REAL ANALYSIS 1   MWF 10:00-10:50AM   FALL 2014   STUART 309

Instructor:	Jonathan White
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Office:	Stuart 316
Office Hours:	MTWF 9:10-9:50am and by appointment
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Texts:	*A Friendly Introduction to Analysis, Single and Multivariable*, 2nd Edition, by Witold Kosmala, Prentice-Hall; *A Tour of the Calculus*, by David Berlinski.
Problem Sets:	Problem Sets will be given throughout the term to supplement class work. Combined these will be worth 200 points.
Math Culture Points:	Math Culture Points will constitute 100 points. These will be earned through participation in various activities outside of class, as detailed elsewhere.
Exams:	There will be two exams during the course of the semester, administered during class time. The dates of these are indicated in the schedule on the back side of this sheet. These exams will be worth 100 points each. The final exam will be held during finals week at the date and time indicated on the back side of this sheet. The final will be worth 200 points.
Grading:	Grading will approximately follow a [92.0%, ∞) → A, [90%, 92%) → A−, [87%, 90%) → B+, [82%, 87%) → B, [80%, 82%) → B−, [77%, 80%) → C+, [72%, 77%) → C, [70%, 72%) → C−, [67%, 70%) → D+, [62%, 67%) → D, [60%, 62%) → D−, (−∞, 60%) → F scale. Current grade information will be available online via Moodle.

"And what are these fluxions? The velocities of evanescent increments. And what are these same evanescent increments? They are neither finite quantities, nor quantities infinitely small, nor yet nothing. May we not call them ghosts of departed quantities?"

-Bishop George Berkeley, 1685-1753

Real Analysis is in many ways a dramatically different course than anything which precedes it in the mathematics curriculum. In some regards, students finally get a chance to see the sorts of things that professional mathematicians deal with -- but at the same time, many of these underpinnings are beneath notice once they've been properly laid. The simplest thing that can safely be said is that there are genuinely troubling issues left unaddressed by the undergraduate calculus sequence, and they must be dealt with before moving on.

It is also important to note at this point that the demands on students become qualitatively different in this course than in its prerequisites. Learning strategies which have succeeded in previous classes will not necessarily suffice at this level. If at some point these challenges or frustrations get too bad, I strongly encourage you to see me for extra explanation -- don't wait until you're overwhelmed. I'm here to help.

Tentative Schedule

Monday, August 25th §1.7 Real Numbers	Wednesday, August 27th §1.8 Properties of Real Numbers	Friday, August 29th §1.9 Review
Monday, September 1th No Class – Labor Day	Wednesday, September 3rd §2.1 Convergence	Friday, September 5th §2.2 Limit Theorems
Monday, September 8th §2.3 Infinite	Wednesday, September 10th §2.4 Monotone Sequences	Friday, September 12th §2.5 Cauchy Sequences
Monday, September 15th §2.5 Cauchy Sequences	Wednesday, September 17th §2.6 Subsequences	Friday, September 19th §2.7 Review
Monday, September 22nd §3.1 Limit at Infinity	Wednesday, September 24th §3.2 Limit at a Real Number	Friday, September 26th §3.2 Limit at a Real Number
Monday, September 29th §3.3 One-Sided Limits	Wednesday, October 1st §3.4 Review	Friday, October 3rd **Exam 1**
Monday, October 6th §4.1 Continuity	Wednesday, October 8th §4.2 Discontinuity	Friday, October 10th §4.3 Properties of Continuous Functions
Monday, October 13th No Class – Fall Break	Wednesday, October 15th §4.3 Properties of Continuous Functions	Friday, October 17th §4.4 Uniform Continuity
Monday, October 20th §4.5 Review	Wednesday, October 22nd §4.6 Compactness	Friday, October 24th §5.1 Derivatives
Monday, October 27th §5.2 Properties of Differentiable Func.	Wednesday, October 29th §5.3 Mean Value Theorems	Friday, October 31st §5.4 Higher Derivatives
Monday, November 3rd §5.5 L'Hôpital's Rules	Wednesday, November 5th §5.6 Review	Friday, November 7th **Exam 2**
Monday, November 10th §6.1 Riemann Integrals	Wednesday, November 12th §6.1 Riemann Integrals	Friday, November 14th §6.2 Integrable Functions
Monday, November 17th §6.2 Integrable Functions	Wednesday, November 19th §6.3 Properties of Riemann Integrals	Friday, November 21st §6.4 Integration and Differentiation
Monday, November 24th §6.4 Integration and Differentiation	Wednesday, November 26th No Class – Thanksgiving Break	Friday, November 28th No Class – Thanksgiving Break
Monday, December 1st §6.5 Improper Integrals	Wednesday, December 3rd §6.7 Review	Friday, December 5th Dedekind Cuts
Monday, December 8th Final Review		
Final Exam – 8am on Monday, December 15th		

Any students with disabilities which might affect their performance in this class should contact me as soon as possible to arrange accommodations.

The faculty has adopted a policy on academic integrity. It is your responsibility to understand and follow it.

Diversity, in all its forms, is valuable.

Math Culture Points

A portion of the grade for this course will take the form of Math Culture Points. These will be earned through activities outside of class including, but not necessarily limited to, those listed below:

Activity	Points	Maximum
Colloquium Attendance	5	–
Colloquium Presentation	5-15	2
Conference Attendance Iowa Section of the MAA	5-15	2

Mathematics Competition Participation
    Iowa Mathematical Modeling Competition
    Putnam Competition
	15	2

Math Culture Reading
    Some weeks specific readings will be posted on the course web page
    Selected readings from Berlinski's *Tour*
    With approval, any relevant column on MAA.org
    With approval, any relevant article from *Math Horizons*, *CMJ*, etc.
	5	–
		10
		3
		3

Math Club Activities (when appropriate) Movies, Speakers, Game Nights, math portion of Playground of Science, etc.	5	--
Volunteer Math Outreach Working with students at McKinnley Middle School, etc.	5	2

Generally Math Culture Points can be earned for at most two activities in any given week, so you should plan to spread your participation throughout the semester. In each case above, credit assumes both full participation and submitting a brief summary/response via Moodle. These reflections should generally be between 100 and 300 words, and include both a brief summary and your personal thoughts on the event or reading.