

## MAT 4860: Analysis

Professor: Charles Delman   Professor's Office: OM 3216  
Email: cidelman@eiu.edu   Office Hours: MW 4-5 p.m., Th 3-4 p.m., F 11 a.m. - noon

### 1. COURSE TEXT:

*Basic Analysis 1*, by Jiří Lebl, Creative Commons Copyright. (Bound copies will be distributed; also available on-line free of charge.)

You may also find it useful to pick up *Analysis*, by Steven Lay, from textbook rental, especially if you need review of material from Foundations. A slightly more advanced treatment of the material of this course, especially useful to those wishing to pursue graduate study in mathematics, is given in the classic text *Principles of Mathematical Analysis*, by Walter Rudin, which I have put on reserve at Booth Library. There are a number of other good books on analysis, and you are welcome to come investigate the ones on my office shelves.

### 2. COURSE CONTENT

Inequalities and limits, sequences and series, continuity, differentiation, and Riemann integration. Both real and complex numbers will also be introduced in contexts where special methods do not apply in the complex case. If time permits, the more general setting of metric spaces will be introduced.

### 3. OBJECTIVES

It is fashionable, unfortunately, to list so-called *measurable objectives*, but I will refrain from doing so, because the most important things to gain from the study of any subject, such as depth of understanding and the ability to think in a way that is natural for the discipline, are not particularly definable or quantifiable. My object is to expose you to a rich set of concepts, techniques, and exercises in the theory of analysis, presented in a discursive manner, with the objective that you will make these ideas your own and develop facility in working with them. Doing so will both deepen your understanding of calculus and prepare you for further advanced work in analysis and other areas of pure and applied mathematics.

### 4. REQUIREMENTS, EXPECTATIONS, & GRADING

**4.1. Class attendance.** Given the benefit of a small class, the value of discussion and cooperative solving of problems, and the fact that supplementary material is not in the text, it should be obvious that attending every class (except, of course, when ill or dealing with an emergency situation) is essential.

**4.2. Problem Sets.** Problem sets will regularly be assigned and graded, with comments and suggestions. In general, assignments will be due on Monday. We will typically discuss new material on Monday, Wednesday, and Thursday, reserving Friday's class for working together on the current assignment and catching up as needed. But of course you should not wait until Friday to start working on the problems!

I encourage you to work together and discuss the homework problems with your classmates. You may hand in joint papers, but I strongly suggest you use this privilege very judiciously, in order to make sure you get sufficient practice writing out solutions on your own. Obviously, all of those submitting a joint assignment will receive the same grade and comments.

Homework typeset in Tex is preferred, but if typing is a burden and your handwriting is legible, I will accept handwritten copies. In either case, make sure that the work you submit is a clean, well-organized final draft, not a rough draft, neatly assembled in the case of hard copies, with multiple pages stapled, not folded together! Electronic submissions are welcome (but not required) and will generally get a faster response; I will set up a dropbox for each student for this purpose. Late homework will not generally be accepted, although exceptions can be made when extenuating circumstances warrant them.

4.3. **Exams.** There will be *two exams before final exam period*, one near the middle of the term (the *mid-term exam*) and one near the end of the term (the *end-of-term exam*). The mid-term exam will cover all of the material since the beginning of the course; the end-of-term exam will cover all material since the midterm exam.

There will be a *comprehensive final exam*, covering all the material of the course, during final exam period.

*Make-up exams will be given only under extraordinary circumstances or in case of serious emergency; prior permission to miss an exam must be obtained from the professor if at all possible.*

4.4. **Academic Integrity.** Complete honesty on assignments and exams is expected of all students. All sources must be appropriately cited and acknowledged. Please refer to the EIU Student Code of Conduct for further details.

4.5. **Attention to communications.** It is the student's responsibility to be informed about any communication from the instructor made in class or sent to the student's EIU email address.

4.6. **Grading.** I do not grade on a "curve". Under no circumstances will your grade directly depend on how how your fellow students do. If you do a good job of learning the material, you will receive a good grade, regardless of how well the other members of the class perform. Don't forget that the reverse is also true: if you do a poor job of learning the material, you will receive a poor grade, regardless of how poorly everyone else does.

I will generally grade problem sets holistically and assign a letter (rather than numerical) grade to each. These letter grades will be converted to the standard 0 – 4 scale, as will any numerical scores ( $100\% \equiv 4.5, 90\% \equiv 3.5, \dots, 60\% \equiv 1.5, \leq 55\% \equiv 0$ ), and a weighted average will then be used to compute your final grade for the course.

Letter grades correspond to my judgement of quality as follows:

- A Excellent. The work exhibits mastery of nearly all important ideas, including those which are subtle or difficult, much insight and originality, highly coherent organization and fine expository style. Errors and omissions, if any, are minor.
- B Good. The work exhibits substantial understanding of most important ideas, including some which are subtle or difficult, some insight and originality, coherent organization and correct usage, grammar and spelling. There are some substantive errors or omissions.
- C Fair. The work exhibits basic understanding of many fundamental ideas, although not those which are subtle or difficult, and demonstrates some coherence. The presentation is readable, with at most minor errors of usage, grammar or spelling. There are many substantive errors or omissions.
- D Poor. The work exhibits some understanding of a few fundamental ideas, but not those which are subtle or difficult, and it fails to demonstrate coherence. Usage, grammar and spelling are mostly correct. There are a great many substantive errors or omissions.
- F No credit. The work exhibits too few of the positive qualities noted above to be worthy of credit.

Each requirement will count toward your final grade as follows:

Homework: 30% Exams:  $2 \times 20\% = 40\%$  Final Exam: 30%

*The instructor reserves the right to make changes in course policy.*

## 5. DISABILITY SERVICES

If you have a documented disability and are in need of accommodation, please contact the Office of Student Disability Services (OSDS), Ninth Street Hall, Room 2006, (217) 581-6583. All accommodations must be approved through OSDS.