

ISE 407 Summer Internship – Report Guidelines (MANUFACTURING)

A report should begin with a few pages containing the summary of work done and the content of the work accomplished for each week. The rest of the report should contain the following sections and be in a continuous text format, with a body text length of at most 15 pages. Extra tables and figures that are not directly related to the discussion in the relevant section should be included in the appendix.

Section 1. Company Introduction/Identity

Fill out the identity card and give general information about the company (its sector, product range, sales volume, suppliers and customers, etc.).

Company Name:	
Company Website:	
Company Location:	
Date of Establishment:	
Ownership:	
Area (m ²)	
Outdoors:	
Indoors:	
Number of Employees	
White Collar:	
Blue Collar:	
Number of IEs:	
Annual Production Capacity for Major Products	

Section 2. Organizational Structure and the Manufacturing System

Describe the organizational structure of the company and its production system by addressing at least the following items.

- Describe the organization of the company by providing:
 - ☐ Organizational chart

- ☐ An adjacency matrix showing the relationships between major departments (finance, marketing, production, etc.) and give brief descriptions on the responsibilities of each department
- ☐ Duties of industrial engineers in the organization
- Provide an overview of the manufacturing system
 - ☐ Identify and discuss the manufacturing technology (JIT, CIM, FMS, etc.), inputs, resources, constraints, etc.

Section 3. System Analysis and Improvement

Analyze a main or sub-system by utilizing industrial engineering (IE) / operations research (OR) tools mentioned in Subsection B for the improvement of that system.

A. Problem Definition

- Identify an important problem related to the one of the processes¹ in the underlying (sub-)system that requires attention and improvement.
 - ☐ Provide a process flow chart (preferably using MS Visio) and identify productive/non-productive activities related to the process
 - ☐ State whether the selected process is deterministic or stochastic. If stochastic, explain the sources of randomness (e.g. arrival times of sub-assemblies, processing times, supply, demand, etc.).
- Analyze the underlying process by identifying its components from the perspective of IE / OR such as objective function, decision variables, constraints, parameters, uncertainty, etc.
- Formally define the problem. Conduct a brief literature survey for problems of these types to identify potential solution approaches.

B. Model Development and Recommendations

- Develop a conceptual model (if viable, optimization, simulation, or statistical model) for the underlying problem. Discuss what type of IE/OR techniques can be used for improving the underlying process (e.g., discrete-event simulation, operations research (LP, IP, MIP, dynamic programming, stochastic models, etc.), machine learning, statistics (descriptive analysis, boxplot / histogram / scatter charts, hypothesis tests, correlation, regression, etc.), project management tools (CPM, PERT, etc.), lean or six sigma methods, root cause analysis, process analysis tools (Gantt / milestone / fishbone / cause and effect charts, process flow charts, event logic diagrams, etc.)

¹ A process is a group of activities that uses inputs and produces outputs/value

- Use at least one of the following software tools for your analysis: MATLAB, Python, AMPL, GAMS, Simio, SQL, Excel.
- Identify the type of data you need for improving the process (If the relevant data is not available, then collect the data you need.) Then, using the data,
 - ☐ Provide recommendations for the improvement of the process based on the IE/OR tools used above.

C. Discussion/Conclusion

Briefly summarize your work on the improvement of the process. Explain how your work contributed (or can contribute) to the firm's operations and elaborate on the challenges you encountered during your analysis.