ME354 COURSE PROJECT
SPRING 1998

OBJECTIVE

Assess the performance of thermodynamic software tools designed to assist in the calculation or demonstration of thermodynamic processes discussed in Thermodynamics 2. Examples of software tools can be readily obtained from the World Wide Web, the ME354 Homepage or from disks provided with various Thermodynamics text books.

The project can be a review of existing software, however, students are encouraged to develop their own tools based on the fundamental principles obtained in ME250 and ME354. Examples of software tools that can be developed by students include:

- calculators for determining properties from superheated steam tables, saturated water tables or the psychrometric chart
- visual aides for demonstrating the performance of one of the various thermal cycles discussed in the course

There are no restrictions on the program languages used to develop tools. Possible options include:

- Visual Basic or Visual C++
- Java or Javascript
- Spreadsheets
- Maple or Mathematica

PROJECT GUIDELINES

1. **Review of Existing Software:** These projects must be individually completed and submitted.
2. **Self-Developed Software Tools:** Groups of two (2) people are acceptable for projects in which original software tools are being developed. Individual reports must be submitted describing the work plan for each member of the group.
3. **Large-Scale Projects:** Projects involving more than two people may be considered at the discretion of the course Professor.

DEADLINES

1. Project Plan: June 1, 1998 (due following class at 9:30 am)
2. Final Report: July 17, 1998 (due following class at 11:30 am)

KEY REQUIREMENTS

1. **Project Plan:** A one page summary of the proposed project should be submitted by June 1, 1998. The project plan should include:

   - Name, ID Number and email address
   - Project Title
   - Abstract: discussing the goals and objectives of the project and the proposed method of implementation.
   - Source of Software: if self-developed, state the software tool used in development, if you are reviewing an existing model, state the source of the software.

   The project plan will be worth 5% of the final project grade.

2. **Final Report:**

   The final report should include, but should not be limited to the following:

   - **TITLE**: A concise but descriptive title for your project.
   - **OBJECTIVES**: A comprehensive statement of the goals of your project. This can be a restatement of the project plan.
   - **DISCUSSION**: A detailed documentation of your project, including mathematical formulations used, computer algorithms or flow charts, assumptions, limitations and proposed usages. For those developing their own codes a brief summary of the computer algorithm and its inherent assumptions plus a well documented computer code will serve as the discussion. (50% of the final project grade)
   - **FEASIBILITY ANALYSIS**: Demonstrate how your model (or the model you have chosen to analyze) works for selected examples. Example problems can be obtained from weekly problem sets, worked examples in various text books and problems from Reynolds and Perkins. The feasibility analysis must include a mix of worked examples and questions from Reynolds and Perkins. Also demonstrate how your model behaves over a range of conditions, including limiting conditions. Determine if the model provides a reasonable degree of accuracy over the full range of input conditions. Comment on the effectiveness of the model as a support tool for thermodynamic analyses. (45% of the final project grade)

   The final report should be in the 15 - 20 page range and should definitely not exceed 25 pages. Choose your words carefully and be concise.

Good luck!