OBJECTIVE:: The specific objectives of the course could depend on the problem definition for the project but the overall performance will be measured on the following criteria.

Course Contents:

a. Problem statement and literature survey- Students should be able to define the problem statement with clearly specified inputs and outputs. Goals for complex problems could evolve over time but it is necessary to have one in the beginning. A brief survey of the available literature and an initial draft of possible directions should suffice.

b. Modeling or Theoretical results- An appropriate model should be chosen for the problem. They should be able to reason the pros and cons of various models and choose a suitable one. It is important that they be in a position to defend their choices. The model should also involve the criteria by which they will quantify and test its performance. In case of theoretical work one should be able to describe the underlying mathematical basis of such problems in the literature.

c. Engineering or Mathematical tools- Numerous available methods could be put to use in implementing and testing the described model. They should demonstrate the ability to learn and put various methods to use. In theoretical study, grasp of mathematical tools used to put together a coherent argument or proof deriving the necessary results should be demonstrated.

d. Demonstration and Presentation- A model designed and implemented (or results derived or proved in case of theory) should be convincingly presented to showcase its positive and negative aspects. A demonstration to this end where applicable or a presentation in case of theoretical contributions should clearly describe the work. The work need not necessarily be novel or original and could be a clear exposition of otherwise hard concepts or a new perspective. The purpose is to measure understanding of the techniques and methods used and to appreciate the results in the larger context of their applicability in science and engineering. It is important to emphasize early on, the effort and time it takes to make a work presentable which is usually underestimated by most students.

A combination of the above criteria can be used to grade the work. Typically the following guidelines could be helpful for projects taken up as part of different semesters.

Evaluation procedure: Statement and Survey 25%, Engineering/Math Tools/Derivations 40%, Demonstration and Presentation 35%.

COURSE TOPICS:: Choice of student and the instructor.

READINGS
1 TEXTBOOK:: Instructor’s choice.
2 REFERENCE BOOKS:: Instructor’s choice.