

(Term 2, 2012/2013: Jan 2, 2013 -- Apr 5, 2013)

MATH 267 Mathematical Methods for Electrical and Computer Engineering

First class: Wednesday, Jan 02, 2013 **Last class:** Wednesday, Apr 03, 2013

	Section 201	Section 202
Instructor	Ian Zwiers	Young-Heon Kim
class	Mon & Wed 8:00 -- 9:30 at Buchanan A104	Mon & Wed 14:00 -- 15:30 at Math 100
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Main Text/Reference:

We will use much of the material from **Joel Feldman's lecture notes: see the OLD link [UBC Math 267 Lecture notes and other resources](#)**. (Note that our HW assignments are different from this link, and posted elsewhere in OUR course webpage.) We will follow the notation in these lecture notes.

Supplimentary Text (OPTIONAL):

- **"Elementary Differential Equations & Boundary Value Problems"** by Boyce & DiPrima is widely available.
Chapters 10 & 11 cover the first four weeks of course material.
- **"Signals and Systems"** (Schaum's outlines) 2nd edition by Hwei Hsu, McGraw Hill. Chapters 1, 2, 4, 5, and 6 cover the later part of the course. This inexpensive book contains a lot of worked out examples. **Warning:** The notation in this book could be a bit different from Feldman's lecture notes.

Other useful references:

- Alan Oppenheim, Alan Willsky "Signals and Systems". This is the course textbook for EECE 359. Chapters 4, 5 & 10 are relevant.
- Steven Karris "Signals and Systems with MATLAB Computing and Simulink Modeling (4th Edition)" Available in UBC online library: go to <http://site.ebrary.com/lib/ubc/docDetail.action?docID=10223892> Parts of Ch 7 -- 10 are relevant to the course.

Exams:

- **Midterm 1: Thursday 31-Jan; 7-8pm. The location to be announced. You should contact the instructor before Jan 16, if you will not be able to write the midterm for a legitimate reason (e.g. overlap with other UBC class/exam).**
- **Midterm 2: Thursday 7-Mar; 7-8pm. The location to be announced. You should contact the instructor before Feb 6, if you will not be able to write the midterm for a legitimate reason.**
- **The date of the final exam is yet to be declared. Do not make any travel plans until the exam schedule has been announced.**
- There are **no make-up** midterms but if you miss a midterm for a legitimate reason (e.g. illness, with a doctor's note), allowances will be made.
- Calculators are NOT permitted on the midterms and the final exam.
- Students will be required to bring Photo ID to all tests and exams.

Homework Assignments Policy: Careful work on the assignments is the best way to prepare for the midterms and the final exam.

- HW's are due on either Monday or Wednesday **in Class**.
- Late homework is **not** accepted.
- Unreadable homework will get a zero mark.
- Work must be shown.
- Missed homework will count as a zero mark.
- **There is a total of nine assignments to be turned in, but only the best eight will count towards your final grade.**
- It is probable that only a subset of those problems turned in would be graded, and you will not be informed (in advance) which ones these are. For example, if your homework does not contain any of the problems to be graded (which will be known only after the due date), you will get zero mark. So, it would be better for you to do all the problems to be handed in.

Grading Your grade for the course will be computed roughly as follows:

Homework: 10%

Midterms: 40% (20% + 20%)

Final Exam: 50%

Important Notes:

- All marks are subject to scaling. This ensures fairness of the final grades across the sections.
IT IS ESPECIALLY IMPORTANT that students know that IF THEY DO NOT FULFILL THE COURSE REQUIREMENTS DURING THE TERM (including not writing the midterm test(s) even if you agree to transfer the weight to the final) AND THEN MISS THE FINAL EXAMINATION, THEY MAY BE DEEMED INELIGIBLE FOR A DEFERRED FINAL.

Material: The core of this course is the study of Fourier series, the Fourier transform, and their discrete analogues. Applications to the wave equation, telegraph equation, circuits, and signal processing will be emphasized. See TENTATIVE SCHEDULE at the end of this page. Topics to be covered (**subject to change**) are roughly:

1. Complex Numbers. (1 lecture): [Complex Numbers and Exponentials](#)]
2. Review of ordinary differential equations. (Self-Reading material): [Review of Ordinary Differential Equations](#) , [The RLC Circuit](#)
3. Introduction to partial differential equations - wave and diffusion equations.(1 lecture): [Derivation of the Wave Equation](#), [Derivation of the Telegraph Equation](#), [Derivation of the Heat Equation 1D](#)
4. Method of separation of variables. (3 lectures): [Solution of the Wave Equation by Separation of Variables](#) , [Solution of the Heat Equation by Separation of Variables](#)
5. Introduction to Fourier Series. (3 lectures): [Fourier Series](#) (version of Feb 4, 2007)], [Periodic Extensions](#)
6. Applications of Fourier Series to circuits. (1 lecture)
7. The Fourier transform with applications. (3 lectures): [The Fourier Transform](#)(version of Feb 25, 2007), [Using the Fourier Transform to Solve PDE's](#)]
8. The Dirac delta function and convolutions. (3 lecture)
9. Discrete Fourier transform. (4 lectures): [Discrete-Time Fourier Series and Transforms](#)] (version of Mar 21, 2007)
10. The z-transform. (3 lectures): [Discrete-Time Linear Time Invariant Systems and z-Transforms](#) (version of Apr 4, 2007)

How to succeed in this course:

- It is very important to learn mathematics by "doing". For example, it is not enough to read a worked out example from a book or lecture notes. It is not enough to understand each step in the solution. You have to struggle to work out examples or problems by yourself, without looking at the solutions.