Syllabus_ Raj_Fall 2022
Nanoscience & Engineering (NS&E)

MCEN_5228-035; MCEN 4228-027

Meets Remotely on Mon and Wed at 3:35 to 3:50 PM

Unique feature

The unique feature is to describe a synergy between:

•**Basic Science**, which draws from classical knowledge in physics, chemistry, mechanics, and materials science,

and,

• **Engineering Phenomena,** for example

1) Cloud Seeding
2) Nanocarbon
3) Thin films, fibers and nano-composites: mechanical properties
4) Graphene
5) Lithium-ion batteries
6) Thermal conductivity of nano-composite
7) Blue shift in small particle

Additional topics may be added if possible.

Textbook

NS&E is a fledgling field. Presently the books are oriented towards research, which are not suitable for this course.

This gap will be filled by: (i) References to literature, and (ii) Chapters from a book called "Introduction of Nanoscience and Engineering which this instructor is writing - your feedback is welcomed to improve these chapters.

Website and Lectures

A personal website will be installed which will be updated with every lecture. The lectures will be prepared during the lecture, clean up and posted soon after the class. The website will be crucial source of knowledge for the course.

Grading

There are two essential parts to the grades: HWExams (see below for explanation) and an end-of-the-semester paper (about five pages) and presentation (about 10 slides). They will account for 75% and 25% of the grade. In my experience students either do well across the board or they stumble. I expect all of you to do well.

HWExams: I will use this method since it worked well in the Spring semester. After every lecture I will post brief HW with one or two questions, which will be due no later than two days. These will be the basis for the 75% grade. There will not be any mid-term or final exam.