



King Abdulaziz University

Faculty of Engineering - Rabigh

General Guidelines for Senior Design Project

2017-2018 (1438 – 1439 H)

Table of Contents

1. Overview	3
2. Senior Design Project Outcomes (ABET Criteria).....	3
3. Registration of a Senior Design Project	4
4. Senior Design Project Duration & Academic Level	4
5. Senior Design Project Coordinator.....	4
6. Senior Design Project (Term-1)	5
7. Senior Design Project (Term-2)	5
8. Plagiarism	6
9. Final Project Deliverables	6
10. Evaluation Criteria.....	6
11. Bibliography	7
12. Appendices.....	7
12.1 Appendix I (SDP Forms)	7
12.2 Appendix II (SDP Templates)	7

1. Overview

Faculty of Engineering – Rabigh (FER) considers the senior design project (SDP) as the most important challenge of the Senior Year. The FER strives to improve the quality of the SDP to get internal and external recognition and, ultimately leading to the higher employment rates of its graduates.

The SDP provides an integrated assessment of the students toward the desired engineering competencies. It focuses on the application of the basic sciences, mathematics, engineering sciences, and design skills acquired by the students in earlier courses. This real-life application includes product design or process improvement. Moreover, SDP focuses on professional practice and includes a variety of non-technical issues such as professional and ethical responsibility, safety, reliability, contemporary issues, and social impacts.

Throughout the process of completing the project, students work in teams and are guided at various stages of the SDP by their advisors who serve as mentors, monitors, consultants, and evaluators.

As part of the SDP, the students will have the chance to demonstrate their capability to: manage the senior project, recognize the objectives, conduct the literature survey, perform the experiments and the relevant analysis, writing the final SDP report, and delivering the main results. The SDP delivery, along with report, might take the form of a simulation, prototype, or other type of specialized output.

2. Senior Design Project Outcomes (ABET Criteria)

- (a) Ability to apply knowledge of mathematics, science, and engineering.
- (b) Ability to design, conduct experiments, and to analyze and interpret data.
- (c) Ability to design a system, component, or process to meet desired needs.
- (d) Ability to function on multi-disciplinary teams.
- (e) Ability to identify, formulate, and solve engineering problems.
- (f) Understanding of professional and ethical responsibility.
- (g) Ability to communicate effectively.
- (h) The broad education necessary to understand the impact of engineering solutions in a global and societal context.
- (i) Recognition of the need for, and an ability to engage in life-long learning.
- (j) Knowledge of contemporary issues.
- (k) Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

Note: The SDP must have at least seven outcomes namely, c,d,f,g,h,i, and j.

3. Registration of a Senior Design Project

Students, *having fulfilled prerequisites for SDP of their respective departments*, are expected to register their SDP with a faculty member whose specialty and interests are compatible with the preferred topic of his project. The project can either be proposed by advisors, a group of students, or an industry/sponsor. The students seeking for SDP will meet SDP coordinator in the preceding semester (till week 12) to discuss the topics/possibilities for their potential projects. The coordinator of the SDP will gather all possible topics and register the student teams for their selected projects at the start of the semester (**Form 1** – SDP Registration). The students must submit the sign-off form to the coordinator at the time of registration (**Form 2** – Sign off). The coordinator should consider the followings for the registration:

- Every SDP must be conducted as teams of 2 - 4 students.
- SDP group can be interdisciplinary or multidisciplinary.
- Interdisciplinary SDP group includes students from a single discipline and can be advised by a faculty member from the same discipline.
- Multidisciplinary SDP group may include students from two engineering programs or from a single discipline with two different specialization areas. Such groups can be supervised by two faculty members each from a respective engineering program or respective specialization area. One of these two advisors will have a primary role in the supervision.

4. Senior Design Project Duration & Academic Level

Senior year students, expected to graduate by the end of the academic year, must undertake the SDP spanning over two consecutive semesters, which hereafter will be called as term-1 and term-2. During the term-1, the students of three departments (EEN, IEN, MEN) will register themselves in senior design project I (XEN 498). After successful completion, senior design project II (XEN 499) will be registered in the term-2. The students of other two departments (CEN, CHEN) will get enrolled for SDP (XEN 499) during the term-1 which will complete in term-2.

In the new curriculum from 2019/20, students of all departments will be enrolled for SDP course (XEN 499) at the start of term-1 which will be completed in term-2.

5. Senior Design Project Coordinator

The functions of the coordinator are outlined below:

- Organize a meeting at the beginning of the term-1 with advisors to assign and register students to the SDPs.
- Arrange or deliver at least 6 hours of lectures during the term-1 covering the following topics:

- Major problems that students may face during their practical work.
- Generating and maintaining a project schedule.
- Writing a technical report.
- Communication skills.
- Arrange or deliver at least 2 lectures during term-2 on various relevant aspects such as:
 - Professional and ethics.
 - Contemporary issues.
 - Engaging in life-long learning.
 - Understanding the impact of engineering solutions.
- Arrange meeting with the advisors to discuss the status of the SDPs.
- Coordinate the evaluation of the written reports and the presentations from the examiners review panel members and then calculate the average for each student.

6. Senior Design Project (Term-1)

Students enrolled in the *senior design project I* (term-1) have to carry out the following sequence of tasks:

- All students registered in the *senior design project I* shall attend general lectures arranged by the project coordinator.
- The students are expected to discuss their progress of project work with their respective advisors during weekly scheduled meetings.
- Minutes of team/advisor meetings are required to be signed by the SDP advisor during term-1. Minutes of at least 10 team meetings (**Form 3a** – Team Meeting Minutes) and 6 meetings with advisor (**Form 3b** – Advisor Meeting Minutes) distributed evenly over term-1 are required at the end of term-1.
- By the end of the term-1, the students in each project have to submit a final report to the advisor and the project coordinator along with other documents (i.e. meeting minutes, team norms, tasks distribution, scheduling, etc.). The report is supposed to contain introductory background, problem statement, the design brief, project planning, and the technical baseline design of the optimum solution along with preliminary reflection on its technical, societal, environmental, and other relevant global aspects.
- The SDP advisor/coordinator will request changes in the report if it does not fulfill with the format provided. The submission dates for the term-1 report and presentation will be during the 13-15 week of the semester (**Form 4a** – Timeline term-1). The schedule for the presentations will be set by the SDP coordinator till week 13.

7. Senior Design Project (Term-2)

Students enrolled in the *senior design project II* (term-2) are required to conduct the following sequence of tasks:

- Teams should complete their projects, which they had started in the term-1, by carrying out the “detailed design” for those projects that do not involve prototype. For the projects requiring prototype, will implement their design, test, and demonstrate the final product.
- In term-2 report, the students should start with term-1 report content to develop a complete report of the whole year. All their implementation experience throughout term-2 including, but not limited to, trial and error process to implement every major part; practical issues faced while conducting the validation procedures of every part; experimental data analysis, representation, and interpretation; and detailed reflection upon the product technically and from global perspectives (i.e. environment, health and safety, etc.).
- The students are expected to discuss their progress of project work with their respective advisors during weekly scheduled meetings
- Minutes of team meetings are required to be signed by the SDP advisor during term-2. Minutes of at least 10 team meetings (**Form 3a** – Team Meeting Minutes) and 6 meetings with advisor (**Form 3b** – Advisor Meeting Minutes) distributed evenly over term-2 are required at the end of term-2.
- At the end of the term-2, the students in each project are required to submit a copy of final design report to the advisor and the SDP coordinator. The submission dates for the term-2 report and presentation/poster will be during the 13-15 week of the semester (**Form 4b** – Timeline term-2). The schedule for the presentations will be set by the SDP coordinator till week 13.
- The SDP advisor/coordinator will request changes in the report if it does not fulfill with the format provided.

8. Plagiarism

The plagiarism will not be tolerated in the SDP. The students must submit a similarity check of their SDP report using plagiarism software like *turnitin* or *ithenticate*. This can be done with the help of their advisor. The students can also get similarity check by submitting their report to the “Technical Support Unit” of FER. The similarity check of the final report should not exceed 30%.

9. Final Project Deliverables

Before posting the final grade of the SDP, each team should submit the following to the advisor:

- 2 copies of the corrected final report.
- CD/DVD that includes a soft copy of the final corrected report, presentation/poster, and developed programs/simulations.

10. Evaluation Criteria

Final course grade is calculated based on the average performance of the student evaluated by the SDP examiners including the advisor and the coordinator. The grading scheme will be as follows:

- | | |
|-------------------------|-----|
| ▪ Report | 20% |
| ▪ Presentation / Poster | 20% |

- Progress 60%

The evaluation shall be based on rubrics of SOs developed by ABET committee within each department.

11. Bibliography

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12. Appendices

- 12.1 Appendix I (SDP Forms)
- 12.2 Appendix II (SDP Templates)