

Civil engineering Department

Graduation Project Handbook

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PREFACE

The Graduation Project Guidelines manual is officially prepared as a reference for graduating year students of Civil Engineering Department. The manual is considered as a supplementary instrument in achieving the goal of completing the Graduation Project (GP): to equip students with key academic knowledge theoretically and practically for their professional competency in the future working life.

It is a concise reference contains essential information for students to comply in order to fulfill the university academic and practical requirements to graduate with resourceful competency. The content clarifies in details about the Graduation Project in terms of its two (2) phases i.e. GP I & GP II, definition, aim, objectives, pre-requisites to register the course, ABET criteria for Students' Outcomes (SO), project categories, level & scope, list of roles & responsibilities for students, supervisor, assessment panel and GP committees and coordinators; deliverables, details of the courses like course registration, details of project weekly schedules, assessment & grading related information like details of Course Learning Outcomes (CLO), detailed measurement guidelines assisting assessment, GP-related forms, and related sample in appendices.

Following part is on how to prepare the final submission of the report, which includes page margins, formatting its content like citation and referencing styles, footnotes or endnotes, tables and appendices, bibliography/reference, plagiarism issue, and other standard academic practice applied elsewhere in general.

It is hoped that this manual will be beneficial reference to ease the graduating year students in successfully accomplishing their Graduating Project proposal and final report at international standard typically implemented at university level worldwide.

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CHAPTER 1: INTRODUCTION

Welcome to the Graduation Project Handbook. This handbook allows students to refer and give them a glimpse of the entire Graduation Project (GP) process since commencing towards completion. It is a graduating requirement for every student to conduct a project-mode course in the final academic year in order to successfully obtain the award of a Bachelor's degree offered at the Department of Civil Engineering, Faculty of Engineering, Najran University, Kingdom of Saudi Arabia.

GP is implemented in divisions of two semesters - 491CE-2 & 492CE-2 typically called GP I and GP II:

- i.491CE-2 (GP I): 2 (two) credit hours where student must prepare a feasible project proposal
- ii.492CE-2 (GP II): 2 (two) credit hours where the proposal is applied and in the end, a final report have to be submitted to the department on the announced datelines. Both proposal and report should be in accordance with the guidelines provided by the Najran University (the University).

These supplementary guidelines are prepared as the reference by all involved parties i.e. the students, supervisors, examiners and GP Committee in order to efficiently standardize the implementation of GP.

1.1 GP Definition

GP is an abbreviation given to Graduation Project (in full). It is a practical training and exposure to engineering research undertaken by every student semi-autonomously. He has to demonstrate the skills to systematically manage it due to the challenging transition the adolescence-adulthood era which is special to sprout freedom of creative thinking into exercising a real work with an adult's commitment. Since the exposure is at tender adulthood, the practical project will be under the supervision of the academicians throughout the two semesters allocated for GP. The project will focus on a particular topic of student's choice in the field of engineering knowledge, using certain selected principles and related concepts in applying suitable techniques on the project as an official establishment to deal with more complex engineering problems in the future working life.

1.2 GP Aim

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The aim of GP is to train students to be able to apply theoretical knowledge gained throughout the previous years in the classes on a practical research project of their choice in order to acquire useful skills and experience during the learning process with the hope to produce skilled and competent engineering graduates.

1.3 GP Objectives

The objectives set for students undertaking the GP are:

- To independently work on students' initiative.
- To enthusiastically explore one or more areas of their program in depth.
- To thoroughly gather and manage information in a scientifically rigorous method.
- To competently process and integrate materials in a sustained exercise of intellectual ordering.
- To skillfully produce coherent, literate official documents.
- To constructively appreciate and incessantly involved in life-long learning.
- To initiate students their path of success in the future industrial careers.
- To design component or system in civil engineering discipline
- To consider sustainability, environmental, issues and determine optimum solution and design.

These objectives are relevant to the required criteria for the assessment of the final report (Refer Chapter 3).

1.4 Pre-requisite(s)

The Student should complete and pass at least 90 credit hours from the civil engineering program prior register GP. In addition, the department council could add any special requirement for certain projects.

1.5 Students Outcomes (SOs): ABET Criteria

Upon completing GP, student should acquire the Course learning outcomes which support all the student outcomes/ Program outcomes of civil engineering program known as a to k. A list of civil engineering student outcomes are listed below.

1. Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. 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. Communicate effectively with a range of audiences.
4. 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. Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. Acquire and apply new knowledge as needed, using appropriate learning strategies.

1.6 Project Categories

Graduation Project 491CE-2 and 492CE-2 should include design experience in one or more areas in civil engineering. Also, GP may be from either one or a combination of the following categories of projects:

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8. **Research:** Research on a specific topic in the field of Civil Engineering. Students are required to use theory, collect data, design, analyze and discuss the results obtained.
9. **Case Study:** Specialized engineering studies, in which students are required to identify and solve problems, analyze data and recommend solutions to problems in the form of a framework and an action plan.
10. **Industrial Study:** Conduct relevant studies on a currently needed attention issue/matter either in research and industrial problems that can be explored to improve existing processes or systems.
11. **Software/Database Development:** The development of computer literacy programming, innovative improvements on software, and the production of models, designs, systems, etc. in accord to engineering disciplines.

1.6 Level and Scope

GP is meant for application and practical learning of the previously gained theoretical learning for students to get adequate exposure and imagination of the real design and research work. GP may embark on either a novel design, study or an extension idea from past research(es) without exhaustive analytical details as long as the students are capable of conducting an independent investigation as well as to critically evaluate the work while acquiring self-competency in carrying out the project.

However, if the idea found identical to any completed project either ever recorded in the Department or at other tertiary learning institutions, it will be nullified for assessment. In general, the scope of the project should be continuously consistent and specifically relevant to the field of Civil Engineering and reach a satisfactory level of a Bachelor's degree. Students also need to efficiently manage the time allocated to GP, which is 30 contact hours per semester for both GP I and GP II.

To meet the requirements of the level and scope of GP, several criteria should be followed:

- The research must be a feasible work for the allocation of 15 weeks for each semester (GP I and GP II).
- Each project must include reasonable and adequate objectives to be achieved.
- Each project must be carried out in accordance to/within the university adequacy of its required equipment to conduct the study.
- The length and size of the final report should be enough and suitable to cover and report all activities conducted through the project. Also, the report should include the necessary supporting information as appendices.

1.7 Roles and Responsibilities

The success of GP implementation is determined by the quality of the enthusiasm, commitment and cooperation from all parties involved towards their roles and responsibilities.

1.7.1 Student

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In order to produce a GP that accomplishes the above conditions established, each student must perform the following responsibilities:

1. Register the GP I and GP II courses before the deadlines set by the University.
2. Choose your team member for the project – maximum is three members in a team.
3. Oblige to the GP work schedule set by the Department.
4. Choose a supervisor and propose a GP title along with a summary before the deadlines set by the Faculty.
5. Verify the originality of the GP work you proposed (either a novel work or an extension of a previously conducted research).
6. Meet the supervisor frequently to discuss anything arises about your GP.
7. Update your activities in the logbook. Bring it along when you meet the supervisor.
8. Systematically plan and manage the project to complete within the allocated time for the project.
9. Get ready to submit all items of assessment on time as incorporated into the Gantt chart timeline in accord with standard format.
10. Avoid anything considered as or related to plagiarism.
11. Present about your GP work at both GP I and GP II seminars.
12. Submit three (3) hard-bound copies of the GP final report.
13. Let your supervisor to certify all items of assessment and hard-bound copies of the final report.

1.7.2 Supervisor

A supervisor serves as a facilitator, mentor, observer and evaluator to the student under his supervision. The supervisees need constant monitoring, guidance, and evaluation. The roles and responsibilities of the supervisor include the following:

1. Have a carefree discussion about the GP title with the supervisee.
2. Approve the proposed title and summary of the GP that he will conduct.
3. Offer guidance and advise to the supervisee on conducting the GP research.
4. Maintain the level of supervisee's GP research within bachelor degree level as long as it does not overdo that level and scope of GP stipulated by the Department.
5. Certify the student's logbook and record their attendance of consultation visits.
6. Check and approve the supervisee's project proposal, draft of final report and hard-bound final report.
7. Endorse (if appropriate) GP forms submitted by the supervisee.
8. Evaluate the logbook, project proposal, and draft of final report reasonably and without any prejudice or bias.
9. Key-in the supervisee's marks into the CLOSO system before the dateline set by the Department.
10. Prepare a justification report if the supervisee has failed his GP.

1.7.3 Assessment Panel

The assessment panel comprises of three academicians other than the supervisor, which are appointed by the Department. The main function of the panel is to evaluate the items of assessment produced by the student. The roles and responsibilities of the assessment panel include the following:

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1. Fairly evaluate the student's project proposal, draft of final report and oral presentation without any prejudice or bias.
2. Attend the GP seminar sessions that involve students assessed by the panel.
3. Share opinions and/or constructive criticism pertaining to the student's GP work.
4. Submit the student's marks to the department before the dateline set by the department.

1.7.4 GP Committee

The roles and responsibilities of the GP Committee include the following:

1. Prepare the activities for GP I and GP II planner calendar.
2. Effectively disseminate information related to the implementation of GP to all parties involved respectively.
3. Allocate all supervisors with a fair quota of GP supervisees.
4. Plan and conduct methodology seminars for GP students.
5. Manage the receiving end of project proposals, drafts of final report from students, and distribute them to the assessment panels.
6. Arrange properly the list of students who will queue to present at both GP I and GP II seminars.
7. Propose and approve names of academicians to be appointed as members of the assessment panels and prepare presentation schedules for the GP I and GP II seminars.
8. Organize and manage the GP I and GP II seminars, including the GP awards ceremony.
9. Ensure that the assessment of GP students is conducted according to the timeframe set by the Department and is managed systematically.
10. Key-in the distributed to parts of certain assessments and the final total into the University's student assessment system (CLOSO).
11. Analyze the overall performance of GP students at the end of each semester, identify problematic students and suggest suitable solutions.
12. Observe and cooperate the implementation of GP within the Faculty to establish its accomplishment by continuously improving the quality of delivery.

1.8 Deliverables

Continuous monitoring and evaluation are crucial in the implementation of GP. To facilitate this process, students are required to provide the following deliverables:

1.8.1 Logbook

The logbook is the Student's record of accomplished work during the GP. The supervisee should show the logbook to the supervisor every time he meets the supervisor, who will certify the records he made.

These records include:

- Title, objectives, scope and work plan.
- Important dates related to the implementation and evaluation of the project.
- Dates of meetings with the supervisor, and outcomes of the meetings such as discussions, advice and instructions.

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- Preparations, problems that have arisen, proposed solutions and equipment that is needed.
- Raw data and/or results achieved to date.
- Sketching of all relevant diagrams.

1.8.2 Project Reports

During the course of GP, the student must provide two types of project reports in English language, which is the project proposal for GP I and the final report for GP II (refer to Chapter 4).

The student must prepare three (3) hard-bound copies of the final report. All hard-bound copies of the final report must comply with the University's report writing guidelines and must be endorsed by the supervisor. If any student failed to submit the hard-bound final report before the deadline assigned by the Department, he will be graded "F" (FAIL) for his entire GP.

CHAPTER 2: PROJECT SCHEDULE

2.1 Overview

In general the whole project comprises of two parts, namely Graduation Project I (GP I) and Graduation Project II (GP II), which are to be completed by the Year 4 students in their first and second semesters.

The students are expected to discuss project topics and scope of work with their respective supervisors before starting their work. Their supervisors are open for students' selection after the supervisors agreed together with the approval from the GP coordinator.

2.2 Graduation Project I (491CE-2)

GP I is concerned with developing the problem specification and design. The progress on these activities will be monitored through regular weekly meetings with your supervisor. By the second week of the semester, students must have a short, written description of the project. Then, for the next 13 weeks, a complete and precise problem statement needs to be developed, followed by the formal design of an experimental system that solves this problem. In addition, students must also prepare an implementation plan that will guide their activities in GP II, and build a working prototype that demonstrates the functionality of the students proposed work / software.

2.2.1 GP I Course Description

The graduation project is a culminating handy course work for which the students are expected to integrate and apply what they have learned through previous academic work and field experiences, with faculty supervision. These projects may be "new," continuation of work done in previous courses; or may be projects started in a previous course that become significantly expanded and enhanced for the thesis. It has two phases-to be taken in consecutive two semesters at senior level.

At the beginning of the semester, the students propose a topic on which they are supposed to work as a group. Project students meet in class weekly, discuss their research, and screen their progresses for peer and faculty critique and suggestions. At the end of the semester, students present their thesis projects to the supervising committee.

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2.3 Graduation Project II (492CE-2)

GP II concerns with experiment or system implementation phase as well as the focus on the contribution of the research from the tentative project. Students' tasks are to realize the completed work in Phase GP I into its application of the working system that meets all specifications.

Students will again weekly meet their supervisors respectively to update about recent activities of the project in its detailed progress. Students have 14 weeks to accomplish the implementation of the previous approved proposal. In Week 15, the students are required to submit the final report and present the results and demonstrate the completed system or implementation in front of the supervisors, coordinators, examiners and fellow students.

2.3.1 GP II Course Description

This is the second phase of the capstone project, which, consists of two courses Graduation Project I and Graduation Project II. During this phase, students are expected to implement the proposed project as outlined in the report produced at the end of Graduation Project I. Each group of students is required to prepare a detailed report together with a poster, and get ready to present the completed formally for another evaluation on their engineering design including verbal and communication skills.

2.4 Course Learning Outcomes (CLOs) of GP I and GP II

The graduation project committee proposed a new CLOs for graduation project I (491CE-2) and graduation project II (492CE-2). Civil engineering program council approved the new CLOs, new assessment plan, revised mapping of CLOs and SOs. The new plan will be implemented in semester 1 2016-2017. Tables 1 and 2 presented the new CLOs for 491CE-2 and 492CE-2 respectively.

Table 1: CLOs for Graduation Project I (491CE-2)

Course Learning Outcomes	Code
Ability to collect data and information required to complete the project from Library and Internet resources.	CLO1
Ability to describe the economic and environmental impact and contemporary issues of the project and various alternative solutions.	CLO2
Ability to plan and design a system, component or process with defined constraints of the project and to uses modern techniques , tools, methods needed in engineering practice.	CLO3
Ability to plan, design and conduct the laboratory or numerical experiments required for the project and to analyze and interpret the data.	CLO4
Ability to identify, formulate and solve the analytical and numerical problems associated with the project.	CLO5

Table 2. CLOs for Graduation Project II (492CE-2).

Course Learning Outcomes	Code
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Ability to identify the codes, design procedures and local laws regulating various aspects of the project.	CLO1
Ability to apply the codes in the design aspects.	CLO2
Conduct required tests, analyze, and interpret data for the design.	CLO3
Ability to function as a member of a multi-disciplinary team.	CLO4
Ability to identify and analyze a situation involving professional ethics and to make a decision.	CLO5
Ability to prepare an engineering report of the project and present it demonstrating engineering communication skills.	CLO6

2.5 CLO-SO Matrix Mapping of GP I and GP II

Mapping the CLOs of the graduation project 491CE-1 and 492CE-2 with SOs is shown in Table 3 and 4 respectively.

Table 3. Mapping of Graduation Project 1 CLOs with SOs.

7	6	5	4	3	2	1	CLO ID
1	0	0	0	0	0	0	CLO1
0	0	0	0	0	0	1	CLO2
0	0	0	0	0	1	0	CLO3
0	1	0	0	0	0	0	CLO4
0	0	0	0	0	0	1	CLO5

Table 4: Mapping of Graduation Project 2 CLOs with SOs

7	6	5	4	3	2	1	CLO ID
1	0	0	0	0	0	0	CLO1
0	0	0	0	0	1	0	CLO2
0	6	0	0	0	0	0	CLO3
0	0	1	0	0	0	0	CLO4
0	0	0	1	0	0	0	CLO5

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0	0	0	0	1	0	0	CLO6
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2.6. Significant Activities for GP

2.6.1 Significant Activities for GP I

Following are the important tentative weekly schedules for GP I.

- **Week 1**
 - Students choose team member for the project – maximum is three members in a team.
 - Students view the list of available GP titles and information.
 - Students select the GP titles and approach respective supervisor.
- **Week 2**
 - Supervisor approves student(s) to commence project.
 - Students submit the GP Title Application Form to the Department office.
 - Students must attend GP briefing.
- **Week 1 - 12**
 - Students progressively fulfill GP activities e.g. from literature review to planning, analysis and design, interim report, etc.
 - Students regularly meet their supervisors at least once a week.
 - A meeting log must be completed by each student for each meeting.
- **Week 13**
 - Students submit the Interim Report and students must assure that their report precisely complies with all the formatting requirements (e.g. layout, font size, references, etc).
 - The GP Committee announces the list of queue for the presentation of project.
 - Students are informed about the presentation time slot and get it well-rehearsed with their supervisors.
- **Week 14 - 15**
 - Project presentation and demonstration of the prototype or research work.

2.6.2 Significant Activities for GP II

Following are the important tentative weekly schedules for GP II.

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- **Week 1**
 - Students re-confirm the previous registration for GP II subject.
- **Week 1 - 12**
 - Students commence GP activities e.g. coding, testing, implementation, core results/findings of the project, final report and etc.
 - Students regularly meet their supervisors at least once a week.
 - A meeting log must be completed by each student for each meeting.
- **Week 13**
 - Students submit the final report (for evaluation) and make sure your report precisely complies with all the formatting requirements (e.g. layout, font size, references, etc).
 - The GP Committee announces the list of queue for the presentation of project.
 - Students are informed about the presentation time slot and get it well-rehearsed with their supervisors.
- **Week 13 - 14**
 - Project presentation and demonstration of the prototype or research works.
- **Week 15**
 - Submit the three (3) copies of the hard bound final report.

CHAPTER 3: GRADING AND ASSESSMENT

3.1 Assessment of Graduation Project

The Graduation Project (GP) assessment is based on the Student's accomplishment and capability to prepare a project proposal, project report, materials and poster for presentation, oral presentation during the seminars and effective use of the logbook. Assessment is done by the supervisor and assessment panel separately and discretely. The distribution of marks for the two components above is:

- Assessment Panel : 50% (used as final exam)
- Supervisor : 50% (used as course work)

The Graduation Project marks justification is shown in Table 5. The graduation project grading form process is provided in the graduation project guideline and all the forms could be downloaded from the department website. In addition, a brief explanation of the assessment procedures and marks allocation is presented below. The data will be used for input to the Graduation Project template of CLOSO software. CLOSO will calculate the final grade and the satisfaction of each CLO and SO.

Table 5. GP Marks Justification

Marks						Project
Graduation Project II (492CE-2)			Graduation Project I (491CE-2)			Examiners
Total	Final Report Draft	Logbook	Total	Project Report	Logbook	Supervisor
50	20	30	50	20	30	

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Total	Final Report Draft	Presentation and Poster	Total	Project Report	Presentation	Assessment Panel
50	27	23	50	27	23	
100	Total		100	Total		

For each of the two semesters of Graduation Project, the project supervisor submits the assessment data using excel spreadsheet. The project supervisor needs just to enter the marks obtained by the students in the project group for each task. Tables 6 through 13 show the list of criteria for the Graduation Project 1 and 2. It also shows the relative weight of each criterion and the CLO it belongs to.

.....فصل أعمدة.....Table 6. **Supervisor Assessment for Logbook** of Graduation Project I and II.

Logbook Assessment (30 Marks)				
Weight	CLO		Criteria	No.
	Project 2	Project 1		
3	CO4	CO1	Regularity and attendance	L1
2	CO3	CO2	Attitude and Ability to conduct project and team work	L2
3	CO4	CO1	Weekly activities	L3
2	CO1	CO1	Project planning, implementation chart and budgeting	L4
3	CO1	CO1	Contents	L5
2	CO6	CO1	Organization	L6
2	CO6	CO5	Use tools and software	L7
3	CO6	CO4	Testing and methodology	L8
3	CO2	CO3	Design elements and component	L9
2	CO5	CO2	Ethics	L10
2	CO6	CO1	Completeness and Accuracy	L11
3	CO5	CO2	Independence and self-learning	L12
30	Total			

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Table 7. **Supervisor Assessment for Report** of Graduation Project I and II

Report Assessment (20 Marks)				
Weight	CLO		Criteria	No.
	Project 2	Project 1		
2	CO3	CO5	Style and Format	R1
2	CO4	CO5	Language (Spelling, Wording, Grammar)	R2
3	CO6	CO1	Information Literacy	R3
1	CO6	CO1	Citations	R4
2	CO6	CO1	Organization	R5
3	CO1	CO1	Contents and Creativity	R6
2	CO6	CO4	Testing, methodology and use of tools and software	R7
3	CO6	CO4	Design elements and component	R8
1	CO5	CO2	Ethics	R9
1	CO6	CO1	Completeness and Accuracy	R10
20	Total			

Table 8: **Examination Panel Assessment for Presentation** of Graduation Project I and II.

Presentation Assessment (23 Marks)				
Weight	CLO		Criteria	No.
	Project 2	Project 1		
1	CO1	CO1	Communication: Nonverbal Skills	P1
2	CO4	CO1	Communication: Grammar	P2
2	CO6	CO1	Time dedicated to project work	P3
1	CO4	CO2	Professional Attire	P4
2	CO5	CO5	Visual Aids	P5
3	CO1	CO1	Content: Main Idea	P6
3	CO6	CO1	Content: Organization	P7
3	CO2	CO3	Content: Support	P8
2	CO3	CO4	Self-Reflection	P9
4	CO6	CO2	Responses to Questions	P10

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23	Total
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Table 9. Examination Panel Assessment for Report of Graduation Project I and II.

Report Assessment (27 Marks)				
Weight	CLO		Criteria	No.
	Project 2	Project 1		
2	CO3	CO5	Style and Format	R1
3	CO4	CO5	Language (Spelling, Wording, Grammar)	R2
3	CO6	CO1	Information Literacy	R3
1	CO6	CO1	Citations	R4
2	CO6	CO1	Organization	R5
4	CO1	CO1	Contents and Creativity	R6
3	CO6	CO4	Testing, methodology and use of tools and software	R7
5	CO6	CO4	Design elements and component	R8
2	CO5	CO2	Ethics	R9
2	CO6	CO1	Completeness and Accuracy	R10
27	Total			

Rubric for Graduation Project Assessment

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The Graduation Project Assessment done by the supervisor and examination panel as described in the above table can be assessed through different criteria. The supervisor tries to follow a guideline in the marking of these criteria according to the description rubrics are given below in different assessment methods like the logbook, presentation, and project report. Rubrics for assessment of graduation project 1 and 2 are given in Table 10 through Table 13.