



وزارة التعليم
Ministry of Education



جامعة المستقبل
Mustaqbal University
أول جامعة أهلية بمنطقة القصيم

College of Engineering and Computer Science

Graduation Design Project (GDP)
Course Manual

2022

MUSTAQBAL UNIVERSITY
COLLEGE OF ENGINEERING AND COMPUTER SCIENCE

Graduation Design Project (GDP) (Course Manual), 2022

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1 College Vision

A nationally distinguished college in education and community partnership in the fields of engineering and computer science.

2 College Mission

Providing distinguished education and enhancing the skill side in the fields of engineering and computer science, to prepare qualified graduates with skills and knowledge and to ensure their equipment to meet the changing demands of the labor market and society, through the development of technologies and innovation.

3 College Objectives

1. Providing distinguished education that contributes to achieving economic development and meets the requirements of the public and private sectors.
2. Preparing distinguished graduates in terms of knowledge and skill in the fields of engineering and computer science who are able to successfully engage in various fields of work.
3. Preparing graduates capable of developing their skills and pursuing higher education.
4. Preparing graduates capable of serving the community and meeting its needs.
5. Preparing graduates capable of leadership in various areas of professional life.

4 Academic Program

4.1 Computer Engineering Program

Vision

To become a national leader in providing high quality education in the area of computer engineering and computer network.

Mission

To excel in embracing knowledge and continuing education; to be recognized as a program that offers one of the best programs in computer engineering and computer network; to provide an environment in which students are given the essential resources to address and solve real-world problems; and to promote active learning, critical thinking, and engineering judgment. In addition, offering internship, co-op and continuing education programs that produce graduates for the highest paid jobs.

Program Educational Objectives (PEOs)

1. Demonstrate success in the professional practice of computer and network engineering by interacting with members of professional teams in industry, government, and other organizations.
2. Keep students' professional knowledge updated through continuously learning new concepts and identifying the new directions in areas of computer engineering and network engineering.
3. Have good manners in their professional environment and develop skills to enhance the state of their practice in a dynamic professional environment.

4.2 Computer science Program

Vision

To become a national leader in providing high-quality education in the area of computer science and software engineering.

Mission

The department seeks to provide quality undergraduate education in both the theoretical and applied foundations of computer science and software engineering. It also seeks to train students to effectively apply this education to solve real-world problems, thus amplifying their potential for lifelong high-quality careers.

Program Educational Objectives (PEOs)

1. Prepare students to be accepted for an entry-level job in high reputed worldwide organizations, immediately after completing the degree.
2. Qualify students to critically analyze and apply a range of concepts, principles, and practices in computing, software engineering and information management.
3. Equip students with the skills to work as individuals with minimum guidance and as leaders or members of a team.
4. Encourage students to follow appropriate practices within a professional, legal, and ethical framework.
5. Provide students with the knowledge to recognize the need for and be capable of pursuing Life-long learning.
6. Make student to pursue graduate studies to successfully complete an advance degree.

4.3 Electronics and Communication Engineering Program

Vision

To become a national leader in providing high-quality education in the area of electronics and communication engineering.

Mission

The department seeks to be recognized internationally as an accredited pioneering program in electronics and communication engineering. It also seeks to provide an environment in which students are given the essential resources to address and solve real-world problems and to promote active learning, critical thinking, and engineering judgment.

Program Educational Objectives (PEOs)

1. Provide graduates with the knowledge and skills required for a successful engineering career.
2. Emphasize professional engineering principles.
3. Encourage students to participate in establishing knowledge-based society in the Kingdom.

4.4 Industrial Engineering Program

Vision

Excellence in providing knowledge and skills in industrial engineering that transform students into well-qualified and efficient industrial engineers who contribute to the welfare of society by providing innovative production systems, products and services.

Mission

To provide a high-quality, up-to-date, and internationally recognized educational program in Industrial Engineering to graduate an industrial engineer equipped with the scientific and technological foundations, techniques and skills necessary to pursue careers in a variety of industrial engineering institutions, as well as those who are ready to meet the growing challenge of designing, promoting and implementing industrial engineering solutions in The industry underwent rapid change.

Program Educational Objectives (PEOs)

1. Provide excellent teaching and adequate education environment with state-of-the-art knowledge and technology related to Industrial Engineering.
2. Contribute towards developments of the knowledge in Saudi Arabia and excellence in the education system in general.
3. Encourage the faculty to conduct good research activities for developing the IE knowledge and sciences.
4. Have strong cooperation with local industry and provide services to the local society.

5 Introduction

The graduation design project provides an integrated assessment of the students toward the desired engineering and computer science competencies. The graduation design project is the first step to transfer the students from the academic community to the industrial environment. The main target of the graduation design project is to improve the student's technical skills, and communication skills by integrating writing, presentation, and teamwork opportunities. The graduation design project is comprehensive and focuses on professional practice and includes a variety of non-technical issues such as professional and ethical responsibility, safety, reliability, and social impacts.

The Graduation Design Project in the College of Engineering and computer science consists of two consecutive phases. Phase one is graduation project I (XX 498) and phase two, is graduation project II (XX 499).

The Graduation Design Project courses are used to assess the eleven ABET outcomes consisting of the ability to: apply previous knowledge, design and conduct experiments, design a system, function on multi-disciplinary teams, identify, formulate, and solve engineering and software problems, adhere to professional and ethical responsibilities, communicate, understand the global and local impact of engineering and software solutions on society, engage in lifelong learning, have knowledge of contemporary issues, and use modern engineering and software tools for practice. Students' abilities in these outcomes are measured using outcome-specific project-related lectures and assignments given throughout the semesters.

6 Graduation Design Project Objectives

The objectives of the Graduation Design Project are:

- To use the skills acquired in the other courses to solve real engineering and software problems.
- To enhance the creativity of the students in analyzing and solving engineering software Problems.
- To create an environment to promote cross-disciplinary learning and a team approach to problem-solving.
- To develop the ability of self-learning.
- To prepare students to be successful in their industrial careers.

7 Graduation Design project course

The GDP is planned to be completed by the end of the semester and divided into two courses: course: XX498 and XX499.

7.1 XX498 course

The student should take a B.Sc. project in a related area to his specialization and with technical merit. This project is for two semesters; it is counted as three credits for the first semester. At the end of the semester, the student submits a report describing his projects and the parts he completed in the first semester and proposed parts in the 2nd semester. The projects are oriented toward providing experience in the establishment of objectives, criteria, synthesis, analysis, construction, testing, and evaluation; solution of open-ended problems; design methodology.

XX498 Outcomes

By the end of this course, the students are expected to be able to:

- Define and formulate engineering problem and software system problem definitions
- Work, interact, cooperate and coordinate as a team.
- Acquire oral and written communication skills.
- Apply theoretical knowledge gained into practical use beginning from the problem description and proceeding through various design phases to end up with a practical solution.
- Deliver presentations that are effective.

Table 1 shows credit hours requirement for all programs to include the GDP XX498 in student schedule.

Table 1: Credit Hours requirement for include XX498 course in student schedule.

Program	Finishing credit Hours
CE (Computer Engineering)	129
CE (Network Engineering)	129
CS (Computer science)	90
CS (Software Engineering)	117
ECE	129
IE	129

7.2 XX499 course

The student should take a B.Sc. project in a related area to his specialization and with technical merit. This project is for two semesters; it is counted as three credits for each semester. At the end of the semester, the student submits a report describing his projects and the parts he completed during the semester. The projects are oriented toward providing

experience in the establishment of objectives, criteria, synthesis, analysis, construction, testing, and evaluation; solution of open-ended problems; design methodology.

Prerequisite: XX 498.

XX499 Outcomes

By the end of this course, the students are expected to be able to:

- Identify problems and comprehend the idea of practical research in architecture.
- Apply engineering and computer science methods and ideas to solve a practical issue.
- Demonstrate in-depth understanding of the subject matter of the project they are working on, solve Issues utilizing their knowledge and abilities, and put solutions into practice and test them.
- Utilizing appropriate research methodologies and techniques in different situations
- Identify potential solutions for the project problem, see patterns and modularize the,
- Problem recognize hidden meanings and identify components, and show proficiency in engineering and Software systems principles.
- Work, interact, cooperate and coordinate as a team.
- Deliver presentations that are effective.

8 Phases of Graduation Design Project

There are seven primary phases to GDP implementation which are as follows:

1. Planning and organizing GDP
2. Having completed stage 1 of the GDP, Course XX498.
3. Assessment of stage 1 of the GDP according to the evaluation strategy.
4. Monitoring progress and follow-up on the GDP.
5. Execution of stage 2 of the GDP, Course XX499
6. Assessment of stage 2 of the GDP according to the evaluation strategy.
7. Students Responsibilities

Phase 1: Planning and organizing the GDP's activities.

A GDP Committee (GDPC) must be established by each department through the department council and under the supervision of the department head (HOD). The phase 1 has to be completed in one semester.

The phase 1 procedures are summary as follow:

1. The GDPC must invite the department/program faculty members to submit their proposals for the new GDP by the end of the sixth week of the semester before the GDP semester.
2. The GDPC must gather the GDP proposals by the tenth week of the semester before the GDP semester. It is the duty of the faculty member to present his idea(s) to the GDPC. It is advised that each GDP proposal have the following items:
 - (a) Title of GDP
 - (b) Brief Description
 - (c) GDP-supervisor(s)
 - (d) Recommended number of students
 - (e) specific objectives of GDP
 - (f) Each student's program or task (option)
 - (g) The specifications, if any, such as prerequisites, optional courses, and a certain GPA for each program.
3. Timetable for each track (option).

4. Each proposed GDP student must read the committee announcement (discussed in the preceding activity) and set/arrange his goals for the project ideas that would be appropriate for his skills before submitting them to the GDPC. The GDPC is in the responsibility of selecting teams of three to four students for each GDP.
5. Following that and before the last test week of the semester before the GDP semester, the GDPC is required to publish the final list of the students who have submitted Nominations for the GDP using the GDP-1 form.
6. After the student project assignment, the remaining project ideas may be prepared for the next semesters.

Phase 2: Having completed stage 1 of the GDP, Course XX498

A. First GDP Implementation Semester Meeting

The initial meeting between each student team and the supervisor(s) may happen during the first week of the GDP implementation semester, but no later.

Initial meeting activities:

1. The supervisor(s) must inform their students about the GDP objectives and outline, the GDP phases, the followup policy, the grading system, the urgent case form, the creation of the documentations, the final report, the presentation, etc.
2. The supervisor(s) must go through with their students the timetable for their GDP.
3. The supervisor(s) must assist the students in creating and signing the tasks sheet as shown on the GDP-02 form.
4. The role(s) of the team reporter must be prepared by the students for the rest of the semester.

B. GDP holds regular progress meetings

During the GDP implementation semester,

1. Students are required to meet with their supervisor(s) weekly and to report this meeting and their duties assigned using the form GDP-3, the form is to be kept in the GDP portfolio and given to the Supervisor(s).
2. The supervisor(s) must monitor students' performance as it is assessed using the GDP-3-2 form (attendance, punctuality, team effectiveness, and performing tasks on time, . . .)
3. According to the directives of the supervisor(s), additional meetings may be held at any time during the week.

C. End of GDP Stage I, XX 498

It is intended that the GDP team achieves the GDP target at the end of this stage, XX 498.

Objectives:

1. Identification and framing of the problem.
2. Literature review.
3. Innovative vision and the creation of solutions.
4. Preliminary or conceptual design of the GDP within practical parameters.
5. Appropriate final report format.

Phase 3: Assessment of stage I of the GDP 1 based on the evaluation strategy

A. Exam Process

This phase is applied during the GDP implementing semester.

1. The GDPC is required to notify, by the end of the 14th week of the GDP implementation semester, the assignments of the exam committees for the active GDPs and the scheduling of the final presentations in accordance with the academic calendar.
2. Each team must submit three draft copies of the final GDP report to the supervisor on a specific day. The supervisor(s) must provide copies to the Graduation Design Project Examiners (GDPE) for review and evaluation.
3. The supervisor(s) must attend and are required to collect the evaluation forms reports from GDPEs, such as GDP-4-1 and GDP-4-2, and calculate the average marks.
4. GDPE must attend the presentation on the scheduled day and complete Form GDP-4-2 to evaluate the presentation.
5. Complete the final form (GDP-4-3) for each student
6. Evaluation and report the final grade to the HOD and Students Affairs Office. The student is responsible for incorporating all of the examiners' suggestions and Revisions into the final GDP report that is issued after the presentation. They must provide their principal supervisor with three final copies (s). All requirements for the final report must be met, as well as the corresponding checklist. To ensure that all Changes, suggestions, etc. were considered, the principal supervisor(s) must sign the final copy. To be included in the library department, the copies must be Given to the head of the department.

B. Evaluation Strategy

The evaluation of each student will be based on two criteria:

- Individual evaluation: Each student will be evaluated, individually, based on his semester work and his oral presentation.
- Entire team evaluation will be based on the written report, design approach, and the GDP product, as well as the overall presentation materials as shown in Figure 1.

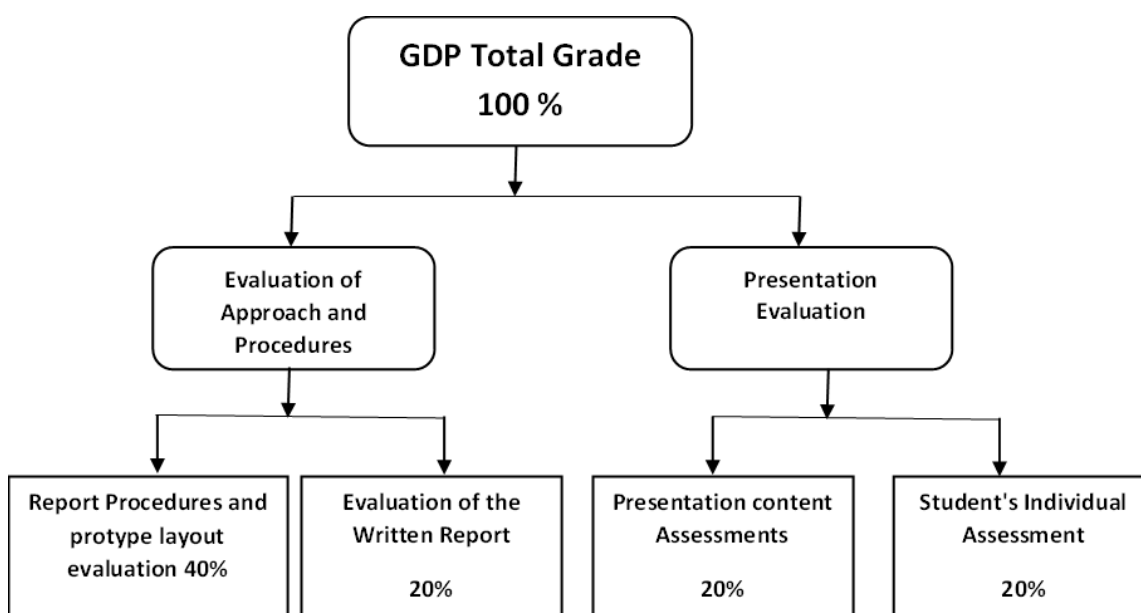


Figure 1: Students' Evaluation Strategy for the GDP 1.

Phase 4: Monitoring progress and follow-up on the GDP

The GDP supervisors must carry out a comprehensive evaluation of the GDP at this stage, considering all of its intended goals, completed tasks, and pending tasks and activities. Re-plan the tasks and activities for the GDP 2 (Course XX 499).

Phase 5: Execution of the GDP 2, Course XX499

A. GDP 2 Implementing Semester

The first meeting between each student-team and the supervisor(s) may be held on or before the first week of the GDP 2 implementing semester. The following activities must be held during this meeting:

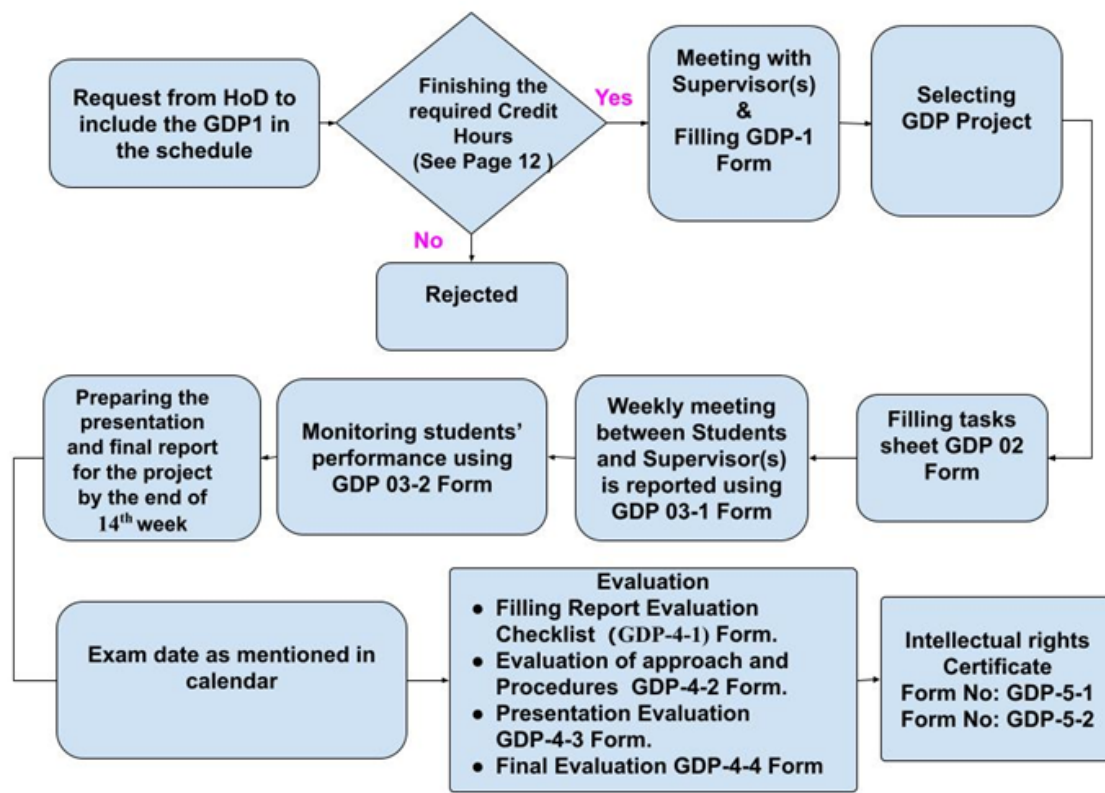


Figure 2: Flowchart to illustrate GDP Stage I, XX 498.

1. The supervisor(s) should discuss the GDP2 objectives. They should also go over the GDP 2.stages, the follow-up policy, the grading system, the urgent case form, the production of the documentations, the final report, time plan, and the presentation.
2. The supervisor(s) must assist the students in creating and signing the task sheet, which should follow the GDP-3-2 form.

B. Regular Progress Meetings of the GDP 2

During the GDP semester, students are required to meet with their supervisor(s) on a weekly basis and to report this meeting and their duties assigned using the Form GDP-3-1.

C. End of GDP 2 Stage II, XX 499

At the conclusion of this stage II, XX 499, it is anticipated that the GDP 2 team will have accomplished the GDP 2 planned objectives and tasks:

1. The outcomes of the GDP's evaluation and verification.

2. The final GDP 2 product within the realistic parameters.
3. The final report of the GDP 2 in the appropriate format

Phase 6: Assessment of stage II of the GDP 2 according to the evaluation strategy

This phase is applied during the GDP implementing semester.

1. The GDPC is required to notify, by the end of the 14th week of the GDP 2 implementation semester, the assignments of the exam committees for the active GDPs and the scheduling of the final presentations in accordance with the academic calendar.
2. Each team must submit three draft copies of the final GDP 2 report to the supervisor on a specific day. The supervisor(s) must provide copies to the Graduation Design Project Examiners (GDPE) for review and evaluation.
3. The supervisor(s) must attend and are required to collect the evaluation forms reports from GDPEs, such as GDP-4-1 and GDP-4-2, and calculate the average marks.
4. GDPE must attend the presentation on the scheduled day and complete Form GDP-4-2 to evaluate the presentation.
5. Complete the final form (GDP-4-3) for each student
6. Evaluation and report the final grade to the HOD and Students Affairs Office. The student is responsible for incorporating all the examiners' suggestions and revisions into the final GDP report that is issued after the presentation. They must provide their principal supervisor with three final copies (s). All requirements for the final report must be met, as well as the corresponding checklist. To ensure that all changes, suggestions, etc. were considered, the principal supervisor(s) must sign the final copy. To be included in the library department, the copies must be given to the head of the department.
7. Create the final GDP poster that will be displayed at the College's yearly GDP 2 Symposium.

Evaluation Strategy

The evaluation of each student will be based on two criteria:

- Individual evaluation: Each student will be evaluated, individually, based on his semester work and his oral presentation.
- Entire team evaluation: will be based on the written report, design approach, and the GDP product, as well as the overall presentation materials. shown in Figure 3.

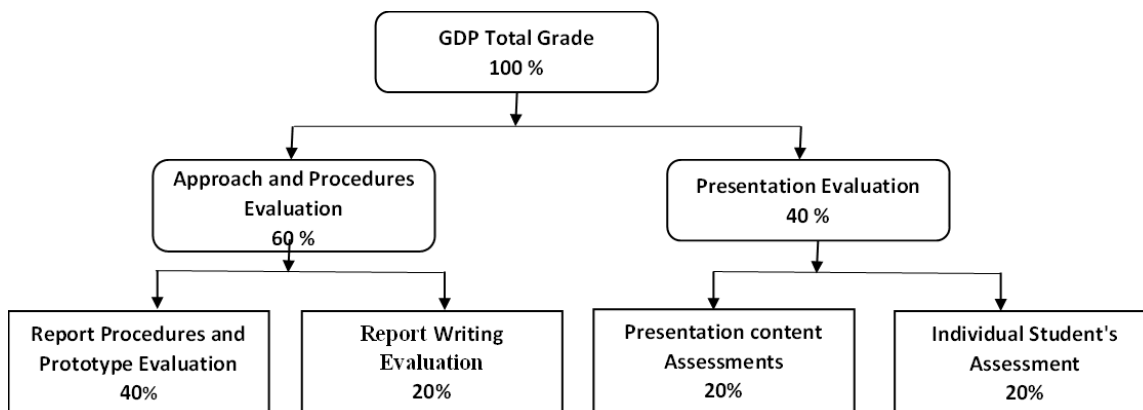


Figure 3: GDP Students' Evaluation Strategy for the GDP; Phase II.

Phase 7: Student's responsibilities

1. Knowing all the requirements and passing successfully the numbers of credit hours of the academic program (regulation of the academic program) and all rules of the Graduation Project Design, (student manual).
2. Student familiar with project concept and Proposal.
3. Knowing the project objectives, implementation, and outcomes.
4. Working in coordination and collaboration with the team members.
5. Preparing the presentation and final report for the project.
6. Correcting and taking the examiner's comments into consideration after the final presentation.
7. Submit three hard copies and one soft copy of the final report to the supervisor.

9 APPENDIX (A): GDP COURSES AND FORMS

XX 498: Graduation Design Project I

1. Course Name and code: Graduation Design Project I, XX 498
2. Credit hours : 3 hrs
3. Coordinator :
4. Specific course information

(a) Course- Description

The student should take a B.Sc. project in a related area to his specialization and with technical merit. This project is for two semesters, it is counted as three credits for the first semester. At the end of the semester, the student submits a report describing his projects and the parts he completed in the first semester and proposed parts in the 2nd semester. The projects are oriented toward providing experience in the establishment of objectives, criteria, synthesis, analysis, construction, testing, and evaluation; solution of open-ended problems; design methodology

5. Specific Objectives for the course

- (a) Course-Specific Outcomes By the end of this course, students are expected to be able to:
- i. Define and formulate engineering problem and software system problem definitions.
 - ii. Work, interact, cooperate and coordinate as a team.
 - iii. Acquire oral and written communication skills.
 - iv. Apply theoretical knowledge gained into practical use beginning with the problem description and proceed through various design phases to end up with a practical solution.
 - v. Deliver presentations that are effective.

(b) Outcomes for xx498 course

Table 2 shows the learning outcomes for the xx498 course.

Table 2: Learning outcomes for xx498 course

No.	Students Outcomes	None	To some extend	High
1	Ability to apply knowledge of engineering, and computing, appropriate to the discipline			
2	Ability to analyze a problem and identify the engineering and computing requirements appropriate for its solution			
3	Ability to design, implement and evaluate the projects to meet desired needs			
4	Ability to apply mathematical foundations, algorithmic principles, and engineering and computer science theory to the modeling and design of computer-based systems in a way that demonstrates comprehension of the trade-offs involved in projects in engineering and software			
5	Ability to apply design and development principles in the construction of engineering and software systems of varying complexity			
6	Ability to function effectively as a member of a team to accomplish a common goal			
7	Ability to communicate effectively with a range of audiences			
8	An understanding of professional, ethical, legal, security, and social issues and responsibilities			

XX 499: Graduation Design Project II

1. Course Name and code: Graduation Design Project II, XX 499
2. Credit hours : 3 hrs
3. Coordinator :
4. Specific course information

(a) Course Description The student should take a B.Sc. project in a related area to his specialization and with technical merit. This project is for two semesters, it is counted as three credits for the first semester. At the end of the semester, the student submits a report describing his projects and the parts he completed during the semester. The projects are oriented toward providing experience in the establishment of objectives, criteria, synthesis, analysis, construction, testing, and evaluation; solution of open-ended problems; design methodology. Prerequisite: XX 498.

5. Specific Objectives for the course

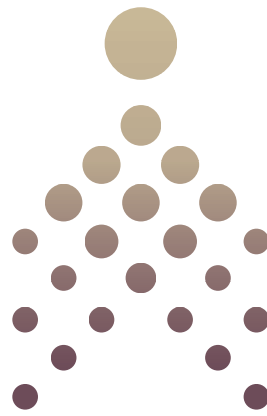
- (a) Course-Specific Outcomes By the end of this course, students are expected to be able to:
- i. Identify problems and comprehend the idea of practical research in architecture.
 - ii. Apply engineering and computer science methods and ideas to solve a practical issue. Demonstrate in-depth understanding of the subject matter of the project they are working on, solve Issues utilizing their knowledge and abilities, and put solutions into practice and test them.
 - iii. Utilizing appropriate research methodologies and techniques in different situations
 - iv. Identify potential solutions for the project problem, see patterns and modularize the problem recognize hidden meanings and identify components, and show proficiency in engineering and Software systems principles.
 - v. Work, interact, cooperate and coordinate as a team.
 - vi. Deliver presentations that are effective.

(b) Outcomes for xx499 course

Table 3 shows the learning outcomes for the xx499 course.

Table 3: Learning outcomes for xx499 course

No.	Students Outcomes	None	To some extend	High
1	Ability to apply knowledge of engineering, and computing, appropriate to the discipline			
2	Ability to analyze a problem and identify the engineering and computing requirements appropriate for its solution			
3	Ability to implement and evaluate the projects to meet desired needs			
4	Ability to apply mathematical foundations, algorithmic principles, and engineering and computer science theory to the modeling and implement of computer-based systems in a way that demonstrates comprehension of the trade-offs involved in projects in engineering and software			
5	Ability to apply design and development principles in the construction of engineering and software systems of varying complexity			
6	Ability to function effectively as a member of a team to accomplish a common goal			
7	Ability to communicate effectively with a range of audiences			
8	An understanding of professional, ethical, legal, security, and social issues and responsibilities			



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