

MKT4000 GRADUATION PROJECT COURSE GUIDE

Yıldız Technical University, Turkey
Mechatronics Engineering Department

This guide has been prepared for students taking the Graduation Project course in order to introduce the course delivery and assessment procedures of the 2026-2027 Fall semester.

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Course Communication Tools

Google Classroom: uynmee

1. OVERVIEW

The objective, course outcomes, resources and course assessment procedures of the Graduation Project course are stated under this heading.

Beginning-of-Semester Procedures

Students must enter their group and project information within the period specified in the course calendar. The final entry date and the related implementation details will be announced through an announcement posted on Google Classroom. Students are required to follow the Google Classroom announcements throughout the course.

1.1 Objective

Graduation Project: The objective of this course is to provide students with a scientific activity environment in which they can use the knowledge and skills they have acquired throughout their education. Students are expected to bring together the knowledge they have learned in previous courses and the methods used in product development in industry, to find a solution to a current mechatronics problem and to create a working prototype. In this process, it is aimed to develop students' ability to perform analysis and synthesis, to evaluate information, and to share their scientific knowledge and insights with their peers.

1.2 Course Outcomes

1. Demonstrating the ability to design and conduct experiments in order to solve engineering problems, and to analyze and interpret data.
2. Applying engineering principles and contemporary tools in order to design and develop a complex system, component or process that meets specified needs.
3. The ability to identify, formulate and solve engineering problems related to mechatronics engineering and to communicate the solution effectively.
4. The ability to collaborate with a supervisor and team members in order to realize project items within the specified time intervals and with the allocated resources.
5. The ability to develop a professional orientation by taking into account the economic, manufacturability, safety, sustainability, environmental, social, legal and ethical aspects of the engineering profession related to the project.

1.3 References

- 1) Bishop, Mechatronics Handbook, 2ed, CRC Press, 2007.
- 2) Bolton, Mechatronics: A multidisciplinary design approach, 4ed, Prentice-Hall, 2009.
- 3) Alciatore, Introduction to Mechatronics and Measurement Systems, McGraw Hill, 2011

2. ASSESSMENT CRITERIA

2.1 Interim Report

Timing: Week 5

The exact submission date and time will be specified in the relevant announcement posted on Google Classroom.

Language : The report must be written in the course language in which you are registered in the OBS system.

Assessment: The reports will be assessed by the Supervising Faculty Member. The assessment criteria are given in Table 1; please follow the announcements for updates.

Submission: The interim report must be uploaded in PDF format to the assignment area specified on Google Classroom. The report must be prepared using the specified template document.

Report content: This report must convey the system design summary and design improvement, the prototype fabrication and integration plan, and the test and verification plan. The general report content is listed, and the content regarding the interim report is defined in the “Interim Report Content Guide” document.

Table 1. Graduation Project Interim Report Assessment Criteria

#	Criterion	Weight
1	System Design Summary and Design Improvement: Summarizing the general concept of the project and the improvements made to this concept together with their justifications. Presentation of the project management plan and the work schedule chart.	15
2	Detailed Design: - Subsystem Component and Method Modifications - Mechanical / Electronic / Software and Control Detailed Designs	50
3	Prototype Fabrication and Integration Plan: Presentation of the steps required for the production and assembly of the physical prototype and the schedule. The production/assembly of the prototype shall be instructed step by step with a clarity that a person outside the team can understand.	15
4	Test and Verification Plan*: The revision and finalization of the test scenarios that will prove that the prototype meets its targeted technical requirements. - Hierarchical Planning: The design of the tests in layers at the component, subsystem and system levels. - Measurement Strategy: Testing of the technical requirements with appropriate equipment and scientific methods - Quantitative Data Requirement: Expression of the success criteria with quantitative values and explanation of the engineering justifications.	15

5	Work Plan, Discussions and Conclusions: Presentation of the current schedule of the project and the overall evaluation of the report.	5
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**The Test and Verification Plan section aims at the quantitative measurement of the engineering outputs of the project. Within this scope, students are required to submit a table showing which methods and equipment they will use to verify the technical requirements specified in the MSD course. The plan declared in the interim report shall be accepted as the main reference for the level of realization in the Final stage.*

2.2 Graduation Project Poster and Prototype Presentation

Timing: Week 11

The exact submission date and time will be specified in the relevant announcement posted on Google Classroom.

Venue: E2 Block / **Language :** The language registered in the OBS system.

Assessment: It is evaluated by a jury consisting of the faculty members of the Mechatronics Engineering Department, and the average of the grades given by at least 2 jury members other than the team supervisor is accepted as the final presentation grade of the poster presentation. The assessment criteria are given in Table 2; please follow the announcements for updates.

Submission: The poster presentation document prepared at B1 page size is uploaded to the assignment area specified on Google Classroom.

Procedure: Students hang their B1 posters in the designated area. Faculty members walk around and examine the posters/prototypes and make an assessment by obtaining information from the students.

Presentation Content:

- The graphical and software presentation of the definition, scope and motivation of the project, its technical specifications, design and simulations, and the ability to present.
- The results obtained: the point reached and the results obtained in the realization of project components such as mechanical, electronic and software.
- The exhibition of the current prototype of the project and the demonstration of its current state.

Table 2. Graduation Project Poster Assessment Criteria

#	Criterion	Weight
1	Poster Organization and Presentation Ability Organization: The poster shall be able to attract the attention of the audience visually and the poster organization shall be understandable. Text and Graphics: The text on the poster shall be legible (font type - size) and comprehensible (scope and composition), and a balance between text and graphics shall be ensured. Context: The poster headings shall be structured in an appropriate context. Size: The suitability of the poster dimensions. Presentation: The ability to express the content of the poster verbally and the adequacy of the answers given to the questions	15
2	Targeted and Achieved Outputs: Compliance with the schedule and the realism of the schedule	5
3	Prototype Functionality and Demonstration: The level to which the produced prototype fulfills its targeted functions and the effective demonstration of its operating principle during the presentation.	20

4	System Safety Precautions: The mechanical, electrical and software safety precautions of the prototype (emergency stop, insulation, user safety, etc.) shall be designed and implemented.	10
5	Project Components (a maximum total of 50 points may be obtained from the main criterion) Mechanical (raw maximum 25 points) - Mechanical Part Procurement - Manufacturing - Assembly - Mechanical Performance Tests - Integration into the System Electronic (raw maximum 25 points) - Electronic Card Design - Electronic Card Manufacturing - Electronic Card Safety Precautions - Electronic Card Performance Tests - Integration into the System Software/Algorithm (raw maximum 25 points) - Algorithm Code Creation - Connecting Relevant Data Sources to the Code - (Hyper) Parameter Optimization / Adaptation - Software Performance Tests - Integration into the System Control (raw maximum 25 points) - Implementation of the Controller - Model-Based Control / Discrete Control - Controller Parameter Optimization - Controller Performance Tests - Integration into the System	50*
* The maximum total number of points that may be obtained from the Project Components criterion is 50. ** There are five sub-criteria under each discipline and each sub-criterion is worth 5 points. The raw maximum score of each discipline is 25. The total raw score of the four disciplines is limited to 50 points.		

2.3 Graduation Project Final Reports

Timing: Week 14, Monday

Submission: The final Graduation Project report prepared in the format of the undergraduate thesis preparation guide document is uploaded to the assignment area specified on Google Classroom. The report prepared for the plagiarism check is also submitted through Google Classroom.

Plagiarism Check: The final reports are subjected to a similarity check via Turnitin. The maximum acceptable similarity ratio is %20.

Assessment: The technical content, technical accuracy and presentation quality of the Final Report are assessed by the faculty member who is the team supervisor. The format of the report is separately assessed by the Course Assistant within the scope of the Final Report Format Assessment. The technical content assessment criteria are given in Table 3; please follow the announcements for updates.

Language: The language registered in the OBS system.

Report content: This report must be written as a continuation of the interim report. Detailed explanations regarding the final report content are defined in the “Final Report Content Guide” document.

Notes:

1. The final report must be submitted after being revised in line with the recommendations of the Supervising Faculty Member.

2. Student project groups that do not submit the final reports or do not prepare them in the appropriate format will not be admitted to the final presentation.

Table 3. Final Report Assessment Criteria

#	Criterion	Weight
1	Summary and Revision of the System Design: Review and revision of the concept, scope, specifications and schematics (flow chart, product breakdown, etc.) of the system. Presentation of the project management plan and the work schedule chart*.	5
2	Revision of the Subsystem Designs: Review and revision of the Mechanical, Electronic, Control and Software/Algorithm systems.	5
3	Detailed Design: Mechanical: The detailed technical design of the system, manufacturing technical drawings, component sizing, material selections and assembly methods. Electronic: Electronic card design, component layout plans and signal paths. Control/Signal Processing: Explanation of the control system design and of the related control/signal processing flows or design structure. Software/Integration: Explanation of the software flow diagrams and algorithm designs.	40
4	Prototype Fabrication and Integration: Integration of the mechanical, electronic, software and interface subsystems of the prototype. Presentation of the steps required for the production and assembly of the physical prototype and the schedule. Step-by-step instruction of the production/assembly of your prototype with a clarity that a person outside the team can understand.	20
5	Test and Verification: Mechanical, electronic, control and software tests.	20
6	Discussions and Conclusions**	10

* **Project Management and Responsibility:** The primary responsibility areas of the team members (Mechanical, Software, etc.) shall be clearly stated on the work schedule. The responsibility areas are examined by the supervisor at the submission stages; technical areas that overlap or remain unassigned are revised.

** **Holistic Participation and Teamwork:** Mechatronics System Design requires interdisciplinary integrity. The responsibility areas exist only in order to manage the workflow; every member of the team shall take an active role in the planning and design of each unit. Each student is the person in charge of their own responsibility area; they make the decisions regarding that area, give clear and comprehensible instructions to their teammates where needed, and act in accordance with the instructions received from the other areas. In the final report, this joint working process and the technical communication within the team shall be documented (with communication evidence such as project management tools, meeting minutes, etc.) and explained clearly.

2.4 Final Report Format Assessment

Timing / Process Information: It is carried out together with the Final Report submission.

Submission: The Final Report is uploaded to the assignment area specified on Google Classroom; the format assessment is performed on this submission.

Assessment: The assessor is the Course Assistant. This assessment is separate from the technical content assessment of the Final Report and only measures compliance with the defined report format. Its weight in the semester grade is %10.

Explanation: The content quality of the report is not within the scope of this assessment. Each of the four criteria is assessed out of 25 points.

Table 4. Graduation Project Final Report Format Assessment Criteria

#	Criterion	Points
1	References and heading selections, use of the template format	25
2	Format compliance of the preliminary pages of the report (cover, table of contents, abstract, list of figures, etc.)	25
3	Format compliance of the captions of figures, equations and tables	25
4	Format compliance of the page layout and the fonts	25
	Total	100

2.5 Graduation Project Final Presentation

Timing: Week 15, Monday

Venue: E2 Block

Duration : 15 minutes of presentation + 5 minutes of questions and answers. (The 1-minute portion of the 15-minute presentation must be allocated to the prototype demonstration video.)

Language : The language registered in the OBS system.

Assessment: It is evaluated by a jury consisting of the faculty members of the Mechatronics Engineering Department. The average of the grades given by at least 2 jury members other than the project supervisor is accepted as the final presentation grade of the final presentation. The assessment criteria are given in Table 5; please follow the announcements for updates.

Submission: The final presentation document and the System/Prototype Demonstration Video are uploaded to the assignment area specified on Google Classroom.

Presentation Content:

- The presentation and evaluation of the work carried out throughout the semester and of the results obtained.
- The demonstration of the functions of the prototype by video.

Table 5. Graduation Project Final Presentation Assessment Criteria

#	Criterion	Weight
1	Presentation Ability: The ability to express the content of the presentation verbally and the adequacy of the answers given to the questions	10
2	System Demonstration Video: A video of a maximum of 1 minute demonstrating that the produced prototype is operational and showing its functions.	10
3	Test and Verification (Plan, Implementation and Analysis) : Presentation of the tests carried out and their results in order to verify that the prototype meets its targeted technical requirements.	20
4	Project Components - Mechanical - Mechanical Part Procurement - Manufacturing - Assembly - Mechanical Performance Tests - Integration into the System - Originality, innovation and pioneering approaches.	60*

	- Electronic Design - Electronic Card Design - Electronic Card Manufacturing - Electronic Card Safety Precautions - Electronic Card Performance Tests - Integration into the System - Originality, innovation and pioneering approaches. - Software/Algorithm - Algorithm Code Creation - Connecting Relevant Data Sources to the Code - (Hyper) Parameter Optimization / Adaptation - Software Performance Tests - Integration into the System - Originality, innovation and pioneering approaches. - Control - Implementation of the Controller - Model-Based Control / Discrete Control - Controller Parameter Optimization - Controller Performance Tests - Integration into the System - Originality, innovation and pioneering approaches.	
* It denotes the maximum number of points that may be obtained from the specified assessment criterion, and the total of the sub-criteria specified below exceeds the maximum number of points.		

Make-up: The make-up report and presentation processes shall be carried out in accordance with the course calendar and with the make-up announcement to be posted on Google Classroom.

3. GRADING PERCENTAGES AND LETTER GRADE RANGES

The assessment schedule and grading percentages are given in Table 6, and the letter grade ranges in Table 7.

Table 6. Assessment Schedule and Grading Percentages

Assessment	Timing	GP %	Assessor
Project Interim Reports	Week 5	%20	Supervising Faculty Member
Poster and Prototype Presentation	Week 11	%20	Jury Member
Final Jury Assessment Final Report Format Assessment Final Report Supervisor Assessment	Week 14, Monday (Report) Week 15, Monday (Presentation)	%20	Jury Member
		%10	Course Assistant
		%30	Supervising Faculty Member

Late Submission Rule: If at least one submission is made after the final date of any submission specified in the calendar/announcements during the semester, 5 points are deducted from the student's final grade at the end of the semester. This penalty is applied only once throughout the semester. In the case of multiple late submissions, the penalties do not accumulate; the total penalty is at most 5 points.

Table 7. Letter Grade Ranges

Letter Grade	Range	
	Lower	Upper
AA	90	100
BA	85	89
BB	80	84
CB	70	79
CC	60	69
DC	50	59
DD	40	49
FD	30	39
FF	0	29