Arab American University

Faculty of Engineering and Information Technology

Computer Systems Engineering

SENIOR PROJECT

Project Title Here ...

Insert Academic year Here ...

Students Statement

We, the undersigned students, certify and confirm that the work submitted in this project report is entirely our own and has not been copied from any other source. Any material that has been used from other sources has been properly cited and acknowledged in the report.

We are fully aware that any copying or improper citation of references/sources used in this report will be considered plagiarism, which is a clear violation of the Code of Ethics of the Arab American University.

First Name Last Name (ID)   First Name Last Name (ID)

First Name Last Name (ID)   First Name Last Name (ID)

First Name Last Name (ID)   First Name Last Name (ID)

First Name Last Name (ID)   First Name Last Name (ID)

Supervised by: *Dr. Author*

Computer Systems Engineering Dept.
Submitted in partial fulfillment of the requirements of B.Sc. Degree in Computer Systems Engineering

Insert Date Here

Supervisor Certification

This to certify that the work presented in this senior year project manuscript was carried out under my supervision, which is entitled:

"SP Title Goes Here"

First Name Last Name (ID)   *First Name Last Name (ID)*

First Name Last Name (ID)   *First Name Last Name (ID)*

I hereby that the aforementioned students have successfully finished their senior year project and by submitting this report they have fulfilled in partial the requirements of B.Sc. Degree in _____ Engineering.

I also, hereby that I have **read, reviewed and corrected the technical content** of this report and I believe that it is adequate in scope, quality and content and it is in alignment with the ABET requirements and the department guidelines.

Dr. Name of Supervisor,

ACKNOWLEDGMENT

ABSTRACT

No more than one page

List important keywords at the end of the abstract.

TABLE OF CONTENTS

*Note (**Delete these lines**): The section titles in each chapter are guidelines and you may modify the titles or add other section titles and/or subtitles in consultation with your project advisor as there may be variations in the departmental requirements.*
(Senior Project I chapters 1 -3),
(Senior Project II All chapters)

LIST OF FIGURES

LIST OF TABLES

LIST OF SYMBOLS AND ABBREVIATIONS

This is where you should put all the symbols used and abbreviations **(must be sorted)**. It is stored in a table format same as the table of contents. Use inserts a row to add more entries….etc

LIST OF SYMBOLS	
w	Angular velocity in rad/s
ξ	Damping ratio
LIST OF ABBREVIATIONS	
ABET	Accreditation Board For Engineering And Technology
EC	Examining Committee
PC	Project Committee

1 CHAPTER 1: INTRODUCTION

General guidelines for Section 1: The capstone project report is a very important part of your work and counts towards a significant portion of your final project grade. This section should provide relevant background information on the project and provide the motivation for it. It should emphasize the problem identified and significance of the project compared with other existing solutions.

1.1 Problem Statement and Purpose

A clearly written, detailed yet concise statement of just what the project entails, including any sub-topics. Where the Abstract seeks describe the problem with as few words as possible, the Description should be as complete as possible without unnecessary words. Pay particular attention to eliminating ″loose ends.″ There should be no aspects of the project that cannot be clearly defined at this stage.

A description of how the proposed project relates to a current problem, opportunity, product, situation, etc. List some specific benefits of the proposed solution (e.g., satisfaction of a specific need, economic gain, contribution to society, advancement of scientific knowledge, etc.). In other words, **why are you doing this project?**

1.2 Project and Design Objectives

List all objectives. Each must be specific, clearly stated, and measurable.   Without these, how will you know if you've accomplished what you set out to do? For example, ″To learn more about robotics″ is a poor objective. How much is more? How will we measure how much you've learned? If it can't be measured, we don't know when it's been achieved. On the other hand, ″To design and build a speed sensor that is accurate to within 0.5 m/s and has a MTBF of 2 years″ is a specific, clear, measurable goal. Note: Students often have trouble writing good objectives. Before you turn in the Proposal, ask yourselves if the objectives are clear, specific, and measurable. The course instructor will be most happy to review and help with your objectives.

1.3 Intended Outcomes and Deliverables

Project outcomes are results that occur from creating your product or service. They are the changes in policies, people and communities that you aim to achieve with your work. Outcomes may be positive or negative and sometimes occur unintentionally. These statements are specific and measurable, letting you know when you accomplished your goal. While they lead to creations, project outcomes focus more on the broad mission.

1.4 Summary of Report Structure

2   CHAPTER 2: BACKGROUND

2.1 Overview

(Context theoretical background of the subject)

2.2 Related Work

(Can be literature review and existing systems, should ends with a comparison of designs)

The literature review is to be complete and well documented, with clearly presented references (including Internet sites) that establish the state-of-the-art and where your project fits. Clearly state your conclusions regarding what you have learned from this research, as it relates to your project.

3   CHAPTER 3: METHODS AND MATERIALS

In this part of the report please include the specific project details. For example, include description of the approach taken, how problems were solved, detailed system architecture

3.1 System Design and Components

Present a detailed and complete design for a device that meets your specifications and fulfills the objectives. Your goal should be to create a design that would allow a competent person with no prior knowledge of how or why your device works to build one from your plans. If you wish, drawings and other supporting documents may be placed in the Appendix to improve readability.

Includes a description of the work done within the scope of the project by the team and methods used in solving the problem described in the Introduction section. Detail how each component in the project worked.

Required hardware and software tools and accessibility.

3.2 Design Specifications, Standards and Constraints

(Description of the project, standards and constraints.)

Existing standards impacting the system design requirement (such as IEEE standards, software standards etc.).

Some examples of standards that might impact design choices:

Standardized network technologies: e.g. Bluetooth, Zigbee/IEEE 802.15.4, IEEE 802.11a/b/g, Internet Protocol—IPv 4 and IPv6, TCP, etc.

Standardized security mechanisms and protocols: IPSEC, SSL/TLS, SMIME, PGP, SET, Kerberos, AES,etc.

Standards for electric power systems: IEEE 1547, IEEE 2030, UL 1741, etc.

Powerline communication standards: IEEE 1901.2, x10 (an open industry standard for home automation)

Standardized software development tools, and software environments: Java Software Development Kits, JVM, JRE, MATLAB, Cadence, Labview, etc.

Standardized software engineering practices: MIL-STD-498, IEEE 12207, POSIX, etc.

Standardized quality management guidelines: ISO 9000, ISO 9001, etc.

Hardware standards: microcontroller standards, plug-and-play standards, measurement bus standards (GPIB/IEEE 488, PCI, PXI), etc.

Open source standards, software, and operating systems: Linux, Apache server, Gnu, OpenGL, etc.

3.3 Design Alternatives

Briefly describe the alternative approaches you considered. Give reasons for why you rejected each alternative in favor of your proposed solution

3.4 System Analysis and Optimization

Describe the types of analyses and/or experimental work that have been carried out and discuss any work that remains to be done.

3.5 Simulation and/or Experimental Test

Include details of any measurements performed, repeated trials (for validation), error/performance analysis (as a function of system parameters). Include plots, images or tables to describe measurement values.

4 CHAPTER 4: RESULTS AND DISCUSSIONS

4.1 Results

Summarize the results and draw conclusions based on those results. Detailed results (e.g., printouts) can be placed in the Appendix to improve readability of the report. experimental results.

4.2 Discussions

Discuss your result that obtains in above section.

5 CHAPTER 5: PROJECT MANAGEMENT

5.1 Tasks, Schedule and Milestones

You are required to develop the schedule of your senior project which involves identifying the main and sub tasks, investigating task sequences, resource estimations, and task duration estimates to generate the project schedule that also includes milestones which are precise points used to measure the progress toward the final goal. A sample of a project schedule represented in Gantt chart format is shown in figure 5.1.
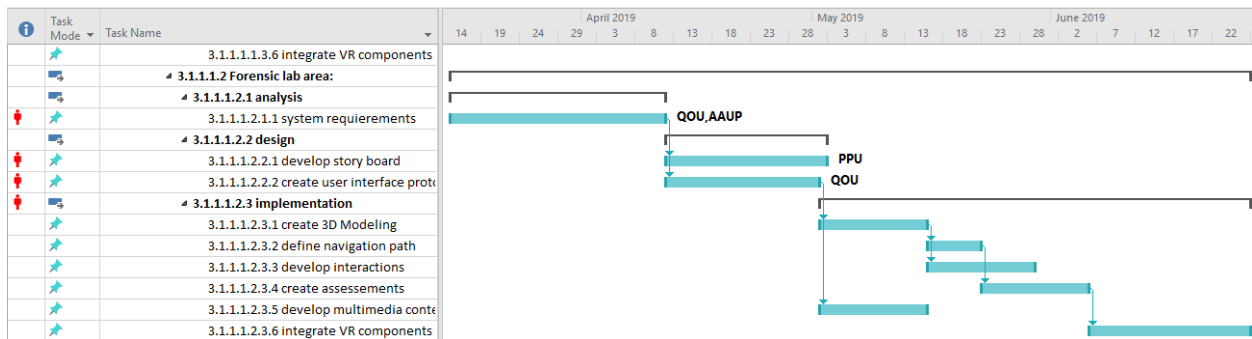

Fig. 5.1 A sample project schedule

5.2 Resources and Cost Management

In this section you have to estimate the needed project resources which involves assessing how many resources—people, tools, equipment, and materials—a project team should use to accomplish project tasks. You have to specify the cost of theses resources where you can fill these costs and calculate the budget of developing the project in a table such as the table below.

Table 5.1 Sample table to fill in total cost of senior project items

Item	# Unit	Unit Cost	Subtotals	Comments
Total senior project estimate				

5.3 Lessons Learned

You have to document information that reproduces both the positive and negative practices of the senior project.

6 CHAPTER 6: IMPACT OF THE ENGINEERING SOLUTION

Sustainability consideration and constraints includes economic, environmental, and social (equity) aspects that need to be evaluated and taken into account in project research and development. There is a strong relationship between these three pillars of sustainability. These need to be considered and incorporated in this section with a discussion on their design constraint and the positive and negative effects of the project within this scope.

6.1 Economical, Societal and Global

Economics (cost) impact: should consider, when relevant,

    i. Prototype design and production cost, including the manner in which production cost can be reduced, when applicable.

    ii. Device cost in mass production, including materials, operations, supports etc.

    iii. Cost saving of the product should be considered when appropriate. For example, energy savings compared with the use of other products, water saving, reduction in operation cost, etc.

    iv. Tax incentives to be considered towards final product cost. For example, renewable energy and energy efficient products tax incentives, carbon footprint reduction, etc.

    v. Environmental aspects, such as availability of resources, may affect the product cost and therefore price and their market vulnerability.

Social impact of the product: when relevant, please consider

    i. How can the developed product impact people lives. Is it a positive or negative impact?

    ii. What community or personal needs does it address?

    iii. Is the product going to change consumption patterns?

    iv. Is the product automating a task currently preformed manually and therefore might impact employment?

    v. Does the product create new jobs or fields?

    vi. Safety aspects and health concerns

    vii. Regulation constraints that address social and environmental concerns

6.2 Environmental and Ethical

Environmental impact of the product: when relevant, please consider

i.   Increase or reduction in emissions obtained through modifications in processes that emit greenhouse gasses (GHG) or products that do so.

ii. Change in consumption or use patterns, which effect the environment such as use of water, food, energy, wood, etc. (positive or negative affect).

iii. Reliance on resources that are scarce (such as precious material) or abundant. For examples, some fuel cells technologies use rare material while other use abundant ones. This will have an impact on the availability of these materials as well as their prices.

iv. Project production and operation effect on natural resources availability and competition on the planet resources. Considering their availability in nature and the impact of their consumption on the balance of nature.

v.   Environmental regulation

6.3 Other Issues

7   CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS

7.1 Summary of Achievements of the Project Objectives

Draw conclusions about the level of success of your work. Did you substantially meet your objectives? What did you learn in the process?

7.2 New Skills and Experiences Learnt

7.3 Recommendations for Future Work

This is one of the most important sections in the Final Report, at least for those who may pick up where you left off. Knowing what you know now, given the same problem, what would you do if you had it to do all over again? Understanding that problems of significance are rarely if ever solved perfectly the first time, what would you suggest as the next step toward finding the answer?

REFERENCES

[1]. Rashid M. H., *Power Electronics: Circuits, Devices & Applications*, 4th Ed., Upper Saddle River, New Jersey: Prentice Hall, 2013.

[2]. Foschini G. J. and Gans M. J., "On Limits of Wireless Communications in a Fading Environment when Using Multiple Antennas," *Wireless Personal Communications,* Vol. 6, No. 3, pp. 311-335, March 1998.

[3]. Gans M. J., "A power-spectral theory of propagation in the mobile radio environment," *IEEE Transactions on Vehicular Technology*, Vol. 21, Issue 1, pp.27-38, 1972.

[4]. Dahl G., Suttrop F., "Engine Control and Low-NOx Combustion for Hydrogen Fuelled Aircraft Gas Turbines," *International Journal of Hydrogen Energy,* Vol. 23, No. 8, pp. 695–704, 1998.

[5]. Watermark 200SS soil moisture sensor specification manual. Available at http://www.irrometer.com/sensors.html

APPENDICES

A p p e n d i x   A :

A p p e n d i x   B :

A p p e n d i x   C :