

Math 3333-Section 14868-Intermediate analysis. Fall Semester, 2017.

Time and Place: 10–11 in SEC 202 (MWF).

Instructor: Dr. David Blecher, 651E PGH, email: dblecher@math.uh.edu

Office Hours: 1-2 pm MW (this may change), or email me

Office phone number: 713-743-3451.

Grader's details and office hours: Jayson Cortez email: mvcortez1@up.edu.ph

Grader's office hours: CASA TTh 2:30-4:30, or by appointment on Friday in his office 343 PGH.

Course website: <http://www.math.uh.edu/~dblecher/3333.html>

Departmental syllabus:

<http://www.uh.edu/nsm/math/undergraduate/courses/math3333/index.php>

Text: Analysis with an Introduction to Proof, Third or 4th or 5th Edition, by Steven R. Lay,

Prentice-Hall, 2001. Buy it as cheap as you can, (homework numbers will include all these Edition numbers), since it will mostly just be used for homework problems, and for extra reading: for classnotes you will mostly use the typed notes

I will provide instead of the book.

Last date to drop with refund or not having it count towards the 'allowed drops'/enrollment cap: September 6 (Wednesday), 2017.

Prerequisites: Math 2433, Math 3325, or consent of instructor—(actually, in reality you only need Math 1432 and a talent for logic and abstract thinking).

Last date to drop with W: October 31, 2017.

Final exam: In class in the last week of lectures.

This course has two goals. First, we learn how to prove things in mathematics. This requires a talent for logic (to be able to follow very detailed chains of logical implications). Don't take this course if you usually lose arguments! It also requires the ability to think very abstractly, manipulate mathematical symbols, and to be able to find simple examples and use them to 'see what is going on', and then to construct a formal proof. Most of this is learned by experience, and this is the course in which we begin to learn this. It is very very different to earlier courses, such as calculus, and because of this you may dislike it very much for a while, or may decide that this is not where you want to go with your life. Learning new skills is often unpleasant at first! You are going to have to completely immerse yourself in the material to absorb it. The second goal of the course is to rigorously develop the basic facts about the real numbers and functions of one real variable, and to actually prove many of the facts you took for granted in Calculus I and II. This will require us to really understand ϵ - δ arguments and definitions, and the basic 'topology' of the real number line (limits, sequences, series, continuity). One only really appreciates many mathematical ideas and techniques when you understand their proofs.

Some encouragement from a great mathematician: "Mathematics is a process of staring hard enough with enough perseverance at the fog of muddle and confusion to eventually break through to improved clarity. I'm happy when I can admit ... that my thinking is muddled, and I try to overcome the embarrassment that I might reveal ignorance or confusion [and ask for help! (DB)] ... this has helped me develop clarity..." Thurston

(These lines will be of great use here or if you are going on to other higher level math classes.)

Plagiarism definition and policies may be found in the UH Student Handbook. Zero will be given for assignments containing examples of clear plagiarism. It may be OK to use something you found on the internet, as long as you cite your link, come to a full understanding of it, and explain it in your own words. However you may not get full marks for this, since homework is supposed to be something you learn from ‘in the struggle’ as you make a sincere attempt on your own.

Syllabus: we will cover the most important topics in the chapters represented in the Lay text from the chapter on real numbers to the chapter on series (inclusive). However as said elsewhere, we will stick closely to the distributed typed Classnotes as opposed to Lay’s text (only use the latter as a supplement, or not at all). You will be expected to reread and digest these classnotes after class, line by line, trying to follow why the line is true, for example how it follows from previous lines (of course if you already followed everything in class then this will be easy and quick). I suggest you add a check mark after you have read and understood the line, add extra explanation or pictures to yourself if needed. Add a question mark next to any line you cannot follow, collect these questions and ask me or the TA about them. Also memorize ‘definitions’ as you read. The best advice I can give to ensure success in this class is to do this reading properly. In my experience, the class becomes much much more difficult if you do not do it; in fact I recommend not taking this Section if you are not willing to do this. This kind of detailed reading is not without pain, but it will help reconfigure your brain to internalize the kind of logic/thinking/proof skills that are needed in this subject (and in other math ‘proof’ courses). It takes a long time to do this, but remember the universal college rule: 3 hours study outside of class for every hour in class. The way I will monitor if you are doing all this, is to give an ‘easy-quiz’ once a week, named as such because it will be easy for anyone who has been reading the notes as suggested. The tests and exam will be based on these class notes, and on the homework. There will be a 30 minute test after every chapter, but two tests on the Chapter 3 material (see tests page). It is important to keep up to date. You can begin already with this reading, on the notes on “Logic and deductive reasoning” on the course webpage.

As a student in this class you are also expected to come to the board once in a while and present for a few moments (you will be given the material to present days in advance to prepare, and can bring me any questions on it beforehand). Again, if you are not willing to do this, please take another Section of Math 3333. You should attempt as many homework problems as possible. They will be collected almost every class day; but only partially graded (actually, you will get 2 grades on each HW assignment, one for the graded questions; and another (out of 5) for ‘completeness’ for the non-graded questions—here the points are for turning in a solution which from a long distance looks like a serious attempt at the problem). It is your responsibility to go carefully through the homework keys and see how the problems should have been done, since these may show up on the test. You are encouraged to work with others, form study groups, and so on, however copied turned in homework will not help you assimilate the material, and will not be graded. If you do not wish to be identified by name on turned in homework to be picked up, just put the first letter of your last name and your student number on the first (top) page. Please bring your student ID, but no calculators, to tests and exams.

Well before each test I will give you a list of 8 or so proofs to memorize. I will give you hints in class on how to memorize proofs (like Step 1: understand the proof! Its impossible to memorize something you do not understand). The reason I do this is to try to reconfigure your brain to internalize the kind of logic and proofs that are needed in this subject (and

in other math ‘proof’ courses), and also to force you to understand some proofs (this after all is one of the main objectives of the course).

Bring comments or complaints to my attention as soon as possible. Don’t wait until the end of the semester to bring up a matter which we could deal with and solve early on. Remember that math is always easy when you look back on it, AFTER you have spent the time wrestling with the new concepts and doing plenty of exercises. No pain, no gain.

The recipe for success: 1) Read classnotes carefully as described above (every line), and ask about what you don’t understand, 2) Do as many problems as possible, 3) Learn from your mistakes - for example, check carefully through your graded work, 4) Give sufficient time to study (particularly for tests).

Course grade is approximately based on a total score of 530 points consisting of homework and easy-quizzes (100 points), six semester tests (50 points each), class presentation (around 30 points), and a final exam (around 100 points).

Students getting below 50 % on tests may consider this an F (this is not the case for homework, where a low grade on many assignments is fairly common, particularly at first as one begins to assimilate the material—the homework can be viewed largely as a place to engage with the struggle with the concepts and learn from the struggle and from the keys). The instructor may change the grade distribution above at his discretion.

The grading system on tests and exams is designed in part to benefit students who follow the instructions given to study for those tests (see the top of the ‘Tests’ page on the website): thus many will get over 100 % for tests, while others who do not follow the instructions (or who only follow part of the instructions) may well do very poorly.

Incompletes: only given to students with at least a C average who are unable to take the Final for unforeseeable, unpreventable, documented circumstances.

UH CAPS Statement Counseling and Psychological Services (CAPS) can help students who are having difficulties managing stress, adjusting to college, or feeling sad and hopeless. You can reach CAPS (www.uh.edu/caps) by calling 713-743-5454 during and after business hours for routine appointments or if you or someone you know is in crisis. No appointment is necessary for the “Let’s Talk” program, a drop-in consultation service at convenient locations and hours around campus: http://www.uh.edu/caps/outreach/lets_talk.html