SYLLABUS FALL 2016
The University of Iowa
The College of Liberal Arts and Sciences
Department of Mathematics
Partial Differential Equations I
Corse Number: MATH:6700:0001

Prerequisite: MATH:5210
Building: McLean Hall
Room Number: 105
Website address: http://homepage.math.uiowa.edu/~strohmer/
Class Time: 1:30P - 2:20P MWF

Some of the policies relating to this course (such as the drop deadline) are governed by its administrative home, the College of Liberal Arts and Sciences, 120 Schaeffer Hall.

Instructor: Gerhard Strohmer
Office location: 225D McLean Hall
Office hours: 10:30-11:20 MWF, and by appointment
Phone: 335-0721
E-mail: gerhard-strohmer@uiowa.edu

DEO Contact Information:
Dan Anderson, 14 MLH, dan-anderson@uiowa.edu

Description of Course:
Elliptic equations; potential theory, maximum principle, a priori estimate, Dirichlet problem; initial value problem for parabolic equations; hyperbolic equations; Duhamel's principle, Cauchy problem; nonlinear equations, characteristics, canonical form, first-order systems..

Objectives and Goals of the Course:
This is the first part of a two-semester sequence about partial differential equations. The aim is to introduce to the theory of such equations from a rather elementary level. We will only consider qualitative aspects of such equations and stay almost completely clear of the question of computing approximations for solutions. Examples of the type of question we will consider are the existence and uniqueness of solutions to certain types of problems, and the continuous dependence on the givens of such problems. We will also look at properties of the solutions such as smoothness. Previous knowledge of partial differential equations is helpful, but by no means necessary.
Initially only fairly elementary tools from multivariable calculus are required, later knowledge of the Lebesgue integral is necessary. We will not derive this theory but discuss the results in class to the extent necessary.

Texts:
Required texts or materials (available at [give name of bookstore]): L.C. Evans: Partial Differential Equations, 2nd edition, AMS, 2010
The book is available at the University Book Store or Iowa Book and Supply.
Additional materials and lecture notes from a related lecture will be made available for download
Optional texts:-
Texts on reserve:-
Other required materials: Additional materials from ICON

Subject Matter for the Semester:

Part I
Chapter 2.2: 2.2.1-2.2.5
Hölder spaces (5.1), Schauder estimates by a modified Campanato method (see additional materials)
Chapter 2.4
Part II
Chapters 5.2-5.9

Grading System and the Use of +/-:
There will be homework assignments about once a week and a take-home final. The grade will take the form of a percentage. The homework grades will be averaged and account for 70% of the grade, the take-home final will account for 30%. Finally the percentages will be converted to letter grades according to the following table:

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<th>70</th>
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<td>D</td>
<td>D+</td>
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<td>C</td>
<td>C+</td>
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<td>B</td>
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<td>A-</td>
<td>A</td>
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In this course, the grade A+ will only rarely be given.

Your homework and test results will be stored on ICON.

Course Policies:
Course attendance and participation in class discussions is strongly recommended, but will not be checked. Homework will be accepted for full credit until 4:45pm on the day it was due. On the second day only 75% of the credit are given, then 50% on the third day, 25% on the fourth, after that no credit at all. There are no exceptions except if you are transferring into the class or have a very good reason. (This includes illnesses with medical documentation and family emergencies)

**Student Collaboration:**

The homework for this course is designed to help you master your knowledge related to the topics covered during lecture. As such, you may discuss the homework problems with others. However, please be aware that to master the skills needed for this class, practice is required and that to do well on the final exam you will need to work many of these problems multiple times without help. Be sure to test your knowledge by doing much of the homework on your own. Even if you have collaborated with others in solving the problems, you must write them up independently.

**Resources for Students:**

Students will find the Writing Center and the Speaking Center very useful for this course:
- Writing Center: [http://www.uiowa.edu/~writingc/](http://www.uiowa.edu/~writingc/)
- Speaking Center: [http://clas.uiowa.edu/rhetoric#for-students/speaking-center](http://clas.uiowa.edu/rhetoric#for-students/speaking-center)

**Teaching Policies & Resources — Syllabus Insert**

Administered Home

The College of Liberal Arts and Sciences is the administrative home of this course and governs matters such as the add/drop deadlines, the second-grade-only option, and other related issues. Different colleges may have different policies. Questions may be addressed to 120 Schaeffer Hall, or see the CLAS Academic Policies Handbook at [http://clas.uiowa.edu/students/handbook](http://clas.uiowa.edu/students/handbook).

Electronic Communication

University policy specifies that students are responsible for all official correspondences sent to their University of Iowa e-mail address (@uiowa.edu). Faculty and students should use this account for correspondences ([Operations Manual, III.15.2, k.11](http://clas.uiowa.edu/students/handbook)).

Accommodations for Disabilities

The University of Iowa is committed to providing an educational experience that is accessible to all students. A student may request academic accommodations for a disability (which includes but is not limited to mental health, attention, learning, vision, and physical or health-
related conditions). A student seeking academic accommodations should first register with Student Disability Services and then meet with the course instructor privately in the instructor's office to make particular arrangements. Reasonable accommodations are established through an interactive process between the student, instructor, and SDS. See [http://sds.studentlife.uiowa.edu/](http://sds.studentlife.uiowa.edu/) for information.

Academic Honesty

All CLAS students or students taking classes offered by CLAS have, in essence, agreed to the College's [Code of Academic Honesty](http://sds.studentlife.uiowa.edu/): "I pledge to do my own academic work and to excel to the best of my abilities, upholding the [IOWA Challenge](http://sds.studentlife.uiowa.edu/). I promise not to lie about my academic work, to cheat, or to steal the words or ideas of others; nor will I help fellow students to violate the Code of Academic Honesty." Any student committing academic misconduct is reported to the College and placed on disciplinary probation or may be suspended or expelled ([CLAS Academic Policies Handbook](http://sds.studentlife.uiowa.edu/)).

CLAS Final Examination Policies

The final examination schedule for each class is announced by the Registrar generally by the fifth week of classes. Final exams are offered only during the official final examination period. **No exams of any kind are allowed during the last week of classes.** All students should plan on being at the UI through the final examination period. Once the Registrar has announced the date, time, and location of each final exam, the complete schedule will be published on the Registrar's web site and will be shared with instructors and students. It is the student's responsibility to know the date, time, and place of a final exam.

Making a Suggestion or a Complaint

Students with a suggestion or complaint should first visit with the instructor (and the course supervisor), and then with the departmental DEO. Complaints must be made within six months of the incident ([CLAS Academic Policies Handbook](http://sds.studentlife.uiowa.edu/)).

Understanding Sexual Harassment

Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community have a responsibility to uphold this mission and to contribute to a safe environment that enhances learning. Incidents of sexual harassment should be reported immediately. See the UI [Office of the Sexual Misconduct Response Coordinator](http://sds.studentlife.uiowa.edu/) for assistance, definitions, and the full University policy.
Reacting Safely to Severe Weather

In severe weather, class members should seek appropriate shelter immediately, leaving the classroom if necessary. The class will continue if possible when the event is over. For more information on Hawk Alert and the siren warning system, visit the Department of Public Safety website.