

Graduate Syllabus (2016–Spring Semester)

Course No/Title: G10645 / Numerical Methods and Scientific Computing I
Instructor: June-Yub Lee SciComp Building A320(02-3277-3451)
Class Time: Thur2~3(9:30~12:30) Office Hour: Tues/Fri 10~11
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1. Course Objectives

We try to develop computational models for various problems in mathematics, sciences, and engineering. We study numerical methods and programming tools to get the computational results of such problems.

2. Required Materials

- [C] *Ke Chen, Peter Giblin, Alan Irving, mathematical explorations with Matlab*, Cambridge University Press, 1999.
- [G] *Walter Gander, Jiri Hrebicek, Solving Problems in Scientific Computing using Maple and Matlab*, 2nd Ed, Springer. 1995. (4th/2004)

3. Supplementary Materials

Richard E. Crandall, Projects in scientific computation, Springer-Velag, The Electronic Library of Science(TELOS), New York, 1994

Stenen Koonin, Computational Physics, The Benjamin/Cummings Pub.

4. Evaluation System

- **Homework** : Programming in Matlab or any other language (F,C,C++)
- **Computational Project** : A report with program and documentation
- **Final Project** : Individual (or team) project of your own choice

4. Weekly Syllabus

Week	Textbook Chapter	Subject	Note
1	C1. Introduction C2. Matrices and Complex numbers	Matlab Primer	
2	C3. Whole Numbers C4. Graphs and Curves	"	
3	C5. Representation of Data C6. Probability and Random Numbers	"	
4	C7. Differential and Difference Equations	"	
5	C15. Iterations for Nonlinear Equations	Root Finding	
6	C16. Matrices and Solution of Linear systems	Linear Algebra	
7	C17. Function Interpolations and Approximation C18. Ordinar Differential Equation	Approximation ODE	
8	Midterm Period	--	4/21(Thur)
9	C19. Checkout Queues	Modelling	
10	Survey and Review	--	5/5(Thur)
11	C21. Epidemics	"	
12	C23. Tides	"	
13	G3. The Illumination Problem	Numerical differentiation and optimization	
14	G5. The Internal Field in Semiconductors	2nd order elliptic PDE	
15	G9. Smoothing Filters	Denoising signals	
16	Final Exam Period		