MtSE 688  "Mathematical and Statistical Methods in Materials Science"

SYLLABUS

- Introduction to Mathematica, graphics; review of algebra and calculus (2 weeks).

- Algebra of Vectors and Matrices (2 weeks):

- Fourier and Laplace Transforms (3 weeks):
  Basic definitions and examples in 1 dimension. Delta-function. Three-dimensional generalizations and applications.

- Ordinary differential equations (2 week):

- Introduction to partial differential equations (2 weeks):
  Physical background, types of equations and boundary conditions. The Laplace operator in 1, 2 and 3 dimensions. Separation of variables and solutions using Fourier expansions. Application of Laplace transformations to diffusion equation.

- Elements of Probability, Statistics and data analysis (3 weeks):
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INSTRUCTOR  Dr. Vitaly A. Shneidman, Rm. 452T, e-mail: vitaly@oak.njit.edu

TIME: Mon. 6:00-9:05
(office hours will be published by the second week of classes)

WEB page: http://web.njit.edu/~vitaly/688/

Software: The Mathematica program will be used. A personal copy of the program (student version) can be purchased from the bookstore or from the wolfram.com web site (mention that you are a registered NJIT student...). Alternatively, the program is accessible from several locations on campus for on-site use. The first option is more convenient and is strongly recommended, especially if you own a laptop or a PC (and you will find Mathematica helpful for your other classes and research).

Grading. Will be determined by cumulative points obtained on the mid-term exam (30%), final exam (40%) and homeworks (30%).


Recommended reference materials:


online: http://mathworld.wolfram.com/