Lebanese American University
Department of Electrical and Computer Engineering

Capstone Design Project Handbook

Fall 2026

This document is presented to guide you through your Capstone Design Project courses. It includes the following sections:

- COE595/ELE 595/MCE 591 Capstone Design Project I
  - Syllabus
  - Report + Presentation Guidelines
- COE/ELE 596//MCE 592 Capstone Design Project II
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  - Report + Presentation + Poster Guidelines
- Rubrics used in assessing your work

COE595/ELE 595/MCE 591 Capstone Design Project I: Syllabus

LAU الجامعة اللبنانية الأميركية Lebanese American University	ELE 595 COE 595 MCE 591	
School of Engineering	Course Title: Capstone Design Project I	3 credits
Department of Electrical and Computer Engineering	Required	
Course syllabus	Instructor: Project Advisor	

1. Course Description and Course Prerequisite

The course is devoted to the solution of open-ended engineering design projects with functional specifications and realistic constraints. This project provides a study of multiple solutions for a major design experience while accounting for multiple realistic constraints and relevant standards. The study is concluded by a written report and an oral presentation providing a course of action for the fulfilment of the project.
This course is the first part of a two-course sequence (ELE/COE 595 and 596) (MCE 591 and 592)
Course Prerequisite: Fifth year standing.

2. Course Objectives and Outcomes

The main objective of this course is to provide students with a well-rounded culminating capstone design experience.

Course learning Outcomes:
By the end of this course, students are expected to:

- Define the project objectives and design requirements.
- Conduct a literature review and background study where needed.
- Identify and consider alternative design solutions.
- Develop a preliminary design while accounting for multiple realistic constraints and relevant engineering standards.
- Apply knowledge and skills acquired in earlier coursework to the proposed design.
- Develop a clear project plan for implementation in Capstone II.
- Prepare and present a professional technical report and oral presentation.

3. Contribution of course to meeting the requirements of ABET Criterion 5

Professional Component	Credits
Mathematics and Basic Sciences	0
Engineering Topic	3
General Education	0

4. Relationship of course to program outcomes

By the end of this course, students are expected to demonstrate

- SO 1: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
  - PI 1: Ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- SO 2: An ability to 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
  - PI 1: Apply an iterative, creative, decision making design process
  - PI 2: Generate multiple solutions that satisfy the design constraints
  - PI 3: Evaluates solutions and identifies the most appropriate
- SO 3: An ability to communicate effectively with a range of audiences.
  - PI 1: Writes a proper document
  - PI 2: Delivers a proper oral presentation to a range of audiences
- SO 4: an ability to 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 context.
  - PI 2: Make informed judgments, considering the impact of engineering solutions in global, economic, environmental, and societal contexts

- SO 5: An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
  - PI 1: Collaborate and lead
  - PI 2: Practice collective decision making and task planning
  - PI 3: Meet objectives
- SO 7: An ability to acquire and apply new knowledge as needed, using appropriate learning strategies
  - PI 1: Acquire new knowledge as needed, using appropriate learning strategy
  - PI 2: Apply new knowledge as needed

5. Deliverables and Timelines

- Draft of Final Proposal: To be submitted to the department two weeks before the oral presentation date. Students missing this deadline will not be allowed to present and will have to postpone their presentation until the following semester.
- Final Proposal and Oral Presentation: To be presented about one week before the first scheduled LAU exam (as announced by the department).

6. Required tools / software / skills

Depends on the nature of project

7. Textbook

No specific textbook

8. Additional References

This course requires references that are project specific

9. Schedule of Exams & Grading Percentage

Check Course Outline

10. Course Policies

- The project advisor should be selected at the beginning of the semester.
- The Capstone Design Project shall be carried out by a group of two or more students.
- The proposed project shall include appropriate hardware and software components.
- For MCE students, the project shall involve the integration of hardware and software to control a mechanical system or process.

11. General Comments

Check guidelines of the course

12. General Rules & Regulations

- **Student Code of Conduct**: LAU students are expected to respect, abide by, and comply with the letter and the spirit of the university's "Student Code of Conduct". Any student found to have committed misconduct is subject to the disciplinary sanctions outlined in the following document: Student Code of Conduct.
- **Use of AI**: Any AI-generated content must be properly acknowledged. It is the responsibility of the student to review and validate any AI generated content. AI tools must not replace the student's own critical thinking and contribution: https://cil.lau.edu.lb/images/Artificial%20Intelligence%20Guidance%20-%20Teaching%20and%20Learning-6.pdf.

13. Person(s) who prepared this description and date of preparation

Prepared by Dani Tannir, 8 August 2023.
Updated by Chadi Abou-Rjeily, 26 November 2025 and 11 November 2026.

Report Guidelines

The following are the minimum compulsory items (unless otherwise stated) of the Capstone Design Project I's report, which is a comprehensive proposal for the Capstone Design Project:

- Cover Page (includes course name, number, project title, group members and other relevant information)
- Abstract
  - A one paragraph summary of the whole project
- Table of Contents
- Table of Figures
- Table of Tables
- Introduction
  - An introduction to the subject, problem, approach...
- Background
  - An extensive, referenced discussion of all relevant background information and a comprehensive literature review.
- Project Constraints
  - The project constraints are to be presented in a tabular format.
  - The constraints that force a certain design path are to be linked to specific sections of the report where that is evident.
  - Quantifiable constraints will have metrics associated with them. Examples include: cost of prototype, size, power consumption, speed etc.
- Standards and Codes
  - The standards and codes to be utilized during the design process should be presented in a tabular format that presents the organization (IEEE for example) and the number of the standard.
  - There should be a discussion of how the design was influenced by any relevant engineering standards/codes.
- Alignment with the Sustainable Development Goals (SDGs)
  - In line with LAU's commitment to sustainable development, the report should explicitly align the project with the SDGs.
  - The report should include a discussion detailing how the project's objectives and outcomes are linked to specific SDGs. This discussion should provide a comprehensive overview of the project's contribution to global sustainability and its role in addressing global challenges.
- Specific chapters for your project (one or more chapters)
  - Demonstrate the consideration of multiple solutions.
  - Provide a preferred solution path based on the multiple solutions considered. Show the applicability with the set constraints and/or relevant standards.
- Results
  - Depending on the nature of the project, results require a separate chapter or are merged with another chapter.
- Conclusion and Plan of Work for the full project
- Declaration of AI Use
  - List the specific AI-tools used and their purpose (e.g., literature search, clarification of concepts, writing/editing assistance, code suggestions), and clearly identify the team's original, non-AI contributions.
- Acknowledgements
- Bibliography (references)
- Appendices (if needed)

Presentation Guidelines

On the date of the presentation (specified by the ECE department), you should adhere to the following guidelines:

- Arrive well in advance of your scheduled time slot and have the necessary presentation files ready.
- For the presentation length, you should adhere to the following time limits:
    - For groups of 3 or 4 students: 15 mins presentation + 5 mins Q&A
    - For groups of 2 students: 12 mins presentation + 3 mins Q&A
- Dress code: You should dress appropriately using business casual or business formal dress code (no jeans or t-shirts/hoodies).

COE/ELE 596// MCE 592 Capstone Design Project II: Syllabus

LAU Lebanese American University	COE 596 ELE 596 MCE 592	
School of Engineering	Course Title: Capstone Design Project II	3 credits
Department of Electrical and Computer Engineering	Required	
Course syllabus	Instructor: Project Advisor	

1. Course Description and Course Prerequisite

The course is devoted to the solution of open-ended engineering design projects with functional specifications and realistic constraints. This project provides a culminating major design experience that is concluded by a written report and an oral presentation.
This course is the final part of a two-course sequence (ELE/COE 595 and 596) (MCE 591 and 592)
Course Prerequisite: COE595/ELE 595/MCE 591 Capstone Design Project I.

2. Course Objectives and Outcomes

The main objective of this course is to provide students with a well-rounded culminating capstone design experience.

Course learning Outcomes:

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

- Refine and implement the design developed in Capstone I.
- Apply appropriate engineering analysis, modeling, implementation and testing methods.
- Integrate the different components of the proposed system.
- Evaluate the final design against the stated requirements, constraints, and relevant engineering standards.
- Verify and validate the performance of the developed system through appropriate analysis, simulation, implementation, or testing.
- Prepare and present a professional technical report, technical poster and oral presentation.

3. Contribution of course to meeting the requirements of ABET Criterion 5

Professional Component	Credits
Mathematics and Basic Sciences	0
Engineering Topic	3
General Education	0

4. Relationship of course to program outcomes

By the end of this course, students are expected to demonstrate

- SO 1: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
  - PI 1: Ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- SO 2: An ability to 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
  - PI 1: Apply an iterative, creative, decision making design process
  - PI 2: Generate multiple solutions that satisfy the design constraints
  - PI 3: Evaluates solutions and identifies the most appropriate
- SO 3: An ability to communicate effectively with a range of audiences.
  - PI 1: Writes a proper document
  - PI 2: Delivers a proper oral presentation to a range of audiences
- SO 4: an ability to 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 context.
  - PI 2: Make informed judgments, considering the impact of engineering solutions in global, economic, environmental, and societal contexts
- SO 5: An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
  - PI 1: Collaborate and lead

- PI 2: Practice collective decision making and task planning
- PI 3: Meet objectives

- SO 7: An ability to acquire and apply new knowledge as needed, using appropriate learning strategies
  - PI 1: Acquire new knowledge as needed, using appropriate learning strategy
  - PI 2: Apply new knowledge as needed

5. Deliverables and Timelines

- Draft of Final Report: to be submitted to the department two weeks before the oral presentation date. Students missing this deadline will not be allowed to present and will have to postpone their presentation until the following semester.
- Poster: to be presented in a poster session that will be announced by the department
- Final Report and Oral Presentation: to be presented about one week before the first scheduled LAU exam (as announced by the department).

6. Required tools / software / skills

Depends on the nature of project

7. Textbook

No specific textbook

8. Additional References

This course requires references that are project specific

9. Schedule of Exams & Grading Percentage

Check Course Outline

10. Course Policies

- The project advisor and group members shall remain the same as in Capstone I.
- The proposed project shall include appropriate hardware and software components.
- For MCE students, the final project shall demonstrate the integration of hardware and software to control a mechanical system or process.

11. General Comments

Check guidelines of the course

12. General Rules & Regulations

- **Student Code of Conduct**: LAU students are expected to respect, abide by, and comply with the letter and the spirit of the university's "Student Code of Conduct". Any student found to have committed misconduct is subject to the disciplinary sanctions outlined in the following document: Student Code of Conduct.
- **Use of AI**: Any AI-generated content must be properly acknowledged. It is the responsibility of the student to review and validate any AI generated content. AI tools must not replace the student's own critical thinking and contribution: https://cil.lau.edu.lb/images/Artificial%20Intelligence%20Guidance%20-%20Teaching%20and%20Learning-6.pdf.

13. Person(s) who prepared this description and date of preparation

Prepared by Dani Tannir, 8 August 2023
Updated by Chadi Abou-Rjeily, 26 November 2025

Report Guidelines

The following are the minimum compulsory items (unless otherwise stated) of the Capstone Design Project II report:

- Cover Page (includes course name, number, project title, group members and other relevant information)
- Abstract
  - A one paragraph summary of the whole project
- Acknowledgements
- Table of Contents
- Table of Figures
- Table of Tables
- Introduction
  - An introduction to the subject, problem, approach.
- Background
  - An executive summary of the work done in Capstone I
  - An extensive, referenced discussion of all material used that is not the student group's work
- Project Constraints
  - The project constraints from Capstone I need to be updated and presented in a tabular format.
  - The constraints that force a certain design path are to be linked to specific sections of the report where that is evident.
  - Quantifiable constraints will have metrics associated with them. Examples include: cost of prototype, size, power consumption, speed etc.
- Standards and Codes
  - The standards and codes to be utilized during the design process should be presented in a tabular format that presents the organization (IEEE for example) and the number of the standard.
  - There should be a discussion of how the design was influenced by any relevant engineering standards/codes.
- Specific chapters for your project (one or more chapters) (implementation, design, . . .)
  - Full description and discussion of the student group's work especially the design component
- Results
  - Depending on the nature of the project, results require a separate chapter or are merged with another chapter.
  - Results need to be analyzed in the context of the initial objectives and design constraints. Were these met and what factors affected the outcome?
- Conclusion and Future Work
- Declaration of AI Use
  - List the specific AI-tools used and their purpose (e.g., literature search, clarification of concepts, writing/editing assistance, code suggestions), and clearly identify the team’s original, non-AI contributions.
- Acknowledgements
- Bibliography (references)
- Appendices (if needed)

Presentation Guidelines

On the date of the presentation (specified by the ECE department), you should adhere to the following guidelines:

- Arrive well in advance of your scheduled time slot and have the necessary presentation files ready.
- For the presentation length, you should adhere to the following time limits:
    - For groups of 3 or 4 students: 15 mins presentation + 5 mins Q&A
    - For groups of 2 students: 12 mins presentation + 3 mins Q&A
- Dress code: You should dress appropriately using business casual or business formal dress code (no jeans or t-shirts/hoodies).
- Video demos should be technical demonstrations of the functionality of your project and proof you have met your design objectives. Video demos should not be of a "marketing nature".

Poster Guidelines

On the day of the presentations there will be a dedicated space to hang your posters. You should adhere to the following guidelines when preparing your poster:

- Poster size: A1 or A2.
- Printing: Full color, glossy or matte (do not mount).
- Content: Technical poster (should show at least project title, student names, LAU logo, main objectives, technical specifications/features/constraints, final design/results). This is not a business/marketing poster for the project.
- Use high resolution images.
- Design: Students should select appropriate theme and colors to suit their project. Design quality is valued.

Rubrics

Student Outcome	2) An ability to 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				
2.1) Apply an iterative, creative, decision making design process					
Score Descriptor		Unsatisfactory	Satisfactory	Exemplary	other
Sub PI	**Apply an iterative, creative, decision making design process**	Does not properly apply the design process	Applies the design process with few gaps	Correctly applies the design process	
	OVERALL				
2.2) Generate multiple solutions that satisfy the design constraints					
Score Descriptor		Unsatisfactory	Satisfactory	Exemplary	other
Sub PI	**Generate multiple solutions that satisfy the design constraints**	Generates solutions that do not meet the design constraints	Generates solutions that sufficiently meet the design constraints	Generates solutions that meet most of the design constraints	
	OVERALL				
2.3) Evaluates solutions and identifies the most appropriate					
Score Descriptor		Unsatisfactory	Satisfactory	Exemplary	other
Sub PI	**Evaluates solutions with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors**	Unable to evaluate the solutions with consideration to factors	Able to evaluate the solutions with consideration to most factors	A comprehensive evaluation of the solutions is presented with consideration to all factors	
Sub PI	**Identifies the most desirable solution and justifies the chosen design**	Unable to identify an appropriate solution	Able to identify an appropriate solution using adequate analysis	Able to identify an effective solution using thorough analysis	
	OVERALL				

Student Outcome	5) An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives				
5.1) Collaborate and lead					
Score Descriptor		Unsatisfactory	Satisfactory	Exemplary	other
Sub PI	**Ability to collaborate and lead**	Does not lead effectively or collaborate with other members	Shares ideas, positively contributes to team progress and occasionally assumes a leadership role	Promotes collaboration with other team members, fills gap in team performance to maintain progress and often assumes a leadership role	
	OVERALL				
5.2) Practice collective decision making and task planning					
Score Descriptor		Unsatisfactory	Satisfactory	Exemplary	other
Sub PI	**Ability to practice collective decision making and task planning**	Member does not participate in decision making or task planning	Member contributes to decisions and task planning	Member promotes and encourages others to practice collective decision making and task planning	
	OVERALL				
5.3) Meet objectives					
Score Descriptor		Unsatisfactory	Satisfactory	Exemplary	other
Sub PI	**Ability to meet objectives**	Members are not able to achive the team objectives	Members are able to achieve the majority of team objectives	Members are able to achieve all team objectives	
	OVERALL				

Student Outcome	7) An ability to acquire and apply new knowledge as needed, using appropriate learning strategies				
7.1) Acquire new knowledge as needed, using appropriate learning strategies					
Score Descriptor		Unsatisfactory	Satisfactory	Exemplary	other
Sub PI		Unable to acquire new knowledge without assistance	Able to acquire sufficient knowledge with some assistance	Able to independently acquire new knowledge	
	OVERALL				
7.2) Apply new knowledge as needed					
Score Descriptor		Unsatisfactory	Satisfactory	Exemplary	other
Sub PI		Unable to apply new knowledge without assistance	Able to apply new knowledge with some assistance	Able to independently apply new knowledge	
	OVERALL				