

MATH 2065: Introduction to Partial Differential Equations *Semester 2, 2011*

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Instructor: (part 2) Zhou Zhang 935 15780 Carslaw 620 zhangou@maths.usyd.edu.au

Lectures: 8.05 to 8.55 am (Mon, Tue, Wed: Carslaw 157)

Practice Class: Thur 8.05 to 8.55 am (Carslaw 157)

Tutorials: As assigned in individual time-tables

Consultation hour: Wed 1-2pm (Carslaw 621, weeks 1-7; Carslaw 620, weeks 8-13)

Unit-of-study website: <http://www.maths.usyd.edu.au/u/UG/IM/MATH2065/>

Or go to the School of Mathematics and Statistics front page and follow the links.

Lecture Notes will be made available on the website.

Relevant Reading

Applied Partial Differential Equations, by Richard Haberman (Prentice-Hall, 2004).

Advanced Engineering Mathematics, by Erwin Kreyszig (Wiley, 2006).

TUTORIALS

You are expected to attend your assigned tutorial group. The tutorial is an opportunity for you to obtain clarification from your tutor in a small group setting. Utilising tutorials effectively is *your* responsibility. No marks will be awarded for tutorial participation, although attendance will be recorded. Your notes should be brought to the tutorials, with your tutorial question sheet (available online). Solutions will be posted online at the end of the week.

All tutorials start in WEEK 1.

ASSIGNMENTS

There will be two assignments. The first assignment is due in week 6, *Thursday, September 1, 4pm*. The second assignment is due in week 11, *Thursday, October 13, 4pm*.

MID-TERM QUIZ

There will be a mid-term multiple-choice quiz, to be held during the practice class in week 8 on *Thursday, September 15 in Carslaw 157 and 159*. Be on time.

FINAL EXAMINATION

The final examination will consist of extended answer questions.

FINAL GRADE CALCULATION

Your final grade will be computed according to the following prescription, with scaling possibly applied to the final marks upon recommendation by the examiners' board.

Final Examination	70 %
Mid-term Quiz	20 %
Mid-term Assignments	5 % each

MISSED ASSESSMENT POLICY

Students missing the mid-term quiz for legitimate reasons *which are properly documented according to the University's Special Considerations Policy* will have their final course marks multiplied by 100/80.

Supplementary examinations will *only* be granted to students who (i) produce legitimate Special Considerations applications for the final examination, *and* (ii) have participated fully in the unit over the semester.

S Y L L A B U S

1. Ordinary Differential Eq), To be decided (uations (ODEs)
 - (a) Second-order homogeneous (summary)
 - (b) Second-order inhomogeneous; undetermined coefficients
 - (c) Laplace transform solution method

2. Preliminaries on Partial Differential Equations (PDEs)
 - (a) Introduction
 - (b) Heat (diffusion) equation derivation
 - (c) Boundary conditions (BCs), initial conditions (ICs)
 - (c) Equilibrium / steady-state temperature

3. Method of Separation of Variables
 - (a) Example with zero BCs
 - (b) Examples with other BCs
 - (c) Examples with Laplace's equation

4. Fourier Series
 - (a) Basic properties
 - (b) Fourier sine and cosine series; PDE applications
 - (c) Manipulating Fourier series
 - (d) Complex Fourier series

5. Fourier transforms
 - (a) PDEs on infinite domains
 - (b) Fourier transform definition and properties
 - (c) PDE solutions using Fourier transforms
 - (d) Fourier transforms in signal processing (discussion)

6. More PDEs: Wave equation (if time allows)
 - (a) Wave equation derivation
 - (b) Solutions using separation of variables / Fourier series
 - (c) Wave/heat equation in two-dimensions
 - (d) Vibrating rectangular membrane