

Course Outline for Mathematics 257 (3 credits) Term 1 2009-2010  
Partial Differential Equations

- Prerequisites: One of Math 215, 255, 265.
- Credit: 3 Credits. Credit only given for one of Math 256, 257, 316.
- Instructor: Section 102: Jessica Conway, Mathematics Annex 1110
- Home Page: [http://www.math.ubc.ca/~conway/Math257\\_Math316/Math257\\_316.html](http://www.math.ubc.ca/~conway/Math257_Math316/Math257_316.html)
- Office Hours: Monday: 12pm-2pm, Fri: 12pm-1pm
- Assessment: The final grades will be based on homework (15%) (including EXCEL projects), two in class midterm exams (35%) and one final exam (50%). Assignments are to be submitted in hard-copy from at the designated class – no late assignments can be accepted. There will be no make-up midterms. To accommodate possible self-isolation for the H1N1 virus I will adopt a policy of discarding missed assessments and adjusting the weighting of other assessments to compensate.
- Test Dates: Monday October 19<sup>th</sup> , Friday November 20<sup>th</sup>.
- Text: Elementary Differential Equations and Boundary Value Problems (9<sup>th</sup>Ed), W.E. Boyce and R.C. DiPrima (John Wiley & Sons) 2006.  
<http://edugen.wiley.com/edugen/class/cls133794/>
- Other References:
1. Partial Differential Equations with Fourier Series and Boundary Value Problems (2<sup>nd</sup> Ed), by N.H. Asmar (Pearson), 2004.
  2. Applied Partial Differential Equations with Fourier Series and Boundary Value Problems (4<sup>nd</sup> Ed), R. Haberman, (Pearson), 2004.
  3. <http://www.math.ubc.ca/~rfroese/notes/Lecs316.pdf>, Richard Froese, Partial Differential Equations, UBC M257/316 lecture notes free on the web.

<u>Topics:</u>	Approx Time
1. Introduction to Partial differential equations (Chapter 10) The heat equation (10.5), the wave equation (10.7), Laplace's equation (10.8)	1 hr
2. Preliminaries Sequences & Series, Taylor Series, Review of methods for ODE	2 hrs
3. Series Solutions of Differential Equations (Chapter 5)	
a. Series solutions at ordinary points (5.1-5.3)	2 hrs
b. Regular singular points (5.4-5.7, 5.8 briefly)	4 hrs
4. Introduction computation using spread sheets	4 hrs
5. Fourier Series and Separation of Variables (Chapter 10)	
a. The heat equation and Fourier Series (10.1-10.6)	7 hrs
b. The wave equation (10.7)	3 hrs
c. Laplace's equation (10.8)	3 hrs
6. Boundary Value Problems and Sturm-Liouville Theory (Chapter 11)	
a. Eigenfunctions and eigenvalues (11.1)	3 hrs
b. Sturm-Liouville boundary value problems (11.2)	2 hrs
c. Nonhomogeneous boundary value problems (11.3)	2 hrs
	Tests <u>2 hrs</u>
	35 hrs