DEPARTMENT OF MATHEMATICS
STRUCTURE OF THE REAL NUMBER SYSTEM
MATH 5310-001
Fall 2023 COURSE SYLLABUS AND POLICIES

Instructor: Clint Richardson
Jacob Pratscher
Office hours: MWF 9--9:50 AM, MW 9:00-11:30 AM,
TR 2:00-3:15 PM
Office: Math Building Room 306 Math Building Room 348
Email: crichardson@sfasu.edu Jacob.Pratscher@sfasu.edu
Phone: (936)468-1736 (936)468-1869
Class Meetings: TR 9:30-10:45 PM Math Building Room 358

COURSE DESCRIPTION: Brief review of infinite sets, Peano’s postulates, relations, equivalence classes and
isomorphisms. Rigorous development of the integers and rational numbers as equivalence classes of ordered pairs.
Development of the real number system using Dedekind cuts. Comparison with Cauchy sequence development.

TEXT/MATERIALS: Materials will be provided by the instructors via D2L.

WITHDRAWL: The last day to withdraw from a full-session course with a grade of W is December 5, 2023. Note:
You can find the withdrawal dates and procedures on: https://www.sfasu.edu/registrar/registration-
information/dates-deadlines and
https://www.sfasu.edu/registrar/registration-information/how-to-drop-withdraw

HOMEWORK: There will be weekly homework assignments that will normally be due Wednesday and Friday at
Noon to be turned in to either instructor. Discussing homework exercises with each other is encouraged, however
your final written solutions must be your own.

EXAMS: There will be three exams, one oral exam, an in-class exam, and a final. The oral exam will be scheduled
with one of the instructors and will occur during week 5 of the semester. The in-class exam will be announced. The
final exam is scheduled for Thursday December 14th, 2023 from 8:00-10:00 AM.

MAKE-UP and LATEWORK POLICIES: No make-ups are allowed without prior discussion beforehand with
one of the instructors, or in case of emergency. If there are concerns with completing any work on-time or being
prepared for an exam please contact the instructor immediately. The decision of a make-up or accepting late work is
left to the discretion of the instructors and is final.

SUGGESTED CLASS PACE
- Week 1- Logic and Sets.
- Week 2- Relations and the Natural Numbers
- Week 3-Cardinality and Counting
- Week 4- Induction and the Integers
- Week 5- Oral Exam, Subtraction and Relations Revisited
- Week 6- Partial Ordering and Practice with Proof Writing
- Week 7- Equivalence Relations and Practice with Proof Writing
- Week 8-The Rational Numbers and Ordered Fields
- Week 9- Ordered Fields and Complete Ordered Fields
- Week 10- Review and In-Class Exam
- Week 11- Accumulation Points in Set Perspective and Density
- Weeks 12 thru 14- Constructing the Real Numbers via Dedekind Cuts
- Final Exam, Thursday December 14th, from 8:00-10:00 AM.
**GRADING:** Grades will be assigned according to the percentage of points earned out of the total points given from homework, oral exams, the midterm exam, and the final exam. Grade intervals will be no stricter than the following table:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>A</td>
<td>90%-100%</td>
</tr>
<tr>
<td>B</td>
<td>80%-89.99%</td>
</tr>
<tr>
<td>C</td>
<td>70%-79.99%</td>
</tr>
<tr>
<td>D</td>
<td>60%-69.99%</td>
</tr>
<tr>
<td>F</td>
<td>59.99% and Lower</td>
</tr>
</tbody>
</table>

**PROGRAM LEARNING OUTCOMES (PLO):**
Students graduating from SFASU with a M.S. degree and a major in the mathematical sciences will:
1. [Written Communication] SFA graduate mathematics majors communicate mathematical ideas effectively in written form, integrating notation correctly and consistently.
2. [Verbal Communication] SFA graduate mathematics majors communicate mathematics effectively to diverse audiences.
3. [Mathematical Maturation] SFA graduate mathematics majors demonstrate mathematical facility.

**STUDENT LEARNING OUTCOMES (SLO):**
At the end of MTH 5310, a student who has studied and learned the material should be able to:
1. Define and apply basic logical and set theoretic notions, including relations, functions, cardinality, and countability. [PLO: 1,2,3]
2. Understand and apply the basic properties of the common sets of numbers, including the naturals, integers, rationals, reals, and complex. [PLO: 1,2,3]
3. Prove and apply standard results from introductory algebra, topology, and analysis. [PLO: 1,2,3]

**ACADEMIC INTEGRITY (4.1)**
The Code of Student Conduct and Academic Integrity outlines the prohibited conduct by any student enrolled in a course at SFA. It is the responsibility of all members of all faculty, staff, and students to adhere to and uphold this policy.

Articles IV, VI, and VII of the new Code of Student Conduct and Academic Integrity outline the violations and procedures concerning academic conduct, including cheating, plagiarism, collusion, and misrepresentation. Cheating includes, but is not limited to: (1) Copying from the test paper (or other assignment) of another student, (2) Possession and/or use during a test of materials that are not authorized by the person giving the test, (3) Using, obtaining, or attempting to obtain by any means the whole or any part of a non-administered test, test key, homework solution, or computer program, or using a test that has been administered in prior classes or semesters without permission of the Faculty member, (4) Substituting for another person, or permitting another person to substitute for one’s self, to take a test, (5) Falsifying research data, laboratory reports, and/or other records or academic work offered for credit, (6) Using any sort of unauthorized resources or technology in completion of educational activities.

Plagiarism is the appropriation of material that is attributable in whole or in part to another source or the use of one’s own previous work in another context without citing that it was used previously, without any indication of the original source, including words, ideas, illustrations, structure, computer code, and other expression or media, and presenting that material as one’s own academic work being offered for credit or in conjunction with a program course or degree requirements.

Collusion is the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any provision of the rules on academic dishonesty, including disclosing and/or distributing the contents of an exam.
Misrepresentation is providing false grades or résumés; providing false or misleading information in an effort to receive a postponement or an extension on a test, quiz, or other assignment for the purpose of obtaining an academic or financial benefit for oneself or another individual or to injure another student academically or financially.

The penalty for a student found cheating on any part of an assignment, quiz, or exam in this class will range from a grade of zero on the work to a grade of F in the course, and may result in additional, more severe disciplinary measures. A student who allows another to copy his work and the student copying the work are both guilty of cheating. Do your own work. Do not show your completed work to others. Do not allow others to copy your work.

WITHHELD GRADES SEMESTER GRADES POLICY (5.5)

Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average.

STUDENTS WITH DISABILITIES
To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices/.

MENTAL HEALTH AND WELLNESS
SFA values students’ mental health and the role it plays in academic and overall student success. SFA provides a variety of resources to support students’ mental health and wellness. Many of these resources are free, and all of them are confidential.

ON-CAMPUS RESOURCES:
SFA Counseling Services www.sfasu.edu/counselingservices Rusk Building, 3rd Floor 936.468.2401
SFA Human Services Counseling Clinic www.sfasu.edu/humanservices/139.asp Human Services, Room 202 936.468.1041

CRISIS RESOURCES:
Burke 24-hour crisis line: 1.800.392.8343
Suicide Prevention Lifeline: 1.800.273.TALK (8255)
Crisis Text Line: Text HELLO to 741-741
The following is an excerpt from SFA Policy 5.4:

The federal definition of a credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally established equivalency that reasonably approximates:

1. Not less than one hour of classroom or direct faculty instruction and a minimum of two hours out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or 10 to 12 weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time, or;

2. At least an equivalent amount of work as outlined in item 1 above for other academic activities as established by the institution including laboratory work, internships, practica, studio work, and other academic work leading to the award of credit hours.

To this end, all students in courses offered by the Department of Mathematics and Statistics that wish to be successful should plan to spend a minimum of two hours outside of class for every credit hour associated with this course. Expected activities to be completed in the time outside of class include reviewing notes from previous class meetings, reading assigned course resources, completing all assigned exercises and projects, and performing periodic assessment preparation.

**Academic Integrity**

The Code of Student Conduct and Academic Integrity outlines the prohibited conduct by any student enrolled in a course at SFA. It is the responsibility of all members of all faculty, staff, and students to adhere to and uphold this policy.

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Plagiarism is the appropriation of material that is attributable in whole or in part to another source or the use of one’s own previous work in another context without citing that it was used previously, without any indication of the original source, including words, ideas, illustrations, structure, computer code, and other expression or media, and presenting that material as one’s own academic work being offered for credit or in conjunction with a program course or degree requirements.

Collusion is the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any provision of the rules on academic dishonesty, including disclosing and/or distributing the contents of an exam.

Misrepresentation is providing false grades or résumés; providing false or misleading information in an effort to receive a postponement or an extension on a test, quiz, or other assignment for the purpose of obtaining an academic or financial benefit for oneself or another individual or to injure another student academically or financially.

**Withheld Grades Semester Grades (SFA Policy 5.5)**

Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average. The circumstances precipitating the request must have occurred after the last day in which a student could withdraw from a course. Students requesting a WH must be passing the course with a minimum projected grade of C. For additional information, go to [https://www.sfasu.edu/policies/course-grades-5.5.pdf](https://www.sfasu.edu/policies/course-grades-5.5.pdf).

**Students with Disabilities**
To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices.

Student Wellness and Well-Being
SFA values students’ overall well-being, mental health and the role it plays in academic and overall student success. Students may experience stressors that can impact both their academic experience and their personal well-being. These may include academic pressure and challenges associated with relationships, emotional well-being, alcohol and other drugs, identities, finances, etc.

If you are experiencing concerns, seeking help, SFA provides a variety of resources to support students’ mental health and wellness. Many of these resources are free, and all of them are confidential.

On-campus Resources:
The Dean of Students Office (Rusk Building, 3rd floor lobby)
www.sfasu.edu/deanofstudents
936.468.7249
dos@sfasu.edu

SFA Human Services Counseling Clinic Human Services, Room 202
www.sfasu.edu/humanservices/139.asp
936.468.1041

The Health and Wellness Hub “The Hub”
Location: corner of E. College and Raguet St.

To support the health and well-being of every Lumberjack, the Health and Wellness Hub offers comprehensive services that treat the whole person – mind, body and spirit. Services include:

- Health Services
- Counseling Services
- Student Outreach and Support
- Food Pantry
- Wellness Coaching
- Alcohol and Other Drug Education

www.sfasu.edu/thehub
936.468.4008
dos@sfasu.edu

Crisis Resources:
- Burke 24-hour crisis line: 1.800.392.8343
- National Suicide Crisis Prevention: 9-8-8
- Suicide Prevention Lifeline: 1.800.273.TALK (8255)
- Crisis Text Line: Text HELLO to 741-741

Acceptable Student Behavior
Classroom behavior should not interfere with the instructor’s ability to conduct the class or the ability of other students to learn from the instructional program (see the Student Conduct Code, policy 10.4). Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic or other penalties. This prohibition applies to all instructional forums, including electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom.

Date of document: 08/23/2023