

MATH 527 A1: INTERMEDIATE PDE (FALL 2009)

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Office hours MW 1pm – 2:30pm.
Lecture Room & Time CAB 457, MW 3pm – 4:20pm.

- **Course Description:** Notions; Elliptic PDE's; Parabolic PDE's; Hyperbolic PDE's; Nonlinear Integrable PDE's.
- **Course Prerequisites:** MATH 436 or equivalent; pre- or corequisite: MATH 518.
- **Course Objectives:** Understanding basics of theories and techniques of modern linear and non-linear partial differential equations.
- **Lecture Schedule & Assigned Readings (temporary):**

- Numbers in “Readings” refer to chapters and/or sections in the textbook.

Week	Dates	Topic	Readings
1	Sep. 2	Introduction	1
2	Sep. 9	Transport equation	2.1
3	Sep. 14, 16	Laplace's equation	2.2
4	Sep. 21, 23	Heat equation	2.3
5	Sep. 28, 30	Wave equation	2.4
6	Oct. 5, 7	Characteristics	3.2
7	Oct. 14	Hamilton-Jacobi equations	3.3
8	Oct. 19, 21	Conservation laws	3.4
9	Oct. 26, 28	Selected topics in solution representation	4 (Selected sections)
10	Nov. 2, 4	Sobolev spaces	5 (Selected sections)
11	Nov. 9	Sobolev spaces (cont.)	5 (Selected sections)
12	Nov. 16, 18	2nd order elliptic equations	6.1 – 6.3
13	Nov. 23, 25	2nd order elliptic equations (cont.)	6.4, 6.5
14	Nov. 30, Dec. 2	Linear evolution equations	7 (Selected sections)

- **Required Textbook:** PARTIAL DIFFERENTIAL EQUATIONS by L. C. Evans, AMS, 1998.
- **Recommended or Optional Learning Resources:**
 - “Partial Differential Equations in Action: From Modelling to Theory” by Sandro Salsa, Springer 2008. Online access through UA library.
 - “Shock waves and reaction-diffusion equations” by Joel Smoller, Springer 1994.
- **Past Evaluative Material:** See the webpage of Math 527 Fall 2008: <http://www.math.ualberta.ca/~xinweiyu/527.1.08f/> (**Warning:** There is no guarantee that the material/exercises/exams this term will be similar to that from Fall 2008)
- **Grade Evaluation:**
 - Weights:

Homework	Quiz	Final (tentative time: 2pm, Dec. 16, 2009)
30%	10%	60%
 - Homework:
 - There will be 6 - 7 homeworks. The one with the lowest grade will be dropped when calculating final grades.

- Collaboration is encouraged. However copying others' solutions is not allowed.
- Homeworks will be announced and collected in class. Check "Announcements" in the course webpage for dates.
- Graded homeworks will be returned in class no more than one week after collection.
- Each homework will be graded as if it carries 30 points.
- Homework problems with "(optional)" in it do not carry any points.
- Quiz:
 - There will be 4 - 5 in-class quizzes. Each will take 25 mins and has one problem.
 - Each quiz will be graded as if it carries 10 pts.
 - The highest two grades will be used when calculating the final grades.
 - Quizzes are open book/notes. You can also bring your favorite references.
- Final:
 - Problems from the textbook will carry at least 50% of the points in the final exam.
 - There will be "bonus" problems carrying extra 25% of points.
 - Final is closed book.
- The grades will not be curved. In particular, one gets A+ if and only if the overall grade is more than 100%.
- **Missed Assignments:**

A student who cannot write a term examination or complete a term assignment due to incapacitating illness, severe domestic affliction or other compelling reasons can apply for extension of time to complete an assignment. Application for deferral of term work worth less than 20% of the final grade can be made in writing to the professor, with supporting documentation, within 48 hours of the missed exam or assignment due date. Application for a deferral of term work worth greater than 20% of the final grade must be made to the professor within 48 hours of the missed exam or assignment due date and must be supported by a completed University of Alberta Medical Statement Form or other appropriate documentation (Calendar section 23.4[3]). Deferral of term work is a privilege and not a right; there is no guarantee that a deferral will be granted. Misrepresentation of Facts to gain a deferral is a serious breach of the *Code of Student Behaviour*.
- **Deferred Final Examination:**

A student who cannot write the final examination due to incapacitating illness, severe domestic affliction or other compelling reasons can apply for a deferred final examination. Such an application must be made to the student's Faculty office within 48 hours of the missed examination and must be supported by a completed University of Alberta Medical Statement Form or other appropriate documentation (Calendar section 23.5.6). Deferred examinations are a privilege and not a right; there is no guarantee that a deferred examination will be granted. Misrepresentation of Facts to gain a deferred examination is a serious breach of the *Code of Student Behaviour*.
- **Reexamination:**

A student who writes the final examination and fails the course may apply for a reexamination. Reexaminations are rarely granted in the Faculty of Science. These exams are governed by University (Calendar section 23.5.5) and Faculty of Science Regulations (Calendar section 182.5.9). Misrepresentation of Facts to gain a reexamination is a serious breach of the *Code of Student Behaviour*.
- **Student Responsibilities:**
 - ACADEMIC INTEGRITY:

The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behaviour (online at www.ualberta.ca/secretariat/appeals.htm) and avoid any behaviour which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.

All forms of dishonesty are unacceptable at the University. Any offense will be reported to the Senior Associate Dean of Science who will determine the disciplinary action to be taken. Cheating, plagiarism and misrepresentation of facts are serious offenses. Anyone who engages in these practices will receive at minimum a grade of zero for the exam or paper in question and no opportunity will be given to replace the grade or redistribute the weights. As well, in the Faculty of Science the sanction for cheating on any examination will include a disciplinary failing grade (no exceptions) and senior students should expect a period of suspension or expulsion from the University of Alberta.

– EXAMS:

Your student photo I.D. is required at exams to verify your identity. Students will not be allowed to begin an examination after it has been in progress for 30 minutes. Students must remain in the exam room until at least 30 minutes has elapsed. Electronic equipment cannot be brought into examination rooms.

– CELL PHONES:

Cell phones are to be turned off during lectures, labs and seminars. Cell phones are not to be brought to exams.

– STUDENTS WITH DISABILITIES:

Students who require accommodation in this course due to a disability are advised to discuss their needs with Specialized Support & Disability Services (2-800 Students' Union Building).

– ACADEMIC SUPPORT CENTRE:

Students who require additional help in developing strategies for better time management, study skills or examination skills should contact the Academic Support Centre (2-703 Students' Union Building).

Policy about course outlines can be found in section 23.4(2) of the University Calendar. Disclaimer: Any typographical errors in this Course Outline are subject to change and will be announced in class. The date of the final examination is set by the Registrar and takes precedence over the final examination date reported in this syllabus.