Student's Handbook for

ENS 491 Graduation Project (Design)
&
ENS 492 Graduation Project (Implementation)

Sabancı University
Faculty of Engineering and Natural Sciences

Preface

This handbook is prepared to guide the students of ENS 491 Graduation Project (Design) and ENS 492 Graduation Project (Implementation) courses. It explains the outline and run of the course and answers many crucial questions about registering to the course, assigning to a project, course schedule and reporting deadlines.

The main goal of ENS 491 / 492 Graduation Project is to give students a realistic project experience where they solve a complex problem. Through workshops, case study sessions, project group work, reports and presentations, students also gain first-hand experience on important issues such as project management, interdisciplinary team work, professional and ethical responsibility and effective communication.

We hope that this handbook would be helpful to all ENS 491 / 492 Graduation Project students and guide them throughout the whole process from course registration to preparation and submission of the final project report.

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ENS 491 / 492 Graduation Project
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Contents

1. Introduction

This handbook is exclusively prepared for ENS 491 Graduation Project (Design) and ENS 492 Graduation Project (Implementation) students to guide them for successfully completing their graduation projects at the Faculty of Engineering and Natural Sciences (FENS), Sabancı University (SU). All students in FENS are required to complete a graduation project as a part of their graduation requirements. In these projects, students have the opportunity to apply and develop their knowledge in the area of their specialization in a team environment.

1.1. Course Description

ENS 491 Graduation Project (Design) and ENS 492 (Implementation) are two senior design or capstone project courses. During their graduation project courses, students are expected to apply knowledge and experience gained during their undergraduate studies to design and implement a solution for a complex problem. As the first part of their graduation projects, students design a system, process, machine or product under real world constraints and requirements in ENS 491 (Design) course. The students then implement solutions to those problems in ENS 492 (Implementation) course.

ENS 491 and ENS 492 are required courses for all the FENS students. ENS 491 is a one-credit course (2 ECTS) while ENS 492 is a three-credit course (5 ECTS). The courses must be taken during the senior year of a student. Students must complete at least 80 SU credits before taking ENS 491. The students must take ENS 491 and 492 consecutively and ENS 492 must be the continuation of the same project designed during their ENS 491 course. Both ENS 491 and ENS 492 are offered every semester. Faculty members can offer projects to a group of students (typically ≥3 students). More than one group may work in whole or one aspect of a project. The project descriptions, total groups and the number of students in each group are announced by the supervisors at the beginning of each semester.

Graduation project starts with the course registration and assignment to a project which are described in the next sections. In addition to carrying out their own project work with project supervisors, students enrolled in ENS 491 Graduation Project (Design) are required to complete 2 assignments (i.e. Project Proposal and Progress Report-I) attend 4 workshops (total of 8 hrs) and 3 case study sessions (total of 6 hrs), and will be evaluated for 3 case study reports throughout the term. Workshop and case study dates and groups will be announced upon completion of project assignments on the 2nd week of the term (see section 1.4. Course Flow and Important Dates). Students enrolled in ENS 492 Graduation Project (Implementation) are required to complete 2 assignments (i.e. Progress Report-II and Final Report) throughout the term.

Pre-requisites and restrictions:

- Students who have completed 80 SU credits are eligible to register ENS 491 Graduation Project (Design).
- Students have to retake ENS 491 when s/he (i) fails, (ii) drops the course or (iii) wants to change his/her project or supervisor.
- It is not possible to take ENS 491 while registered to an Erasmus exchange program.
- There is no summer school for ENS 491 or ENS 492.
- ENS 491 is a prerequisite of ENS 492 and must be taken consecutively

1.2. Course Learning Outcomes (joint for ENS 491-492)

Upon completion of this course, students will have:

- ability to identify, define, formulate complex scientific/engineering problems/processes,
- experience in applying knowledge of science, mathematics and engineering to solve a complex scientific/engineering problem under realistic constraints (such as economic, environmental, social, ethical, health and safety, manufacturability and sustainability), and in accordance with the standards of the field of specialty,
- ability to identify and use modern techniques and tools to solve a problem,
- knowledge on project management, risk management, change management, and legal consequences of engineering solutions,
- awareness on IP management, innovation and entrepreneurship,
- experience in effective communication of their findings by reports and presentations,
- experience in working in multidisciplinary teams.

For reference, here are some definitions/interpretations of a complex problem, process, system:

Complex Problem: An open-ended problem including many components, which has possibly alternative and nontrivial approaches/solutions by different students and which

- requires in-depth knowledge of the field of specialty (3 years of background gained so far), abstract and creative thinking, use of research-based scientific/engineering knowledge in a creative way,
- is relevant to stakeholders with varying needs and constraints.

Complex System, Process, Device or Product: A system, process, device or a product, which has multiple components and subsystems, possibly of relevance to more than one discipline, whose analysis and design is a complex problem.

1.3. Grading Policy

The grading policy for individual grading items in both ENS 491 Graduation Project (Design) and ENS 492 Graduation Project (Implementation) is stated in the table below:

Course	Evaluation Item	Effect on final grade	Penalty
ENS 491	Draft Proposal	-	Uploading past the deadline: 1 LGD* to all project group members.
	Project Proposal	20%	Uploading past the deadline: 1 LGD to all project group members. Missing report: Final grade of "F" to all project group members.
	Progress Report-I	30%	Uploading past the deadline: 1 LGD to all project group members. Missing report: Final grade of "F" to all project group members.
	Individual Grade	40%	An individual grade of "F" will result in a final grade of "F" for the individual group member (regardless of the grades from the other evaluation items).
	Attendance to 4 workshops	-	1 LGD to individual student for an unattended workshop. Final grade of "F" to students who miss 2 out of 4 workshops.
	Attendance to 3 Case Studies	-	1 LGD to individual student for an unattended case study. Final grade of "F" to students who miss 2 out of 3 case studies.
	Case Study Reports	10% (total of 3 reports)	Uploading past the deadline: 1 LGD to all case study group members. Missing report: Final grade of "F" to all case study group members.
ENS 492	Progress Report-II	20%	Uploading past the deadline: 1 LGD to all project group members. Missing report: Final grade of "F" to all project group members.
	Final Report	30%	Uploading past the deadline: 1 LGD to all project group members. Missing report: Final grade of "F" to all project group members.
	Presentation	10%	Uploading past the deadline: 1 LGD to all project group members. Missing presentation document: Final grade of "F" to all project group members. Unattended individual group member(s) will receive 1 LGD
	Individual Grade	40%	An individual grade of "F" will result in a final grade of "F" for the individual group member (regardless of the grades from the other evaluation items).

*1 LGD: one letter grade will be deducted from the final letter grade. For example if a student misses 1 workshop, 1 case study and the presentation (i.e. summing to 3 LGDs) s/he will get a B even if s/he scores an A. Only students with special permission by the university presidency or with a health report by the university health center will be exempt of the 1 LGD sanction.

2. Registration Processes

ENS 491 Graduation Project (Design) has a two-step registration process. **The students must both register to the course over the bannerweb and also get assigned to a project over mySU**. Registering ENS 491 over the bannerweb is same as registering other courses whereas assignment (registration) to a project can only be done by the project supervisor, i.e. by the faculty member who is offering the project. Each step is described in detail in the following sections.

2.1. Course Registration (over bannerweb)

ENS 491 is offered every term and registration is done over the bannerweb (http://bannerweb.sabanciuniv.edu/) during the add-drop period with special request using the section number of the intended supervisor. For this, students should first browse the offered projects that are announced in the online registration system for ENS491/492 (http://mysu.sabanciuniv.edu/apps/fens/ens4912/) and then get in touch with the offering supervisor for verbal approval of acceptance. When accepted, the student should then ask for the section number of the supervisor for the registration process over the bannerweb.

PS: ENS 492 Graduation Project (Implementation) registrations are open during the regular course registration period every term and also requires registration with special request using the section number of the supervisor.

2.2. Assignment to a Project (over mySU)

Following the course registration, the project supervisor will then assign the student to his/her project over the online registration system for ENS491/492 (http://mysu.sabanciuniv.edu/apps/fens/ens4912/). For this the supervisor will need the student's SU ID number and phone number. Students must check whether they are successfully assigned to a project by logging in to the online registration system for ENS491/492 using their SUNET user name and password. A successful login denotes a successful assignment to a project. In case the login is not successful, the student should immediately consult to his/her supervisor to warn about the missing project assignment and make sure that he/she is assigned to the intended project by logging in to the online registration system.

3. Course Flow, Events and Important Dates

In addition to regular weekly meetings with the supervisor(s), students are required to accomplish the compulsory events for ENS 491 Graduation Project (Design) and ENS 492 Graduation Project (Implementation) listed chronologically in the table below.

Course	Event* no.	Description	Date
ENS 491	1	Register to the course over the bannerweb (http://bannerweb.sabanciuniv.edu/) with special request using the section number of the intended supervisor	2nd week of the term during the add-drop period announced in the academic calendar
	2	Check project assignment by logging in to the online registration system for ENS491/492 (http://mysu.sabanciuniv.edu/apps/fens/ens4912/) using SUNET user name and password	2nd week of the term during the add-drop period announced in the academic calendar
	3	Announcement of Workshop and Case Study dates and groups	2nd week of the term right after the add-drop period
	4	Attend to Workshop-I	3rd week of the term
	5	Attend to Case Study-I	3rd to 6th weeks of the term
	6	Upload "Draft Proposal" by logging in to (http://mysu.sabanciuniv.edu/apps/fens/ens4912/)	5th week of the term, 11:55 PM Sunday
	7	Attend to Workshop-II	7th week of the term
	8	Attend to Case Study-II	7th to 10th weeks of the term
	9	Upload "Project Proposal" by logging in to (http://mysu.sabanciuniv.edu/apps/fens/ens4912/)	8th week of the term, 11:55 PM Sunday
	10	Attend to Workshop-III	10th week of the term
	11	Attend to Workshop-IV	11th week of the term
	12	Attend to Case Study-III	11th to 14th weeks of the term
	13	Upload "Progress Report-I" by logging in to (http://mysu.sabanciuniv.edu/apps/fens/ens4912/)	14th week of the term, 11:55 PM Sunday
ENS 492	1	Register to the course over the bannerweb (http://bannerweb.sabanciuniv.edu/) with special request using the section number of the intended supervisor	During the regular registration period announced in the academic calendar
	2	Upload "Progress Report-II" by logging in to (http://mysu.sabanciuniv.edu/apps/fens/ens4912/)	7th week of the term, 11:55 PM Sunday
	3	Upload "Final Report" by logging in to (http://mysu.sabanciuniv.edu/apps/fens/ens4912/)	14th week of the term, 11:55 PM Sunday
	4	Upload "Presentation" by logging in to (http://mysu.sabanciuniv.edu/apps/fens/ens4912/)	1st week of final exams, 11:55 PM Sunday

*All events are compulsory: Failure to complete events 1 and 2 result in incomplete registration and automatic drop-off of ENS 491. There are no makeups for any of these events (see grading policy above for penalty and restrictions).

4. Preparation and Submission of Assignments

Details about preparation and submission of “Project Proposal”, “Progress Report-I”, “Progress Report-II” and “Final Report” will be announced by email and course web site along with their templates in MS Word .docx format.