MA 341 FOUNDATIONS OF ANALYSIS Spring 2010

Lectures: TTh 9:00am - 10:15pm REC 121

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Office Hours: T 10:30am – 11:30pm, Th 1:30pm – 2:30 pm

Textbook. R.G. Bartle and D.R. Sherbert *Introduction to Real Analysis*, Third Edition, John Wiley & Sons, Inc., 2000.

Course content. A rigorous introduction to real analysis. Sets and function. Real numbers. Completeness of real numbers. Sequences. The limit of a sequence. The Bolzano-Weierstrass Theorem. Series. Limit of Functions. Continuity. Uniform continuity. Inverse functions. The derivative. The Mean Value Theorem. The L'Hospital Rule. Taylor's theorem. The Riemann Integral. The Fundamental theorem. Sequences of functions. Interchange of limits. 3 credits, 2 classes per week, 2 midterms, 1 final exam.

Deadline to enroll. The capacity of the class may will be increased during the first week to accommodate first 3-4 students willing to add to the class. Keep checking the registration web page to add to the class. The last day for late registration is January 15th, 2010.

Deadlines to drop.

January 25, 2010 before 5pm is the last day to cancel a course without it appearing on record.

February 8, 2010 before 5pm is the last day to drop a course without a grade.

March 22, 2010 before 5pm is the last day to drop a course with a passing or failing grade.

Final. The day for the final is to be announced in a couple of weeks. The updated information will be available at:
`https://roomschedule.mypurdue.purdue.edu/Timetabling/exams.do`

Homework arrangements. Homework problems are listed for each section in the Lecture Schedule attached to the syllabus. The purpose of homework is to strengthen your skills and to give you better understanding of the material through practice. (REMEMBER! Doing homework is crucial for you performance: normally a B requires working out at least 85% of problems.)

Absence from exams. Missing a midterm is permitted only for the most compelling reason. Except in extraordinary situations, permissions should be obtained in advance from the professor to miss an exam; otherwise you will be awarded a 0. If you are excused from taking a midterm, you course grade will be determined by giving extra weight to the final exam. Except in extremely exceptional situations, a student who misses the final exam fails the course.

Incompletes. These are given only in exceptional circumstances. The student must have satisfactorily completed all but a small portion of the work in the course, have a compelling reason for the incomplete, and must have a prior arrangements with the professor for how the incomplete will be removed, well before the end of the term.

Grading policy. The letter grades are assigned on the scale *F,D,D+,C-,C,C+,B-,B,B+,A-,A*. Your course grade is based on the following (assuming that all scores are made out of 100):

1) Each of the two midterms will give you 25% of your Semester Grade;

2) An accumulated grade for completed homework is 20% of the Semester grade;

3) Your performance on the final exam: The grade for the final is 30% of the Semester Grade.

Again, the final exam makes 30%, each midterm makes 25%, and homework makes 20% of the Semester Grade.

Week 1, January 11 — January 15, 2010

T	1.1: Sets and functions. 1.2: Mathematical induction
	HW **1.1:** 2,3,5,8,11,14,16,19; **1.2:** 1,2,4,6,10,13,14,18
Th	1.2: Mathematical induction (cont.). 1.3 Finite and infinite sets.
	HW **1.3:** 1,4,5,7,9,10,11,12

Week 2, January 18 — January 22, 2010

T	2.1: Algebraic and order properties of real numbers. 2.2 Absolute value and real line.
	HW **2.1**: 1,3(a,b),4,7,8,9,17,18; **2.2**: 2,4,6,8,14,15
Th	2.3. The completeness property of real numbers.
	HW **2.3**: 1,3,4,6,7,10

Week 3, January 25 — January 29, 2010

T	2.4 Applications of the supremum property.
	HW **2.4** 2,3,4(a),5,6,7,8(a),10
Th	2.5: Intervals
	HW **2.5**: 1,2,4,6,7,8,9,17

Week 4, February 1 — February 5, 2010

T	3.1: Sequences and Their Limits. 3.2 Limit theorems.
	HW **3.1**: 3(c,d),5(a,d),6(a,c),8,9,11,15,16; **3.2**: 1,3,6,7,9,11,13,15
Th	3.2: Limit theorems. (cont.) 3.3: Monotone sequences.
	HW **3.3**: 1,2,3,4,7,9,10,11

Week 5, February 8 — February 12, 2010

T	3.4: Subsequences and the Bolzano-Weierstrass Theorem.
	HW **3.4**: 1,2,3,4,5,7,12
Th	3.5: The Cauchy criterion.
	HW **3.5**: 2,3,4,5,8,10

Week 6, February 15 — February 19, 2010

T	3.7: Introduction to infinite series.
	HW **3.7**: 2,3(a,c),4,6,8,12,13,14(a,b)
Th	4.1: Limits of funstions. 4.2 Limit theorems.
	HW **4.1**: 1,4,5,6,7,11,13,16; **4.2**: 2,3,4,5,6,7,8,12

Week 7, February 22 — February 26, 2010

T	4.3: Some extensions of the limit concept.
	HW **4.3**: 2,4,5,6,7,8,9,11
Th	Midterm ♯1.

Week 8, March 1 — March 5, 2010

T	5.1: Continuous functions. 5.2: Combinations of continuous functions
	HW **5.1**: 3,4,5,6,7,8,11,12; **5.2**: 2,3,5,7,10,12,13,14
Th	5.3: Continuous functions of intervals.
	HW **5.3**: 1,2,4,7,11,12,14

Week 9, March 8 — March 12, 2010

T	5.4: Uniform continuity.
	HW **5.4**: 2,3,4,5,6,7,8,10
Th	5.6: Monotone and inverse functions.
	HW **5.6**: 1,4,5,6,7,8,10,12

March 15 — March 19, 2010. Spring Break

Week 10, March 22 — March 26, 2010

T	6.1: The Derivative.
	HW **6.1**: 1,2,3,6,9,14,15,17
Th	6.2: The Mean Value Theorem.
	HW **6.2**: 2,6,7,9,12,13,14

Week 11, March 29 — April 2, 2010

T	6.3: L'Hospital's Rules
	HW **6.3**: 1,3,4,5,6,8,10,12
Th	6.4 Taylor's Theorem.
	HW **6.4**: 2,4,8,9,10,12,16,18

Week 12, April 5 — April 9, 2010

M	7.1: The Riemann Integral
	HW **7.1**: 1(c,d), 2(c),3,5,7,8,11,12
Th	Midterm ♯2.

Week 13, April 12 — April 16, 2010

T	7.2: The Riemann integrable functions
	HW **7.2**: 4,5,8,9,10,16,20
Th	7.3: The Fundamental Theorem.
	HW **7.3**: 5,6,7,10,11,14,15,16

Week 14, April 19 — April 23, 2010

T	8.1: Pointwise and uniform convergence
	HW **8.1**: 2,4,7,12,17,21,22
Th	8.2: Interchanging of Limits.
	HW **8.2**: 1,2,3,4,6,7,10,17

Week 15, April 26 — April 30, 2010

T	Review.
Th	Review.

Final: to be announced. Check `https://roomschedule.mypurdue.purdue.edu/Timetabling/exams.do`