MATH 5308
Analysis II
MoWe 5:30-6:50pm, PKH 109

INSTRUCTOR: Prof. Ren-Cang Li, 445 PKH, (817) 272-0548, rcli@uta.edu

CLASS HOME PAGE: http://www.uta.edu/faculty/rcli/Teaching/math5308/s2015

OFFICE HOURS: MoWe 3:00-3:50pm or by appointment

Prerequisites: MATH 5307 or consent of the instructor.


Course Content: Infinite series, sequences and series of real-valued functions, concept and basic properties of Lebesgue integral, Fourier series and Fourier integrals, analysis in \(\mathbb{R}^n\), including continuity, differentiation, and Taylor's formula.

Learning Outcomes: On successful completion of Math 5308, students should be able to demonstrate, clearly in writing, a solid knowledge of the material including (but not limited to) the following topics:

1. Riemann-Stieltjes Integral: mean value theorem, change of variable, differentiation.

2. Infinite Series and Infinite Products: limit superior and limit inferior of a real-valued sequence, Cauchy condition for series, alternating series, absolute and conditional convergence, various tests for series, Dirichlet's test and Abel's test, infinite products.

3. Sequences and Series of Functions: uniform convergence with continuity, differentiation, and integration, the Cauchy condition for uniform convergence, the Weierstrass test, Dirichlet's test for uniform convergence, mean convergence, uniform convergence of power series.

4. The Lebesgue Integral: integral of a step function, basic properties of the Lebesgue integral, the Levi monotone convergence theorem, the Lebesgue dominated convergence theorem, continuity and differentiation under the integral sign.

5. Fourier Series and Fourier Integrals: orthogonal systems of functions, properties of the Fourier coefficients, the Riesz-Fisher theorem, the Riemann-Lebesgue lemma, Parseval's formula, the Weierstrass approximation theorem, convolution theorem for Fourier transforms.

6. Multivariable Differential Calculus: directional derivatives and continuity, total derivative, the Jacobian matrix, the chain rule, the mean-value theorem for differentiable functions, Taylor's formula.

Expectations of the Student:

- 15 hours/week outside of class. You are expected to spend at least 15 hours per week outside of class studying and working on problems for this course.
MATH 5308, Spring 2015

- **MavMail and Announcements.** You must have an activated MavMail account and check it regularly. You are responsible for all information that I send to your MavMail account and all announcements that I make in class or on the course website.

- **Personal responsibility.** The ultimate responsibility for your learning lies with you. The onus is on you to attend every class, keep up with assignments, put in the expected hours, and ask for help when needed.

**Homework:** There will be weekly homework, assigned every Wednesday and due the next Wednesday. No late homework will be accepted. However, if there is a compelling reason; please contact me in advance, if possible. I will give you an extension for serious health problems, job interviews, or a similar serious situation.

You are expected to work out correct solutions to all problems. You may work together on homework, but it should be turned in individually. One or two randomly selected problems will be graded as your homework grades. In preparing your turned-in homework, you are required to

- write out the complete question before presenting your solution,
- write neatly and large and dark enough for good legibility (you may type your work), and
- explain all your answers and justify all claims in your proofs.

**Exams, Weights, Grading:** There will be one mid-semester examination and a Final. All exams are **comprehensive**.

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<tr>
<th>Component</th>
<th>Date</th>
<th>Points</th>
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<tbody>
<tr>
<td>Midterm</td>
<td>Wednesday, Mar 4 (in class)</td>
<td>30</td>
</tr>
<tr>
<td>Final</td>
<td>Monday, May 11, 5:30-8:00pm</td>
<td>40</td>
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<tr>
<td>Homework</td>
<td>assigned every Wednesday and due next Wednesday</td>
<td>30</td>
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<td>Total Points Possible: 100</td>
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While I reserve the right to raise grades, as a rule having the following percent of the scaled points will earn a grade of

<table>
<thead>
<tr>
<th>Grade</th>
<th>Minimum %</th>
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<tr>
<td>A</td>
<td>85</td>
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<tr>
<td>B</td>
<td>70</td>
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<tr>
<td>C</td>
<td>55</td>
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Important Dates:

- Tuesday, Jan 20: First day of the class
- Wednesday, Feb 4: Census Date: Deadline for makeup requests
- Wednesday, Mar 4: Midterm (in class)
- Monday - Friday, Mar 9-14: Spring break
- Friday, Apr 3: Official last day to drop a class
- Friday, May 8: Last day of the class
- Monday, May 11: Final Exam, 5:30-8:00pm

Americans with Disabilities Act: The University of Texas at Arlington is on record as being committed to both the spirit and letter of federal equal opportunity legislation; reference Public Law 93112 - The Rehabilitation Act of 1973 as amended. With the passage of new federal legislation entitled Americans with Disabilities Act (ADA), pursuant to section 504 of the Rehabilitation Act, there is renewed focus on providing this population with the same opportunities enjoyed by all citizens. As a faculty member, I am required by law to provide “reasonable accommodation” to students with disabilities, so as not to discriminate on the basis of that disability. Student responsibility primarily rests with informing faculty at the beginning of the semester and in providing authorized documentation through designated administrative channels.

Academic Dishonesty: It is the philosophy of The University of Texas at Arlington that academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include suspension or expulsion from the University.

“Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.” (Regents Rules and Regulations, Part One, Chapter IV, Section 3, Subsection 3.2, Subdivision 3.22)

Student Disruption: The University reserves the right to impose disciplinary action for an infraction of University policies. For example, engagement in conduct, alone or with others, intended to obstruct, disrupt, or interfere with, or which in fact obstructs, disrupts, or interferes with, any function or activity sponsored, authorized by or participated in by the University.

Information is subject to change, please visit the class webpage regularly!