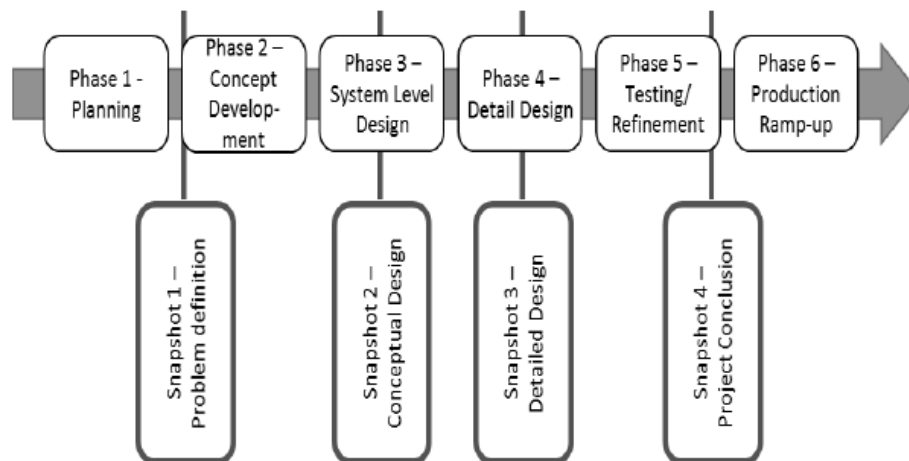
US National Institute for Standards and technology (NIST): <https://www.nist.gov/>

UL Safety Standards: <https://standardscatalog.ul.com/>

<https://www.astm.org/Standard/standards-and-publications.html>

If no existing engineering standards are relevant to the project, this has to be clearly discussed and verified in this section of the project.

## 8. Capstone Design Process



## 9. Student Outcomes (ABET criteria)

- 1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- 2) an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
- 3) an ability to communicate effectively with a range of audiences
- 4) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
- 5) an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
- 6) an ability to develop and conduct appropriate experimentation, analyze, and interpret data, and use engineering judgment to draw conclusions.
- 7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

## 10. Graduation Project Logbook

Students should meet their supervisor weekly to discuss their progress. The supervisor will give the students guidance and assign them work to do during the week. During Project I and Project II, the students need to keep a project team's Logbook that consists of several Log Book pages. The Log Book page is shown below. The Logbook plays an essential role in documenting and keeping a concise track record of all phases of the project. Good documentation is a key to a successful project and hence the logbook is required. Each group must have a Logbook in which project progress and assignments are recorded. The Logbook should be kept neat and well-organized. Finally, when the project is completed, each team should handle their own Logbook to the Graduation Project Coordinator along with the final project report.

## 11. Graduation Project Deliverables

**In week 4, the project team should submit a first report to their supervisor. In week 8, the project team should submit a second report to their supervisor. By week 12 the project team should submit a final report to their supervisor. After approval by the supervisor, this report is also submitted to the Graduation Project Coordinator as follows:**

By the end of the semester, before the deadline announced by the Graduation Project Coordinator, the project team should submit the following to the Graduation Project Coordinator:

- Four hard copies of the final report signed in the front page by the supervisor. The minimum number of pages is 50 pages. The report format is given in the Appendix.
- One soft copy on a CD in pdf format.
- The Logbook with the supervisor signature on each page.

## 12. Graduation Project Assessment and Grading

Assessing the students' abilities to problem solving and effectiveness in expressing ideas in oral and written communication is done by examining the proposed designs described in the report, and observing the oral presentation. By considering the scope and depth of the students' treatments of all issues related to the design project, the faculty is able to assess the students' abilities to consider wider environmental issues which often accompany electrical engineering practice.

The final project report should be submitted by each group of students, in which the problem statement, design concept, simulation work and hardware concept are clearly described. Each group will also submit their Logbook. Students will prepare an oral presentation. In Project I and Project II, examiners will evaluate the project report and oral presentation to put their grades. In Project I, they also provide constructive criticism and suggestions to help improve and develop Project II. The project mark is divided as follows:

Supervisor Evaluation Report 1	10
Supervisor Evaluation Report 2	15
Supervisor Evaluation Final Report	25
Examination Committee	50
Total	100

The examination committee grade includes marks for the Logbook. The complete distribution of the supervisor marks and examination committee marks are given in the Appendix.

## 13. Plagiarism Policy for the Graduation Project Report

Plagiarism is the use of others published and unpublished ideas or words (or other intellectual property) without reference or permission from original author, and presenting them as new and original rather than derived from an existing source. The effect of plagiarism is to mislead the reader as to the contributions of the plagiarizer. Plagiarism is a scientific misconduct and should be completely avoided.

The project report will be subjected to iThenticate program to avoid plagiarism. iThenticate is a plagiarism detection software. It identifies material that matches text from documents found in extensive database. Its results include a percentage score which indicates how much of the document matches other sources. For Project reports the acceptable percentage must not exceed 40%.



## Appendix A

### Student Anti-Plagiarism Declaration

This is to declare that our graduation project:

Project title:	
Supervisor name:	

Is the sole contribution of the student(s) below and no part hereof has been reproduced illegally (in particular: cut and paste) which can be considered as **Plagiarism**. All referenced parts have been used to support and argue the idea and have been cited properly. I/We certify that I/we will not commit any plagiarism, cheating, or any other academic integrity violation. I/We will be responsible and liable for any consequence if violation of this declaration is proven.

**Date:** \_\_\_\_\_

#### Graduation project group's student(s):

<b>Name:</b>		<b>Signature:</b>	
<b>Name:</b>		<b>Signature:</b>	
<b>Name:</b>		<b>Signature:</b>	
<b>Name:</b>		<b>Signature:</b>	

**Appendix B**  
**Format of the final report cover page**





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**TITLE OF THE FINAL PROJECT**  
**TITLE OF THE FINAL PROJECT, continue**

**PREPARED BY:**

*Student Name*                      Registration No.:

*Student Name*                      Registration No.:

*Student Name*                      Registration No.:

**SUPERVISED BY**

*Dr. Supervisor Name*

*Supervisor Signature*

**DEPARTMENT OF ELECTRICAL ENGINEERING**  
**COLLEGE OF ENGINEERING AT WADI AL DAWASER**  
**PRINCE SATTAM BIN ABDULAZIZ UNIVERSITY**

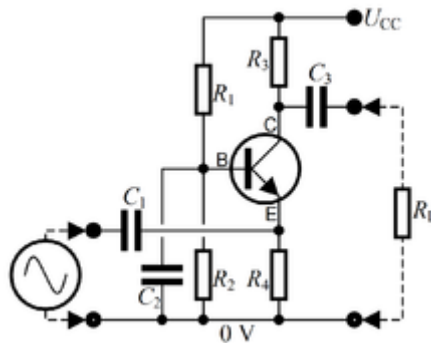
**MONTH YEAR**

## Appendix C

### Format of the project reports

The following format must be used:

- High quality 80 gm A4 paper shall be used.
- Use a personal computer or laptop to write the graduation project report.
- Print on high quality laser printers
- The basic text should be in “Times New Romans” of font 12 point. However, 10-point font size may be used for footnotes, captions, figures, tables and other print outside the basic text.
- The line spacing should be generally set at 2.0 (double spacing). Single spacing may be used only in the following cases:
  - Acknowledgments
  - Abstract
  - References
  - Tables of Contents
  - Captions of figures and Tables.
  - Footnotes
  - List of Tables/ Figures/ Illustrations
- Chapter headings are to be centered and written in (bold) capital letters. The size for Chapter Headings is 14 point. Other sub-headings are to be aligned to the left margin and should be of 12 point in size.
- Spacing between two paragraphs should be set at 4.0 points. The first sentence of a paragraph should be indented to 1.25 cm. A Heading that appears as a last line on a page will not be accepted. There should be a minimum of two lines of a paragraph at the bottom of the page under the Heading
- Every page except the title page must be numbered. Preliminary pages such as abstract, acknowledgments and table of contents are to be numbered in lower case Roman numeral (ii, iii, iv, etc.). The main text pages are to be numbered in Arabic numerals (1, 2, 3, etc.) and all pages must be numbered.
- All figures and tables should be placed after their first mention in the text. Figure caption should be below the figures while table caption should be above the table. They should be referred in the text, for example, Figure 1 or Figure 1.1, and for tables Table 1, or Table 1.1. See the following examples.



**Figure 1:** The caption should be placed after the figure

**Table 1:** The caption should be placed before the table

A	B	C	D
(1)	0.279	0.312	-
(2)	1.68	0.168	0.025

- Equation number should be Arabic numerals enclosed in parentheses on the right- hand margin. They should be cited in the text, for example, Equation (1) or Equations (1)-(3), or Equation (1.1) or Equations (1.1)-(1.3)

## Appendix D

### Final Report Arrangement and Content

#### Arrangement

The contents should be arranged in the following order:

- TITLE PAGE
- ABSTRACT
- ACKNOWLEDGEMENTS (Optional)
- TABLE OF CONTENTS
- LIST OF TABLES
- LIST OF FIGURES
- LIST OF SYMBOLS/ABBRAVIATIONS
- BODY OF THE PROJECT TEXT (may include the following as needed):
  - **Introduction:** including background literature and significance of the project
  - **Description of the problem**
  - **Objectives:** project objectives must be clearly stated with expected outcomes
  - **Problem design and analysis:** including tasks that should be conducted to achieve the stated objectives
  - **Materials and Methods:** including all materials and equipment that will be used, software, any other computer-based activities
  - **Design Constraints:** including all relevant constraints that were incorporated in the project design
  - **Engineering Standards:** including all relevant engineering standards that this project must comply with, or must follow its process.
  - **Work Schedule:** including bar chart or Gantt chart with tasks of team members
  - Other section as needed
  - **Ethical implications and impact on society:** including the positive and negative impact on the local, national and possibly international.
  - **Conclusions**
- REFERENCES
- APPENDICES (Optional)

