Real Analysis MATH 5351_001
Department of Mathematics and Statistics
Spring 2016

A. COURSE INFORMATION

Course number/section: MATH 5351_001
Class meeting time: M W 5:30-6:45 PM
Class location: EN-107
Course Website: https://bb9.tamucc.edu/

B. INSTRUCTOR INFORMATION

Instructor: Dr. Alexey L Sadovski
Office location: CI-338
Office hours: M W 4-5:30 PM & T R 11:00 AM-12:30 PM
Telephone: (361) 825-2477
E-mail: Alexey.Sadovski@tamucc.edu
Appointments: Appointments also available. Office hours subject to meetings related to other duties on campus. They may change during the semester.

C. COURSE DESCRIPTION

Catalog Course Description
This course includes such topics as sequences and series of constants and functions, the Riemann integral, Fourier series, and an introduction to Lebesgue measure and integration.

Extended Course Description
[delete and describe any additional topics that you will cover if there are any]
[delete and insert an overview of the course including its relevance within the curriculum and after graduation]

D. PREREQUISITES AND COREQUISITES

Prerequisites
MATH 4301 Introduction to Real Analysis, or permission of the Professor

Corequisites
none

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES

Required Textbook(s)

Optional Textbook(s) or Other References
is H. Royden, Real Analysis, 3rd edition
F. STUDENT LEARNING OUTCOMES AND ASSESSMENT

Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

By the end of this course, students should be able to:
1. - state the main theorems covered in this class
2. - prove theorems from the class
3. - use the theorems to prove related results
4. - write technical proofs
5. - solve a number of problems in the problem sections at the ends of the chapters
6. - discuss and present a theorem from this course to the class

G. INSTRUCTIONAL METHODS AND ACTIVITIES

Methods and activities for instruction include: Lectures and discussions.

H. MAJOR COURSE REQUIREMENTS AND GRADING

The methods of evaluation and the criteria for grade assignments are: quizzes, two exams, a final exam, and some graded homework assignments.

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exams</td>
<td>40</td>
</tr>
<tr>
<td>Quizzes</td>
<td>30</td>
</tr>
<tr>
<td>Homework</td>
<td>10</td>
</tr>
<tr>
<td>Final exam</td>
<td>20</td>
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</tbody>
</table>
# I. COURSE CONTENT/SCHEDULE

<table>
<thead>
<tr>
<th>DATE (BY DAY OR WEEK)</th>
<th>TOPIC</th>
<th>CHAPTER(S)</th>
<th>ASSIGNMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>01/20-22</td>
<td>Open and closed sets</td>
<td>2.1-2.4</td>
<td>Chapters reading and problem solving</td>
</tr>
<tr>
<td>01/25-29</td>
<td>Closure, completeness, series</td>
<td>2.5-2.9</td>
<td>Chapters reading and problem solving</td>
</tr>
<tr>
<td>02/1-5</td>
<td>Nested sets, compactness, connectedness, continues images</td>
<td>3.1-4.2</td>
<td>Chapters reading and problem solving</td>
</tr>
<tr>
<td>02/8-12</td>
<td>Riemann Integral, Exam#1</td>
<td>8.1-8.2</td>
<td>Chapters reading and problem solving</td>
</tr>
<tr>
<td>02/15-19</td>
<td>Volumes and Measures</td>
<td>8.2</td>
<td>Chapters reading and problem solving</td>
</tr>
<tr>
<td>02/22-26</td>
<td>Lebesgue's theorem for the Riemann integral</td>
<td>8.3</td>
<td>Chapters reading and problem solving</td>
</tr>
<tr>
<td>02/29-03/04</td>
<td>Properties of the Riemann integral</td>
<td>8.4</td>
<td>Chapters reading and problem solving</td>
</tr>
<tr>
<td>03/7-11</td>
<td>Lebesgue measurable functions</td>
<td>handouts</td>
<td>Handouts reading</td>
</tr>
<tr>
<td>03/14-18</td>
<td>Spring Break</td>
<td>handouts</td>
<td>Handouts reading</td>
</tr>
<tr>
<td>03/21-25</td>
<td>The Lebesgue integral of a bounded function over a set of finite measure</td>
<td>handouts</td>
<td>Handouts reading</td>
</tr>
<tr>
<td>03/28-04/01</td>
<td>The Lebesgue integral of a nonnegative function, The general Lebesgue integral</td>
<td>handouts</td>
<td>Handouts reading</td>
</tr>
<tr>
<td>04/4-8</td>
<td>Continuity of differentiable mappings, Conditions for Differentiability</td>
<td>6.3-6.4</td>
<td>Chapters reading and problem solving</td>
</tr>
<tr>
<td>04/11-15</td>
<td>Fubinni Theorem for Riemann Integral, Exam#2</td>
<td>9.1</td>
<td>Chapters reading and problem solving</td>
</tr>
<tr>
<td>04/18-22</td>
<td>Inner product spaces, orthogonal families of functions</td>
<td>10.2</td>
<td>Chapters reading and problem solving</td>
</tr>
<tr>
<td>04/25-29</td>
<td>Completeness and Convergence Computation of Fourier series</td>
<td>10.3-10.5</td>
<td>Chapters reading and problem solving</td>
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<tr>
<td>05/2-3</td>
<td>Computation of Fourier series Fourier integrals</td>
<td>10.5, 10.8</td>
<td>Chapters reading and problem solving</td>
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<tr>
<td>05/10</td>
<td>Final Exam</td>
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Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.
J. COURSE POLICIES

Attendance/Tardiness
required

Late Work and Make-up Exams
Only for excused absences

Extra Credit
none

Cell Phone Use
Cell phones and such must be turned off before class.
Each time your phone rings during class, your course grade goes down by 1%.

Laptop Use
permitted

Food in Class
No food in class

Missed Exam
If you have to miss an exam, it is your responsibility to contact me no later than
the day of the exam. Failure to contact me on or before the exam day results in
a grade of zero points for the exam. This also applies to the final exam

Participation
none

Others
none

K. COLLEGE AND UNIVERSITY POLICIES

• Academic Integrity (University)
University students are expected to conduct themselves in accordance with the
highest standards of academic honesty. Academic misconduct for which a student is
subject to penalty includes all forms of cheating, such as illicit possession of
examinations or examination materials, falsification, forgery, complicity or
plagiarism. (Plagiarism is the presentation of the work of another as one’s own
work.) In this class, academic misconduct or complicity in an act of academic
misconduct on an assignment or test will result in a failing grade.

- **Classroom/Professional Behavior**
  Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

- **Statement of Civility**
  Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

- **Deadline for Dropping a Course with a Grade of W (University)**
  The grade of W will be assigned to any student officially dropping a course. Please consult with the instructor before you decide to drop to be sure it is the best thing to do. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Should dropping the course be the best course of action, visit the Office of the University Registrar for the Course Drop Form that must submitted. No student is eligible to receive a W without completing the official drop process by this deadline. Please consult the Academic Calendar (http://www.tamucc.edu/academics/calendar/) for the last day to drop a course.

- **Grade Appeals (College of Science and Engineering)**
  As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at http://www.tamucc.edu/provost/university_rules/index.html, and the College of Science and Engineering Grade Appeals webpage at
http://sci.tamucc.edu/students/GradeAppeal.html. For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

- **Disability Services**
  The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.

If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

http://disabilityservices.tamucc.edu/

- **Statement of Academic Continuity**
  In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

L. **OTHER INFORMATION**

- **Academic Advising**
  The College of Science & Engineering requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

**GENERAL DISCLAIMER**
I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.