**MCET 530 – THERMAL FLUIDS SCIENCESS II**

**PROJECT PROGRESS REPORT**

**DUE: Friday, March 1, 2019**

**COMPANY NAME:**

**OBJECTIVE**

Using all available resources, design and analyze a power plant that operates on a *simple actual vapor power cycle*. The main objective of this first task is to maximize the overall plant efficiency and achieve a power output of at least 50 kW, while minimizing cost.

**REQUIRED DELIVERABLES:**

The first component of your progress report should be a detailed **thermodynamic analysis** of the designed plant. Your analysis must include solutions for the following:

1. Heat transfer into the cycle
2. Heat transfer out of the cycle
3. Power output of the cycle (net work)
4. Cycle efficiency, ηcycle
5. Overall plant efficiency, ηplant
6. Mass flow rate of the fuel

Remember, your plant design is limited to the devices available for purchase. All devices vary in cost, efficiency, and operating parameters. Your design must consist of at least a boiler, turbine, condenser, pump, electric generator, a source for Qin (combustor, reactor, or solar receiver), and a cooling system.

In addition to a thermodynamic analysis, you must also consider the **purchase and operational costs** compared to the efficiency. You must provide a yearly budget that contains the following information:

1. Initial company capital
2. All device names and prices used in the plant
3. Total cost of all components in the plant
4. Cost of the fuel
5. Environmental fines from both the fuel source and cooling system
6. Final design cost for one year operation and remaining company capital

**APPROVAL SIGNATURES:**

Project Manager \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_

Customer \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_

**Design Objectives and Approach**

This document proposes**…**here you formally state what you propose to design. In the case of the first round of analysis, everyone is proposing a simple vapor power cycle.

Next, explain how you generated the design concept. For example, did you choose to maximize a certain temperature, did you choose the most efficient devices, etc.

Lastly, summarize/list your resulting required thermodynamic deliverables.

1. Heat transfer into the cycle
2. Heat transfer out of the cycle
3. Power output of the cycle
4. Cycle efficiency
5. Overall plant efficiency
6. Mass flow rate of the fuel

**Financial Analysis**

Here you would place a few sentences that explain the budget for the cycle. A detailed table is sufficient and should include the following parameters.

1. Initial company capital
2. All device names and prices used in the plant
3. Total cost of all the components in the plant
4. Cost of the fuel
5. All environmental fines
6. Final operating cost for one year and remaining company capital or profit generated

**Appendix**

Attach all design revisions with the final design on top.