

# Math 3000-001 Syllabus - Fall 2018

**Meets:** TR 11:00-12:20 in GAB 461

**Instructor:** Dr. Pieter Allaart

**Office:** GAB, Room 415; Phone: 369-7313

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**Office Hours (tentative):**

- Tue 10:00-11:00
- Wed 1:00-2:00
- Thu 10:00-11:00 and 1:00-2:00
- and by appointment
- I will usually be able to answer a few brief questions immediately after class.

**Book:** Analysis, with an introduction to proof; by S. Lay (5th edition)

**Grading:** Grades will be based on two mid-term exams, homework, quizzes, class participation, and a final exam, weighted as follows:

- Mid-term exam 1: 20%
- Mid-term exam 2: 20%
- Homework: 10%
- Quizzes: 10%
- Class participation: 10%
- Final exam: 30%

**Mid-term Exams:** The mid-term exams will be given in class on October 4 and November 15. (There is a slight chance that these dates will change). If you show up late for an exam, without a valid excuse, do not expect to be given extra time for the exam. The final exam will be on Tuesday, December 11 at 10:30. If you miss an exam due to illness or other circumstances beyond your control, you should contact me within 24 hours in order to be granted a make-up exam. The make-up exam may be different from the original.

**Quizzes:** Quizzes will be given in class roughly once a week on Tuesdays, and will be based on (though not necessarily identical to) the homework due that day. Your two lowest quiz grades will be dropped. In view of this, no make-up quizzes will be given for any reason.

**Homework:** Homework will be assigned at the end of each class period, and is due at the beginning of class on the first Tuesday following the day it is assigned. Homework must be written neatly and legibly. Homework consisting of multiple pages must be stapled together. A selection of the problems will be graded and your work will be returned with brief comments. However, for more elaborate feedback I recommend that you come to my office. Homework which is messy or difficult to read will not be graded! Your two lowest homework grades will be dropped. In view of this, **late homework will not be accepted**, regardless the reason. If you could not come to class, and missed the assignment, it is your responsibility to find out what the assignment is.

**Attendance:** You are expected to come to class each class day and take active part in the lectures. Real Analysis is completely different than any other math class you have taken so far, and you will not master the new skills if you do not actively attend class. The class participation portion of your grade is based in part on attendance and arriving on time. If you cannot make it to class due to illness or other unforeseen circumstances, you should contact me before class or as early as possible. Likewise, if you know that you will not be able to arrive to class on time or have to leave early, you should inform me of this beforehand.

**Extra credit:** Do not expect to be able to do some extra work to help your grade either before or after the final exam. There will be no extra credit other than perhaps an extra problem on an exam. Your best bet to help your grade is to do the required work at the time it is assigned.

**Disabilities:** The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with an accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the Office of Disability Accommodation website at <http://www.unt.edu/oda>. You may also contact them by phone at 940.565.4323.

**Cheating:** No cheating will be tolerated. Anyone caught cheating will be subject to any penalty the instructor deems appropriate, up to and including an automatic F for the course. Furthermore, a letter will be sent to the appropriate dean.

## List of topics:

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Lecture	Section(s)	Topic(s)
1	-	Introduction, two big theorems, motivation
2	3.4	Neighborhoods, interior and boundary points
3	2.1	Set notation and set operations
4	1.1	Logical connectives and truth tables
5	1.1	Negations
6	1.2	Quantifiers, negating quantified statements
7	1.3, 1.4	Techniques of proof and counterexamples
8	3.4	Topology of the reals: open and closed sets
9	2.1, 3.4	Unions and intersections of open and closed sets
10	3.4	Accumulation points and closure
11	3.4	Properties of closure, review for exam
12	-	Exam 1
13	3.2, 3.3	Axioms of ordered fields; least upper bound, greatest lower bound
14	3.3	The Completeness Axiom; the Archimedean property of the reals
15	3.3	Density of the rationals and the irrationals; $\sqrt{2}$ is irrational
16	2.2, 2.3	Functions; domain, range, injective and surjective functions
17	2.3	Image and inverse image of sets
18	5.2	Continuous functions: precise definition, examples
19	5.2	Properties of continuous functions
20	5.3	Proof of the Intermediate Value Theorem; $\sqrt{2}$ exists!!
21	3.5	Compact sets
22	3.5	The Heine-Borel theorem (first half)
23	3.5	The Heine-Borel theorem (second half), review for exam
24	-	Exam 2
25	5.3	Prove of the Extreme Value Theorem
26	3.1	Mathematical Induction
27	2.4	Cardinality
28	-	Catch-up and final exam review
29	-	Final exam review

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