

Math 257/316: September 2016

<ul style="list-style-type: none">▪ Instructor: Professor Ian A. Frigaard MATX room 1103 frigaard@math.ubc.ca	<ul style="list-style-type: none">▪ Office hours: MWF: 17.00-18.00 in MATX 1103
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Web page for downloads etc: <http://blogs.ubc.ca/frigaard/teaching257and316/>

Regular schedule:

Section 101: Mon, Wed, Fri, 9.00-10.00 in Buchanan A102

Section 102: Mon, Wed, Fri, 16.00-17.00 in Leonard S. Klinck 200

Text:

- This is an introductory course and the material can be found for free in many places online and/or in many textbooks that you may have used for Math 215/255 (e.g. Boyce & di Prima). **We will mostly follow the sequence** in chapters 4, 5 & 7 of “Diffy Qs: Differential Equations for Engineer” which may be downloaded for free at: <http://www.jirka.org/diffyqs/>
- Some additional aspects will be drawn from the lecture notes of Professor Peirce, which may be found here: http://www.math.ubc.ca/~peirce/math257_316_2015F.htm
This url also has excellent resources for the course and for exam preparation, going back many years.

Grading: 2 x midterms (total 30%); 5 x assignments (total 20%); 1 x final exam (50%). The policy of the course is that you will need to get a passing grade on the examined parts of the course in order to pass the course, i.e. your assignment grade % will be capped by your exam & midterm grades if you do not score over 50% on those parts of the course.

- Midterm 1: Wednesday 12th October in class; (50 minutes: 15%)
- Midterm 2: Monday 14th November in class; (50 minutes: 15%)

Assignments: 5 sets of assignment problems will be distributed, with due dates. Kindly present your work in a legible and organized manner, that you feel that your best friend would be able to mark.

Office hours: I usually do not respond to e-mail enquiries as I simply have insufficient time to do so. Please come either in office hours or see me directly after a lecture.

Schedule of lectures:

1. W 7th Sept. Introduction, review of DE's for IVP's and other pre-req's
2. F 9th Sept. Introduction to boundary value problems
3. M 12th Sept. Orthogonality, periodic functions & Fourier series
4. W 14th Sept. Fourier series, examples
5. F 16th Sept. Convergence, Gibb's phenomenon
6. M 19th Sept. Odd and even functions
7. W 21st Sept. Sine and cosine series
8. F 23rd Sept. Application to forced oscillators **Assignment 1 due**
9. M 26th Sept. Introduction to PDE's: 1st order wave equation, conservation laws
10. W 28th Sept. The 1D wave equation, 1D heat and diffusion equations
11. F 30th Sept. Solving the 1D heat equation, separation of variables with Dirichlet conditions
12. M 3rd Oct. Solving the 1D heat equation, separation of variables with Neumann conditions
13. W 5th Oct. Heat equation, other conditions and examples
14. F 7th Oct. Heat equation, steady states and other examples **Assignment 2 due**
- THANKGIVING – UNIVERSITY CLOSED
15. W 12th Oct. MIDTERM 1
16. F 14th Oct. Finite differences for the Heat Equation I
17. M 17th Oct. Finite differences for the Heat Equation II
18. W 19th Oct. 1D wave equation and d'Alembert's solution
19. F 21st Oct. 1D wave equation: separation of variables I
20. M 24th Oct. 1D wave equation: separation of variables II
21. W 26th Oct. Finite differences for the Wave Equation **Assignment 3 due**
22. F 28th Oct. Laplace's equation: separation of variables I
23. M 31st Oct. Laplace's equation: separation of variables II
24. W 2nd Nov. Laplace's equation: separation of variables III
25. F 4th Nov. Laplace's equation: Finite differences & iteration
26. M 7th Nov. Sturm-Liouville problems I
27. W 9th Nov. Sturm-Liouville problems II **Assignment 4 due**
- REMEMBRANCE DAY – UNIVERSITY CLOSED
28. M 14th Nov. MIDTERM 1
29. W 16th Nov. Applications 1
30. F 18th Nov. Applications 2
31. M 21st Nov. Power series solutions: regular I
32. W 23rd Nov. Power series solutions: regular II
33. F 25th Nov. Method of Frobenius I **Assignment 5 due**
34. M 28th Nov. Method of Frobenius II
35. W 30th Nov. Examples
36. F 2nd Dec. Course review