

2010/2011. TERM 2. **Math 257:201: Partial Differential Equations**

Instructor: Young-Heon Kim.

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Course Webpage: All homework assignments, lecture notes and additional information (e.g. about midterm and final) will be posted on the course website:

<http://www.math.ubc.ca/~yhkim/yhkim-home/teaching/Math257/index.php>

Web CT Vista: Some important information such as **grades** for HW and midterms will be posted in <https://www.vista.ubc.ca>

Course schedule: Mon, Wed, Fri 11:00–12:00 at Math Annex 1100.

Office hours: TBA. Or by appointment (please email).

References:

- **Recommended Textbook:** W.W. Boyce & R.C. DiPrima, *Elementary Differential Equations and Boundary Value Problems* (9th. ed.), Wiley, 2009. Earlier editions are also fine.
- **Course lecture notes** will be available in the course webpage.
- **Reference:** Richard Froese's lecture notes: <http://www.math.ubc.ca/~rfroese/notes/Lecs316.pdf>

Prerequisite. One of Math 215, Math 255 or Math 265.

Final Grading Scheme (subject to change): The **higher one** in either of

- HW including spreadsheet projects (15%), Two Midterms (17.5% each), Final exam (50%)
- HW including spreadsheet project (15%), Best of Two Midterms (15%), Final exam (70 %)

Homework assignment:

- Homework will be collected at the beginning of lecture **each Wednesday** starting January 12. A problem set will be posted on the course website every week. Stay tuned.
- **Homework will be collected ONLY IN CLASS: for example, I will NOT accept homework submission at my office.** This policy is to motivate students keep attending the lectures.
- **Late homework submission will not be accepted in any case.** If you are unable to attend lecture on a certain Monday, submit the homework in an earlier lecture. A missed homework will result in 0 mark. **Two lowest homework grades will be dropped in computing the final grade.**
- Your homework should be written in a **clear** manner so that the grader can understand **easily** what you are doing. Also it should be hand written **neatly**. **Unreadable or very hard to read homework may get zero or very low mark.**
- You are encouraged to discuss the homework with other students, but you must produce and write the solutions **on your own**.
- 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 decided after the deadline), you will get zero mark.** So, it would be better for you to do all the problems to be handed in.

Exams: There will be **two midterms** and a **final exam** in this course.

- The midterms will be held during class hours on **February 11 (Friday) and March 18 (Friday)**.
- **No make-up midterms!**
- **Missing a midterm normally results in a mark of 0.** Exceptions may be granted **ONLY** with prior consent of the instructor, and with official documentation supporting the student's reason for missing the exam. In case of a medical emergency, the instructor must be notified within 48 hours

of the missed test, and presented with a doctor's note immediately upon the students return to UBC. A physician's note **should** specifically state that the student was medically unfit to write the missed exam **on that specific day**.

- The date of the final exam is yet to be declared. *Do not make any travel plans until the exam schedule has been announced.*
- **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.**
- Students will be required to bring **Photo ID** to all tests and exams.
- Calculators, books, or aids of any kind will **NOT** be allowed in midterms or in the final.
- Complaint of the mark on the midterm exams should be made **right at the time** you get the exam back. Later claims will **NOT** be considered.

Grading policy: For computational problems, to earn lots of credit, you have to get the right answer with proper set-up of the calculation. In many cases (especially for the easier problems), about half the points will be given for setting up the calculation *properly* and about half for computing the numerical answer *correctly*. For more difficult problems, more percentage will be given for properly setting-up the calculation. **You may lose most (sometimes, all) of points for setting up the calculation incorrectly, even if the subsequent computations are correct.** Also, you may lose half the points for not finding the correct final answer, even if the initial set-up is correct.

IMPORTANT! Academic Integrity/Honesty. Please see

- <http://www.science.ubc.ca/sites/science.ubc.ca/files/faculty/teaching/sep05acadhonesty.pdf>

and also

- Student Conduct and Discipline:
<http://www.students.ubc.ca/calendar/index.cfm?tree=3,54,0,0>

Rough Schedule of Topics

(with approximate lecture time, and corresponding Boyce & DiPrima sections).

- (1) Introduction to Partial Differential Equations (PDE) (1 hour)
 - The heat (10.5), wave (10.7), and Laplace (10.8) equations
- (2) Some Review (2 hours)
 - Review of ODE methods (especially 2.1-2.2, 3.1-3.4)
 - Review of sequences, series, power series, & Taylor series (5.1)
- (3) Series Solutions of Differential Equations (6 hours)
 - Series solutions at ordinary points (5.1-5.3)
 - Regular singular points (5.4-5.7)
- (4) Introduction to Computation Using Spreadsheets (4 hours)
- (5) Fourier Series and Separation of Variables (13 hours)
 - The heat equation and Fourier series (10.1-10.6)
 - The wave equation (10.7)
 - The Laplace equation (10.8)
- (6) Boundary Value Problems and Sturm-Liouville Theory (7 hours)
 - Eigenfunctions and eigenvalues (11.1)
 - Sturm-Liouville boundary value problems (11.2)
 - Nonhomogeneous boundary value problems (11.3)