

University of Alberta
Department of Mathematical & Statistical Sciences

Math 436 Lec A1 Fall 2012

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Office Hours: TR 10:30am – 12:00pm or by appointment.
Lecture Room & Time: CAB273 TR 12:30pm – 13:50pm
Course Web Page: <http://www.math.ualberta.ca/~xinweiyu/436.A1.12f/>

Course Description:

Partial differential equations as physical models. Introduction to basic generalized functions. Theory of linear and quasi-linear first-order equations: general solution, initial value problem, generalized solutions and propagation of singularities, characteristic surfaces, shock formation. Theory of fully nonlinear first order equations: complete solution and the initial value problem. Hamilton-Jacobi equation and its applications. Second order linear equations in n dimensions: classification, canonical form, characteristic surfaces and shock formation, initial and boundary value problem.

Course Prerequisites:

MATH 337.

Course Objectives and Expected Learning Outcomes:

Be familiar with major analytical theory/techniques for PDEs.

Temporary Lecture Schedule:

Dates	Topic	HWs
Sept. 6 - 15	From Random Walks to PDEs	HW1
Sept. 20 – Oct. 11	Characteristics	HW2, 3
Oct. 23 – Nov. 8	Separation of Variables	HW4, 5
Nov. 15 - 29	Approximate Solutions	HW6

Recommended or Optional Learning Resources:

See course website.

Grade Evaluation:

The course mark will be calculated based on the following breakdown:

Course Component	Weight	Date
Assignments	20%	Roughly one assignment every 3 or 4 lectures
Problems	10%	Before Tuesday Dec. 4, 2012 2pm.
Midterm	25%	Thursday Oct. 18, 2012 12:30pm (in class)
Final Exam	45%	Tuesday Dec. 18, 2012 2pm

Note:

- The date of the final examination is set by the Registrar and takes precedence over the final examination date reported in this document. Students must verify this date on BearTracks when the Final Exam Schedule is posted.

- An overall course mark of 50% or more guarantees a passing grade of at least D. An overall course mark of 90% or more guarantees a grade of at least A.
- Grades are unofficial until approved by the Department and/or Faculty offering the course.

Assignments:

Assignments are due in class. You will have roughly 7-10 days to complete each assignment.

Problems:

There will be one "Problems" section at the end of each unit of lecture notes. Each subsection in that section is a problem. A satisfactory solution should fill in all the gaps (missing proofs, missing calculations, missing explanations, etc. -- yes you are supposed to spot these gaps first). Each problem is worth 5 pts. The best two scores count. You can re-submit a problem as many times as you see necessary before the cut-off (Dec. 4 2012 2pm).

Note: The grading of problems may be **very strict**.

Past (or Representative) Evaluative Material:

Exams from the last couple of years will be available on course website or as handout. However there is no guarantee of similarity between this year's exams to these past ones.

Exam Aids:

All exams are closed-book exams. During the exams you are not allowed to use textbooks, notes, calculators, or any electronic device.

Missed Assignment/Lab:

No late assignment is accepted. The lowest assignment score (including zeroes for missed work) will be dropped.

Missed Midterm:

There will be no make-up midterm. A student who cannot write the midterm due to incapacitating illness, severe domestic affliction or other compelling reasons can apply for an excused absence. If accepted, the weight of the missed midterm will be transferred to the final.

To apply for an excused absence, the student must present supporting documentation pertaining to the absence to the instructor within two working days following the scheduled date of the missed term work, or as soon as the student is able. In the case of an incapacitating illness, either a medical note or a statutory declaration (which can be obtained at the student's Faculty Office) will be accepted.

An excused absence is a privilege and not a right; there is no guarantee that an absence will be excused. Misrepresentation of Facts to gain an excused absence is a serious breach of the *Code of Student Behaviour*.

Missed 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 Statutory Declaration (*in lieu* of a 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*.

Any **deferred final examinations** are scheduled as follows:

Date: Saturday Jan. 12, 2012.

Time & Location: CAB357 before 8:30am to register. The exam starts at 9am.

Re-examination:

A student who writes the final examination and fails the course may apply for a re-examination. Re-examinations 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 192.5.9). Misrepresentation of Facts to gain a re-examination 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.governance.ualberta.ca) 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.

Collaboration on Assignments:

You are encouraged to discuss with fellow students. Even if you know how to solve a problem, explaining it to others may greatly improve the quality of your solution, not to say your understanding of the material. In some sense, you are doing your friend a favor if you discuss with him/her.

However, you have to write up solutions yourself. Copying is not allowed. Every term there are several students who receive academic sanctions for copying assignments. See course website for some tips to avoid copying on assignments.

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 and hats should not be worn.

Cell Phones:

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

Audio or Video Recording:

Audio or video recording of lectures, labs, seminars or any other teaching environment by students is allowed only with the prior written consent of the instructor or as a part of an approved accommodation plan. Recorded material is to be used solely for personal study, and is not to be used or distributed for any other purpose without prior written consent from the instructor.

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 (2-300 Students' Union Building).

Decima Robinson Support Centre for Mathematical & Statistical Sciences:

Students who require additional help with assignments or have questions about the course material in general are encouraged to visit the Decima Robinson Support Centre (528 Central Academic Building). Graduate students will be available to provide one-on-one help. In order to get maximum help during each visit, students are asked to be specific about the problem with which they are seeking help. The Centre is open Monday to Friday, 9:00 – 15:00.

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.