Guidelines for Computational Physics Projects

The syllabus for PH423/523-2C specifies the grading weight and due dates for the computation physics projects:

Grading:	Project I – due March 1	(25%)
	Project II – March 24	(25%)
	Homework – due as noted	(20%)
	Final Project - Thu. Apr. 28, 10:45 am - 1:15 pm	(30%)

Graduate students enrolled in PH523 are assumed to have had more exposure to computational methods and introductory science and/or engineering concepts and are expected to use this knowledge in answering homework and preparing project reports. This expectation is reflected in the assignment of partial credit on homework and projects.

The syllabus also specifies the learning objective of the course to use computational methods to solve advanced physics problems in science and engineering applications. It is important for students to demonstrate through their work and report of their projects how this learning objective is achieved. Further, students are required to submit a written report for each project which includes the following components:

i. Statement and analysis of the problem;
ii. Formulation of an algorithm to solve this problem computationally;
iii. Development (writing, debugging and testing) of a computer program to solve the problem;
iv. Discussion, summary, and conclusions of solution of this problem.

These guidelines provide further instructions for preparation and scoring guidelines of these reports. First, the topic of each report needs to have approval of one of the course instructors (Drs. Harrison, Kawai, or Shealy) in advance of due date to insure the scope and formatting of project and report are appropriate for the background and level of each student. The professor will also serve as a mentor of the student for each project. A student can work with a different professor on each project.

The Final Report should be written in the format of a scientific or engineering paper containing the following components:

1. Title, author information, and abstract (5pts.)
2. Introduction containing statement of the problem and importance of numerical solution of the problem with references writing in format (15 pts.)
3. Procedures section describing formulation of an algorithm and development of a computer program to solve the problem. Use of figures and diagrams to illustrate procedures used. List program output in an appendix of paper where the code is structure is documented and references are made to sources of components of program from original sources, such as, Numerical Recipes collections of books and program libraries (30 pts.)
4. Results section describing data and analysis of running your problem to solve the problem. Figures and plots of variables should be included and illustrate a range of simulations for physically interesting domains of variables and parameters. The figures and plots need to contain a caption, labels of axes, and legend identifying different curves which may be present in some figures. When appropriate, a comparison of solution of the problem should be made with other known results with appropriate references being given. (30 pts.)
5. Summary and conclusion section describing outcomes of solution of the problem and effectiveness of the algorithm and computer program to solve the problem. (20 pts.)