MATH 523H
INTRODUCTION TO MODERN ANALYSIS
FALL 2017

Staff responsible: Dr. Taryn Flock
flock@math.umass.edu

Email preferred, emails sent M-F can expect a response within 24hrs
413-545-7693

Office hours: Wednesday 1:20-2:20 and Thursday 2:30-4:30 and by appointment
LRGT 1344

Lecture: MoWeFr 12:20-1:10
LGRT 147

Midterm: Wednesday, October 18th, 7:00-9:00pm
LRGT 0206

Final: Tuesday, December 19th 1:00-3:00pm,
LRGT 123

Website: Moodle Course

Textbooks:
The text is intended to be a resource/reference. Find a book whose style works for you. Feel free to talk to me about the books (or about reading mathematics more generally) in office hours.

Official course text:

Other recommended texts:

For a historical perspective:

Course description
This course is the first part of the Introduction to Analysis sequence (Math 523 and Math 524). The central idea of this course is convergence. We will first explore convergence of sequences of real numbers. We will then extend this understanding to the world of functions, developing a rigorous understanding of calculus along the way. Precise definitions and formal proof will be emphasized. “The ideas and objects in analysis play an important role in differential equations, probability, numerical analysis, geometry, and in most areas of applied mathematics. But in studying analysis one learns that mathematics is much more than just a set of methods that work. Students will be asked to construct proofs, sometimes long ones, and this will open the door to a much deeper understanding of the nature of mathematics.”

Topics covered.

- Numbers: $\mathbb{N}, \mathbb{Q},$ and $\mathbb{R}$; the completeness axiom for $\mathbb{R}$
- Sequences: convergence, cauchy sequences, subsequences, the Bolzano-Weierstrass Theorem
- Series: absolute and conditional convergence, convergence tests
- Functions & continuity: the intermediate value theorem, uniform continuity
- Calculus: differentiation, the mean value theorem, L’Hopital’s theorem, integration
- Sequences & Series of functions: Power series, uniform convergence, Taylor’s theorem
- Metric Spaces (if time):

\footnote{1Note per university policy: There is no class Monday October 9th (Columbus day), but class will meet Tuesday October 10th.}

\footnote{2Luc Rey-Bellet, Syllabus for 523H Spring 2017}
Assessment Structure

**Homework (20%)**: Problem sets will assigned weekly due Fridays, in class or by 4:00pm in my office. **No late work will be accepted** but I will drop the lowest homework score.

**Class participation (10%)**: Worksheets will be handed out regularly in class. They will be graded for completeness rather than accuracy. Make-up worksheets will be accepted when the absence is due to religious observance or “extenuating circumstances-including jury duty, military obligations, scheduled activities for other classes, the death of a family member, or verifiable health-related incapacity” as per academic regulations.

**Midterm (30%)**: If you miss the exam, the final will count for 70% of your grade. Make-up exams will be given only as required by U Mass academic regulations. Note 2 weeks notice required except in exceptional circumstances.

**Final Exam (40%)**: If you miss the exam, you will receive a 0. Make-up exams will be given only as required by U Mass academic regulations.

**Academic Honesty**

Working on problems is how we learn mathematics. Spend some time struggling.

Feel free to discuss the homework problems with your classmates. However, I strongly recommend writing up your solutions without looking at notes from said discussions. (This will help you understand how much of the material you understand.)

Rather than google solutions of unverifiable quality, I encourage you to come office hours and talk to me. If you do use the internet or a textbook in your work for this class, please cite your sources and again, write up your solution without looking at what you’ve referenced.

No collaboration will be allowed on exams.

*Since the integrity of the academic enterprise of any institution of higher education requires honesty in scholarship and research, academic honesty is required of all students at the University of Massachusetts Amherst.*

*Academic dishonesty is prohibited in all programs of the University. Academic dishonesty includes but is not limited to: cheating, fabrication, plagiarism, and facilitating dishonesty. Appropriate sanctions may be imposed on any student who has committed an act of academic dishonesty. Instructors should take reasonable steps to address academic misconduct. Any person who has reason to believe that a student has committed academic dishonesty should bring such information to the attention of the appropriate course instructor as soon as possible. Instances of academic dishonesty not related to a specific course should be brought to the attention of the appropriate department Head or Chair. The procedures outlined below are intended to provide an efficient and orderly process by which action may be taken if it appears that academic dishonesty has occurred and by which students may appeal such actions.*

*Since students are expected to be familiar with this policy and the commonly accepted standards of academic integrity, ignorance of such standards is not normally sufficient evidence of lack of intent. For more information about what constitutes academic dishonesty, please see the Dean of Students website:* 
[http://umass.edu/dean_students/codeofconduct/acadhonesty/](http://umass.edu/dean_students/codeofconduct/acadhonesty/)

**Accommodations**

Please let me know if there are extenuating circumstances affecting your attendance and/or performance in this class. The early you get in touch with me, the earlier we can plan solutions. Note that in all cases, you will be held responsible for the material in course.

*The University of Massachusetts Amherst is committed to making reasonable, effective and appropriate accommodations to meet the needs of students with disabilities and help create a barrier-free campus. If you are in need of accommodation for a documented disability, register with Disability Services to have an accommodation letter sent to your faculty. It is your responsibility to initiate these services and to communicate with faculty ahead of time to manage accommodations in a timely manner. For more information, consult the Disability Services website at [http://www.umass.edu/disability/](http://www.umass.edu/disability/).”*

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3except in truly exceptional circumstances. Talk to me!