ECE 695 – Spring 2015

"Numerical Simulations" – Professor Bermel

Final Project: Template and Rubric

Slide 1: Title Slide

Class Name, Instructor, Your Name, Date

Slides 2-3: Problem Description

Describe the problem that is being solved, and provide a justification for your investigation, citing relevant scientific literature.

Slides 4-5: Mathematical Model Formulation

Present a physically realistic model related to the class that will help you solve the problem, which may include other relevant information from the scientific literature and/or generally accepted scientific or engineering principles. Identify key assumptions or limitations.

Slides 6-7: Proposed Problem Solution

a. Define the approach

Predictively compare and contrast alternate simulation techniques that will help you solve the problem. State boundary conditions, assumptions and limitations. Describe how this simulation or code implements the model. Provide an explanation of why you chose this particular computational tool.

b. Validate the solution

The approach needs to be validated thoroughly. You can validate it by means of experimental data, a theoretical model, or previously documented test cases.

Slides 8-10: Problem Solution Implementation

Use your simulation to solve the problem to the extent possible. Explain your solution, noting any limitations or inaccuracies in the results, and discuss how these might be fixed. Briefly discuss how your approach can be applied to solve important research problems in the current scientific literature.

Slides 11-12: Results and Conclusions

Summarize the modeling approach and results, and show how the proposed solution addresses the problem/project.

Grading Rubric for Final Project

1. Student ID:	Unsatisfactory(0-3)	Needs Improvement (3-5)	Meets Expectation (5-8)	Exceeds Expectation (9-10)
Problem Description and Abstract (20%) Describe the problem that is proposed to be solved and provide a justification using literature from relevant research papers.	An unclear description of the problem statement and no relevant research backing provided.	Description of the problem statement needs refinement. Inadequate research relevance.	The problem is defined appropriately, but will need a little more refinement in terms of relevant literature.	The problem is very well defined, and the literature from relevant research work builds a persuasive case for the problem.
Feedback/comment from Instructor:				
Problem Framing **Analytical (10%)** **Numerical (10%)** Build both analytical and numerical models to help solve the problem. Interpret the problem (goals, information, limitations, and assumptions) in terms of relevant models, concepts or theories.	-No analytical or mathematical model included in the report.	- An analytical and mathematical model is provided, but it is incorrect.	- An analytical model is provided, but needs minor improvisation. - A mathematical model is provided, but needs minor improvisation.	-Both the analytical and mathematical models provided accurately frame the problem.
Feedback/comment from Instructor:				
Problem Synthesis **Define and Build (15%)** **Validate (10%)** Evaluates the quality of the solution approach built to solve the problem. The simulation needs to be validated thoroughly with either experimental data or test cases. Predictively compare and contrast alternate solution processes in terms of relevant metrics (e.g., accuracy, computational time, etc.). Develop a simulation (potentially built on an existing platform like MEEP) to solve the problem.	-The implementation of the solution approach is incorrect. -The solution approach is not validated	-The implementation of the solution approach serves the purpose, but needs refinement. -The validation process for the solution approach needs to be improved.	-The implementation of the solution approach provides the approach to solve the problem, but needs minor improvements. -The validation process for the solution approach needs minor improvements,	-The implementation of the solution approach is accurate. - The solution approach is validated appropriately.
Feedback/comment from Instructor:				
Problem Implementation and Solution (30%) Evaluates whether the student can use the model they build to solve the problem in a satisfactory and convincing fashion. Can this code help solve significant research problems of current interest?	-No solution provided to the problem. -Does not discuss the application of solution for a related problem.	- A solution is provided, but it is incorrect or does not adequately address the issue or problem. -Not a clear description of how the solution can be used to resolve a related problem.	-A solution is provided that would adequately address the issue or problem, but it is presented in a way that is unclear, or improperly documented. -A discussion is included which describes the use of the current approach to solve related problems.	- A solution is provided that is correct, clear and well documented. -A very clear explanation is provided of how the current approach can help solve related problems of interest.
Feedback/comment from Instructor:				
Organization of the Presentation (5%) An important aspect of a project report is its clarity to the audience, as well as the professional nature of its presentation.	Presentation is highly unclear and unprofessional.	Presentation has a number of unclear or unprofessional problems.	The presentation is mostly clear, but has 5 or fewer minor points of confusion.	The presentation is highly clear, and has
Feedback/comment from Instructor:				