****

**NAME OF THE PROJECT**

**by**

**NAME & SURNAME**

**NAME & SURNAME**

**NAME & SURNAME**

**NAME & SURNAME**

**NAME & SURNAME**

**NAME & SURNAME**

**Supervised by: Advisor’s Name**

**Faculty of Engineering**

**Department of Industrial Engineering**

**FALL or SPRING and YEAR**

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

## WARNING

**If you are registered to IE 401, you are expected to discuss with your advisor about which sections/subsections have to be included in your report. This template is designed for your final reports (i.e., reports for IE 402). Please keep in mind that expectations may vary depending on your project topic.**

#### Format of Project

1. Required spacing between lines and maximum number of pages defined for your report excluding References and Appendices are as follows.

|  |  |  |
| --- | --- | --- |
|  | **Maximum Number of Pages** | **Spacing between lines** |
| **IE 401 Project Report** | **20** | **1.5** |
| **IE 402 Project Report** | **40** | **1.5** |

There is no page limit for Appendices, however, checking Appendices is not mandatory for your jury members so make sure you include all important information in the main sections of your report, not in the Appendices.

1. You are strongly recommended to double check with your advisor about the flow of your project report, especially if you are planning to change the chapters, introduce subsections, etc.
2. The font must be “Times New Roman” with font size 12.
3. Each equation and formula should have a number such that first number shows the chapter number and second one shows a particular equation in that chapter.

 (1.1)

All tables and figures must have numbers. Similar to the equations, the first number shows the chapter number and the second one shows a particular table or figure in that chapter. Caption of a table should be written above the table, whereas, caption of a figure should be written below the figure.

Both figures and tables should be legible. (Do not decrease the font size a lot to make the tables and/or figures fit in the margins.)

**Table 3.2: Average computation times of MILP in seconds**

|  |  |
| --- | --- |
| **# of Jobs** | **MILP**  **(sec.)** |
| 60 | 11.2 |
| 70 | 20.9 |
| 80 | 34.3 |
| 90 | 47.5 |

**Figure 4.2: % increase in sales (2015)**

1. All references should have a number in brackets that corresponds to the number of the source. Refer to IEEE documentation at http://www.ieee.org/documents/ieeecitationref.pdf.

For example:

[1] Wallace, R. B. and Whitt, W. (2005). A staffing algorithm for call centers with skill-based routing. *Manufacturing & Service Operations Management*, *7*(4), 276-294.

1. According to the topics of the project, more chapters and/or sections can be added.

#### Content of Project

1. An outline is provided for each section to organize your final report in the following pages of this report template file. Your report is supposed to follow this outline; however, it is not limited to it. You can (and you should) change any part of it if it is a better fit for your project. In particular, bullets given under each chapter are not subsection headings; you are supposed to use them as a check list for possible content. However, **you have to explain the bold statements in the outline (i.e., you cannot exclude them from your report).**
2. While writing the project report, make sure that enough background information along with a clear definition of topic are provided.
3. The writing of project should be written in appropriate style in formal English.
4. Another important consideration is flow that means moving from one statement in a text to the next. A clear connection of ideas is important to help readers to follow the text.
5. Titles should express the topic and scope of the study in order to demonstrate the chosen area to readers.
6. Try to avoid directly referring to the reader such as "Let us examine ..." or "As you will see..."

#### Presentation

1. The project must be presented briefly at the time that is announced during the semester.
2. All group mates should take part in the presentation.
3. Each project group will have a maximum of 20 minutes for presentation plus 10 minutes of Q&A session. It is strongly recommended that the group practices the presentation in advance as the presentations exceeding 20 minutes will be interrupted. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

## Declaration of Own Work Statement/ (Plagiarism Statement)

Hereby I confirm that all this work is original and my own. I have clearly referenced/listed all sources as appropriate and given the sources of all pictures, data etc. that are not my own. I have not made any use of the essay(s) or other work of any other student(s) either past or present, at this or any other educational institution. I also declare that this project has not previously been submitted for assessment in any other course, degree or qualification at this or any other educational institution.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Name | Name | Name | Name | Name | Name |
| Signature | Signature | Signature | Signature | Signature | Signature |
| Place, Date | Place, Date | Place, Date | Place, Date | Place, Date | Place, Date |

## Abstract

The abstract is a short summary of the report. Problem with its main objective or aim will be summarized followed by your modern solution approach, suggestions and conclusion. Abstract must be short writing and must not include diagrams or complex formulas.

## Acknowledgments

This section is to thank your colleagues, a company or a financial support. For instance, a statement can be written as ‘We would like to thank Company ABC product manager for his invaluable help during our project…’

Furthermore, in the acknowledgments, disclaimers statements are written, for example, ‘However, any mistakes that remain are my own.’ Acknowledgments should be written in the first person using I for single author and we for one of two or more joint authors.

Moreover, financial support may tend to come first, followed by thanks. Disclaimers may depend on the writer. Mentions of other matters, such as permissions or sources of materials, may also take place.

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### Introduction

It is a short overview of the work done including the general outline of the structure and contents of the work by describing the following.

1. Work done in this report
2. Scope of the work done
3. Motivation behind the work
4. Main purpose of the work
5. How is the work done?
6. Main findings/contributions
7. Conclusion
8. Flow of the project (For example, “Organization in the company is explained in Chapter 2, whereas, problem situation is analyzed in Chapter 3…”)

### Company or Public/Nonprofit Organization

Information about the company or public/nonprofit organization **relevant to the project** is included in this chapter. Make sure that you paraphrase all materials that you are citing (especially if you are using company documents for this chapter).

1. Brief history of the company or public/nonprofit organization
2. Physical facilities
3. Organizational units and relevant subsystems
4. Services and/or products
5. Market(s) and customers
6. Relevant data (number of workers, amount of revenue, …)

### Current Situation and the Problem

Following information about the problem situation is expected to be included in this chapter.

**i) Problematic issues described by the company or public/nonprofit organization relevant to your project**

* 1. **History and complexity of the problematic issues**
  2. **Relations of these problematic issues with other components of the system**
  3. **Difficulties including uncertainties**
  4. **Trade-offs and conflicts**

1. Customer or beneficiary expectations and needs
2. Relationship of the issue with the scope of the project clarifying causes (diagrams can be used here, e.g., fishbone diagram)
3. Data analysis of the company or public/nonprofit organization relevant to your project and assessment of the current system based on data analysis

### Problem Description

1. Definition of your problem including the following:

**a. Clarify which one you design: a complex system or device or product**

**b. State whether you develop a solution approach for the company and/or public/nonprofit organization’s problem(s), improve an existing system, device or product and/or design a new system, device or product**

c. Inputs, outputs, components of the problem, and relationship in the system shown by diagrams (such as process flowcharts) including people, materials, information, equipment and energy

1. Problem formulation
   1. Assumptions
   2. Goals/Objectives
   3. Constraints and conditions
   4. Performance measures
   5. Restrictions (especially compare your constraints and conditions with the realistic constraints and conditions observed in the company )
   6. Alternative courses of action
2. Discuss the physical, technical, social, environmental and economic constraints, if any exists
3. **List industrial engineering courses mapping your problem by filling in a similar table as mentioned below and explain the reasons briefly in a paragraph**

**At least two elective courses and relevant core courses should be mapped to your project.**

|  |  |
| --- | --- |
| **Industrial Engineering Courses** | **Where is it used?** |
| IE 373 Service Systems Planning | Call center design |
| IE 374 Pricing and Revenue Optimization | Revenue Optimization |
| …. | …. |

|  |  |  |  |
| --- | --- | --- | --- |
| **Goal ID** | **Goal** | **Tick if related to your project** | **Explanation** |
| **1** | No Poverty |  |  |
| **2** | Zero Hunger |  |  |
| **3** | Good Health and Well-Being |  |  |
| **4** | Quality Education |  |  |
| **5** | Gender Equality |  |  |
| **6** | Clean Water and Sanitation |  |  |
| **7** | Affordable and Clean Energy |  |  |
| **8** | Decent Work and Economic Growth |  |  |
| **9** | Industry, Innovation and Infrastructure |  |  |
| **10** | Reduced Inequality |  |  |
| **11** | Sustainable Cities and Communities |  |  |
| **12** | Responsible Consumption and Production |  |  |
| **13** | Climate Action |  |  |
| **14** | Life Below water |  |  |
| **15** | Life on Land |  |  |
| **16** | Peace, Justice and Strong Institutions |  |  |
| **17** | Partnerships |  |  |
|  | | | |

1. **Check the list of the UN Sustainable Development Goals (You can check detailed explanations of the goals @** [**https://www.un.org/sustainabledevelopment/sustainable-development-goals/**](https://www.un.org/sustainabledevelopment/sustainable-development-goals/)**) and explain how the goal is related to your project briefly.**

**If a goal is not related to your project, please write “-” at the corresponding cells. Keep the table as it is; please do not delete any row.**

**At least one goal must be chosen and explained.**

### Design (or Solution) Approach

1. **Literature Review with proper reference citations has to be provided under a separate section with the title ‘Literature Review’.**
2. **Choice of modeling approach and its justification (advantages and disadvantages of your modern design tool)**
3. Representation of your model(s)

\* For example, if it is mathematical programming model: Indices, Parameters, Decision Variables, Formulation (objective function and constraints), Explanation of objective function and constraints.

\* For example, if it is a heuristic solution algorithm, Inputs, Outputs, Flowchart (or pseudocode), Explanation of the heuristic solution algorithm

1. Verification and validation of your model(s)

### Computational Results

1. Results of computational experiments (when applicable) including the software used
   1. Scenario analysis (what-if analysis)
   2. Sensitivity results
   3. Experimental design and statistical analysis
2. Interpretation and discussion of the results, proposed solution and/or design alternatives
3. Confirmation of computational results on pilot implementation

### Implementation

Implementation plan is explained in this chapter. If implementation could not be done in the company or public/nonprofit organization, explain the implementation steps as it will be done in the future.

1. **Expected structure and procedural updates suggested for the company or public/nonprofit organization**
2. **Design of a control mechanism to monitor and improve the system performance**
3. **Resource requirements for implementation**
4. **Technical, operational and financial feasibility of implementation**
5. **Difficulties faced during implementation**

### Conclusion

i) Summary of the work done

1. **Comment on the impact of your work on global and societal health, environment and safety including the legal consequences of your work**
2. **Discuss possible ethical issues resulting from the outcomes of your project.**

iii) Conclusion

iv) Future work

## References

In this part, there should be a list of references and each reference has its own number in the reference list. There may be several types of references like web pages, books, articles or conference proceedings. As mentioned in the Format of Project Section on page 3, refer to IEEE documentation at http://www.ieee.org/documents/ieeecitationref.pdf.

## Appendices

In this chapter, detailed description such as codes, data, screenshots, maps, figures and tables, may be represented.