**CEN 421 M23**

**Class Project Written Report Structure**

**V1**

**as of 5/10/22**

**Title Page:**

NU logo, Team’s name, Project title, Date, Team Members

**Table of Contents:**

The table of contents is designed for the convenience of the reader.

Do not list the “Title Page” or “Table of Contents” in the table of contents.

**Section 1: Introduction**

This Section answers the question “**Why?**”

It also establishes a statement of the need and gives background of why this project warrants to be worked on. Specifically,

* Why this project is important? What is the “pain”?
* Is there anything unique, interesting or challenging about this project?
* Will this project experience help students prepare for the “real-world” professional careers? How?

In general, the first Section should include the following information:

* **Background**: provide a brief description of the process of how the team has selected this particular project. This section a description of the events leading up to your decision to work on the proposed project.
* **Problem Statement**: this is the heart of this effort - the question to be answered by the project.

A good way to approach the problem statement is to address the

following: Because of x and y, there is a problem in society (or the field

of engineering management); if only we knew more about z, things might

be better. The project should be designed to answer z, which is

the project outcomes/answer. Students first might want to pose a

question to be answered, and then rephrase that question into the form

of a statement.

* **Purpose and the Key Objective**: Rarely is a problem in engineering management one dimensional. This subsection should describe the specific elements of the question/problem being addressed by the project. There should be just one “key” objective to be addressed.
* **Project Outcomes**: based on the purpose and objectives, what are the expected outcomes for the project? What is the ”cure”?
* **Success Criteria**: what criteria will be used to determine whether the proposed project outcome is successful?

* **Limitations (out of scope)**: explain which aspects of a typical project will not be included here. Describe the (potential) effects the specific limitations may have on your project success.
* Transition to the next section.

**Section 2: Secondary Research Related to this Project**

It is not a series of book reports or journal articles. A good secondary project review tells a story about the topic/question/problem, by synthesizing readily available from different publications, data basis, vendor material, trade organizations, consulting firms, regulatory agencies, and governmental sources.

How were similar projects approached in the past? Were all these approaches successful? Why, perhaps, some of them failed?

This Section will contain the greatest number of citations, so it is important that they be done correctly. Each citation must have a corresponding listing in the Reference section.

Transition to the next section.

**Section 3: Methodology**

This Section answers the question “**Hows?**”

In general, this Section describes the logic of the project process and the project plan.. These are the steps:

1. **Purpose:**

Re-state the statement of the purpose of this project.

1. **Concept Generation:**

1. Identify the “concept” of the “cure” based on the “pain” defined before.

2. Generate an unrestricted set of potential solutions (the Fuzzy Front End)

3. Apply predetermined criteria to select the one concept to be further

 developed

4. Draft a description of this concept.

1. **Affected Stakeholders:**

Identifying the internal and external stakeholders with an interest in the

solution. Will this project generate any positive or negative externalities that

will have a long-term effect on the stakeholders? How do you plan to “price-in” these externalities in your project model?

1. **Analytical Model:**

Architecting the appropriate logical model that includes: the dependent variable, a set of independent variables (drivers of the outcome), and the relationships between these variables. Also, all relevant constrains should be clearly stated.

Specific Models to evaluate outcomes: i.e., Financial (NPV), strategic, operating, marketing, functional ,safety, etc.

1. **Secondary Datapoints:**

Collect current and relevant data points from the reliable secondary sources.

Identifying the gaps in the knowledge base.

1. **Primary Datapoints:**

If needed, development appropriate primary 1 data collection methods, tools, and instruments. For example: observation, experimentation, simulation, prototyping.

Collect and evaluate collected primary datapoints.

Transition to the next section

**Section 4: Design, Testing, Modeling**

Use visualization, drawings, illustrations etc., to show the “before” and “after” scenarios.

Point out the areas of the physical improvements” (the “cure”).

Transition to the next section.

**Section 5: Interpretation of Results**

Link these improvements to the expected outcomes (success criteria). Tables are an effective way to present quantitative data. Qualitative data should be summarized, as opposed to verbatim transcriptions.

Transition to the next section

**Section 6: Conclusions and Recommendations**

This Section consists of an interpretation of the results and the recommendations of the further steps that would be needed in order to make this project an outstanding success.

**Appendices**

The main purpose of appendices section is to provide detailed information that would be distracting if presented in the text. For example, a survey instrument or questionnaire, a data collection forms, analytical models.

**Short Bios:** a short paragraph describing each student’s educational and professional background.

**References:**

Only those works cited in the text appear in the reference section and, conversely, every work in the reference section must appear in the text.

**List of Tables:**

The term “table” applies to numerical and statistical data set in vertical or horizontal alignment. If there are tables in your text/appendix, a list of tables must be included. The “List of Tables” is on a page by itself and arranged in the same general format as the Table of Contents. Please note:

* Titles may be shorter than they appear in the text as long as they are not misleading. Titles may not be longer than the titles in the text.
* Numbering of tables. You have two options: (a) You may begin by numbering the first table with the numeral “1” and continue to number your tables consecutively throughout the entire manuscript; or (b) you may number the first table in each Section with the numeral“1” and continue to number your tables consecutively within each Section. For example, if Section four has three tables and Section five has three tables, the numbering would be as follows: 4.1, 4.2, 4.3; 5.1, 5.2, 5.3.
* Single space within titles, which are longer than one-line, double space between entries.
* Tables one page or less in length should never be divided. Tables must not exceed the usual margins of the page in the manuscript.
* Lengthy tables should be placed in the Appendix.

**List of Illustrations:**

This list is also placed on a page by itself and arranged in the same general format as the Table of Contents. Designate figure numbers with Arabic numerals.

**List of Symbols:**

If symbols are needed in the text, a list should be provided to explain their definitions or meanings. The list should be placed on a separate page and included where specified by these instructions.

**Definition of Terms:**

List and describe definitions of terms which might be unfamiliar to the reader. Definitions should have references if they are of a technical nature.

**Program Learning Objectives**

These objectives should be augmented by the learning objectives of your NU Department.

|  |  |  |  |
| --- | --- | --- | --- |
| **MSENM Program Learning Outcomes** | **U** | **S** | **H** |
| 1. Demonstrate quantitative analytical and critical thinking skills and techniques to manage projects and processes (products and services).
 |  |  |  |
| 1. Examine a multidisciplinary approach involving the integration of engineering, management, quality, and risk analysis in projects, and processes (products and services).
 |  |  |  |
| 1. Identify, prioritize, and select relevant solutions in solving complex engineering problems and processes.
 |  |  |  |
| 1. Assess tools and techniques, resources, organizational systems, and decision-making processes for the successful management of projects and processes (products and services).
 |  |  |  |
| 1. Apply global mindset and a detailed knowledge of business environments in engineering management solutions.
 |  |  |  |
| 1. Demonstrate organizational and team skills needed to manage projects and processes.
 |  |  |  |
| 1. Communicate effectively using graduate-level oral and writing skills.
 |  |  |  |
| 1. Demonstrate professional and ethical responsibility in engineering management
 |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Specialization in Project Management PLOs** | **U** | **S** | **H** |
| * Apply a multidisciplinary approach involving the integration of engineering, management, quality, and cultural analysis to the conduct of project management engineering.
 |  |  |  |
| * Evaluate the financial impact of projects on corporations and businesses and develop appropriate action plans through project management engineering.
 |  |  |  |
| * Integrate state-of-the-art technological advances to the practice of project management engineering.
 |  |  |  |
| * Achieve agreed upon scope, budget and schedule requirements using resources, organizational systems, and decision-making processes.
 |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Specialization in Systems Engineering PLOs** | **U** | **S** | **H** |
| * Implement and manage technologies aligned with the business of an organization.
 |  |  |  |
| * Perform organizational systems analysis, design, planning, and integration of technology.
 |  |  |  |
| * Evaluate hardware, software, and systems applications that support technologies.
 |  |  |  |
| * Develop strategic technology management policies and procedures required by the organization.
 |  |  |  |