

Math 446 Section A01 CRN 12261 & Math 550 Section A01 CRN 12268
Advanced Partial Differential Equations (1.5 units)
Course Outline

Department of Mathematics and Statistics, UVIC
September 2015.

INSTRUCTOR

Dr. Martial Agueh (agueh@uvic.ca); **Office:** DTB A440; **Phone:** 250-721-7466.

Please do not leave a message; send an e-mail instead.

Research Area: Applied mathematics (Partial differential equations, Calculus of variations, Geometric inequalities, Kinetic theories, Optimal transport).

OFFICE HOURS

Tuesday 11:30 - 12:30, Friday 10:00 - 11:00 (in DTB A440) ; Appointments otherwise.

COURSE WEBPAGE

<http://www.math.uvic.ca/~agueh/M446Fall2015.html>

Announcements and Homework Assignments will be posted on the course webpage. Please check the webpage regularly.

PREREQUISITES

Math 335, 336 or 434.

An exposure to basic notions of PDE with Math 346 or 326 (Introduction to PDE) is an asset, but not a requirement.

LECTURES

Tuesday, Wednesday, Friday: 1:30 - 2:20 pm, in MacLaurin Building D111.

TEXT

Partial Differential Equations

by Laurence C. Evans, 2nd edition, Graduate Studies in Mathematics, Vol. 19, American Mathematical Society, 2010.

TOPICS and TEXT SECTIONS

Introduction (Sections 1.1-1.3)

Classical linear PDEs: transport, Laplace, Poisson, heat and wave equations (Sections 2.1-2.4)

Nonlinear first-order PDEs: characteristics, Hamilton-Jacobi, conservation laws (Sections 3.2-3.4)

Some representation of solutions: separation of variables, similarity, traveling waves, Fourier transform (Sections 4.1-4.3)

Sobolev spaces (Chapter 5, selected topics)

Elliptic equations: weak solutions, Lax-Milgram theorem, Regularity, Maximum principle (Sections 6.1-6.4)

Linear evolution equations: parabolic and hyperbolic equations, semi-group theory (Sections 7.1, 7.2, 7.4).

HOMEWORK ASSIGNMENTS

Throughout the course, Homework will be assigned, collected and marked. These marks will count for 30% of your final numerical grades.

EXAMINATIONS AND GRADING

There will be ONE MIDTERM EXAM on **October 28**, that will count for 30% of your final numerical grade. There will also be a FINAL EXAM (scheduled during December 07-21, 2015) that will count for 40% of your numerical grade.

If you have a legitimate reason for missing a homework assignment (*with documentation*), then the rest of the homework assignments will count for 30% of your numerical course grade.

If you have a legitimate reason for missing the midterm (*with documentation*), then your homework assignments will count for 40% of your numerical course grade, and the final exam will count for 60%; (in other words, 10% of the percentage of the missed midterm will go towards the homework assignments, and 20% will go towards the final exam).

There will be NO make-up midterm and homework assignments.

The only acceptable calculators for all the examinations are the Sharp EL-510R or Sharp EL-510NB.

Your final numerical grade will be determined as follows:

- [1] Homework assignments: 30%
- [2] Midterm exam (October 28): 30%
- [3] Final exam: 40%.

Accessibility: Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or the Resource Centre for Students with a Disability (RCSD) as soon as possible. The RCSD staff are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations <http://rcsd.uvic.ca/>. The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.

OTHER POLICIES

You **MUST READ** the following information, which outlines the new University-wide grading table, academic integrity, attendance, calculators, and other important topics.

a. Undergraduate link:

<http://www.uvic.ca/science/math-statistics/undergraduate/course-policies/index.php>

b. Graduate link:

<http://www.uvic.ca/science/math-statistics/graduate/course-policies/index.php>

COURSE EVALUATION SURVEY

I value your feedback on this course. Towards the end of term, you will have the opportunity to complete an anonymous survey regarding your learning experience (CES). The survey is vital to providing feedback to me regarding the course and my teaching, as well as to help the department improve the overall program for students in the future. When it is time for you to complete the survey you will receive an email inviting you to do so. You will need to use your UVic netlink ID to access the survey, which can be done on your laptop, tablet, or mobile device. I will remind you and provide you with more detailed information nearer the time, but please be thinking about this important activity during the course.