

**Metropolitan State University**  
**College of Arts and Sciences**  
**MATH 301-01 Introduction to Analysis**

**Term:** Fall 2013  
**Meeting:** Monday 6—9:20am  
**Instructor:** Dr. Pangyen Ben Weng, Assistant Professor of Mathematics  
**Office:** St. John's Hall 323, St. Paul Campus  
**Office hours:** Monday 8—1 appointments only  
Wednesday 8—1 walk-in  
Friday 8—1 appointments only  
Appointments at other times are also welcome, depending on the availability of the instructor.  
**Email:** Pangyen.Weng@metrostate.edu  
**Phone:** 651-793-1496

**Course Description:** This is an introductory course in mathematical proofs, with emphasis on real analysis. In this class students must strive to learn and eventually to master the essential elements of advanced mathematics: abstraction of mathematical concepts, rigor in the mathematical language, and derivation of logical proofs.

The topics of this course include logic and the construction of proofs, mathematical induction, topology of real numbers, convergence and limit theorems, monotone sequences, Bolzano-Weierstrass Theorem, Cauchy sequences, limit, continuity, and differentiability of functions, derivatives, and the mean value theorem. Although many of these concepts were covered in Calculus, they are to be investigated rigorously instead of intuitively.

**Calculators:** Calculators are not needed for this class, and are not allowed in exams.

**Textbook:** *Analysis with an Introduction to Proof*, Fifth Edition, by Steven R. Lay.

**Assignments:** Homework assignments are given weekly, and are due at the beginning of the next class meeting. Late homework will NOT be accepted. Assignments must be properly typed up in MS-Word or LaTeX with minimum spelling or grammatical errors. Submit your file to the dropbox of D2L using one of the following names, depending on your typesetting programs:

**MATH\_301\_HW\_(2-digit-number)\_(your first name)\_(your last name).doc** (Word), or  
**MATH\_301\_HW\_(2-digit-number)\_(your first name)\_(your last name).pdf** (LaTeX)

For example, *MATH\_301\_HW\_05\_Joe\_Smith.doc*.

Homework assignments are graded as follows.

Percentage	70%—100%	40%—69%	0%—39%, or absent
Score	10	4	0

**Quizzes:** There are weekly quizzes. They are graded as follows.

Percentage	70%—100%	40%—69%	0%—39%, or absent
Score	10	4	0

**Midterm Exams:** Midterm exams are 90-minute long, and the passing score is 70%. Students must make up failed midterm exams within two weeks. Students must have passing scores on both midterm exams to be eligible for the final exam.

**Final Exam:** Only those who pass both midterm exams are eligible for the final exam. The final exam is a 150-minute comprehensive exam. Students who score below 50% in the final exam automatically fail the course. No make-up for failed final exams.

**Testing Center:** Phone: 651-793-1460; email: testing.center@metrostate.edu

**Course Requirements and Grading Policy:** Your final score is determined by homework (20%), quizzes (10%), two midterm exams (20% each), and a cumulative final exam (30%). Students who score below 50% in the final exam automatically fail the course. Students who score 50% or higher in the final exam receive letter grades based on the following scale.

Percent	[93,100]	[90,93)	[86,90)	[83,86)	[80,83)	[76,80)	[73,76)	[70,73)	[60,70)	[0,60)
Grade	A	A-	B+	B	B-	C+	C	C-	D	F

**Attendance:** Students are expected to attend all classes. Should one miss a class, he/she is still responsible for the work covered and any announcements made. Attendance may be taken at the start of class. Four or more absences, excused or unexcused, would result in a grade of F.

**Policy on Academic Integrity:** The Metropolitan State University Student Handbook states *“In simple terms, plagiarism is using another person’s words or ideas and presenting them as your own, without acknowledging the original source. This is a serious academic offense. Academic sanctions can include receiving a failing grade for an assignment or an entire course.”*

Assignments and exams are to be completed independently unless specified otherwise. Copying and/or utilizing another person’s work in order to complete your assignments or exams constitutes plagiarism. In situations where I suspect academic dishonesty, I reserve the right to either reassess your understanding of the material or assign a grade of 0 points. Repeated offenses will result in a grade of F for the entire course. For additional information on the university’s policies regarding plagiarism, please refer to the student handbook found at <http://www.metrostate.edu/msweb/pathway/gateway/handbook/handbook.html>.

**Classroom Diversity:** The instructor strives to provide a welcoming learning environment to students of diverse backgrounds with diverse learning needs. Students who have questions or concerns about the course policy or how the course is conducted are encouraged to discuss them with the instructor.

**Students with Disabilities:** Special accommodations can often be made for those with learning disabilities. Students who have or may have documented learning disabilities are recommended to contact the instructor as well as the Disability Services Office at (651) 793-1540 or (651) 772-7687.

**Email Communication:** In accordance with University's policy, this class will use your university email address (name@metrostate.edu) to communicate with you about all course-related matters.

**Suggested Problems:**

- Chapter 1: (1.1) 1–4, 8, 10–14, (1.2) 1–15 (1.3) 1–8 (1.4) 1–13, 20–22
- Chapter 2: (2.1) 1–7, 13–25 (2.2) 1–21 (2.3) 1–19, 24–28 (2.4) 1–4, 6–8, 10–12
- Chapter 3: (3.1) 3–15, 18, 19, 22 (3.2) 1–10 (3.3) 1–15 (3.4) 1–13, 16–21  
(3.5) 1, 2, 4, 8, 12
- Chapter 4: (4.1) 1–10, 13, 14 (4.2) 3–15, 17, 19 (4.3) 3–10
- Chapter 5: (5.1) 1–11, 13, 15, 17, 20 (5.2) 1–4, 6, 8, 9, 11, 12, 14–18 (5.3) 1–14
- Chapter 6: TBA

**Tentative Schedule:**

Week	Dates	Coverage	Activities and Due Dates
1	Aug. 26	1.1 Logical Connectives 1.2 Quantifiers 1.3 Techniques of Proof: I 1.4 Techniques of Proof: II	Homework 01
2	Sep. 9	2.1 Basic Set Operations 2.2 Relations	Homework 02
3	Sep. 16	2.3 Functions 2.4 Cardinality	Homework 03
4	Sep. 23	2.4 Cardinality 3.1 Natural Numbers and Induction	Homework 04
5	Sep. 30	<b>Exam I</b> 3.2 Ordered Fields	Homework 05
6	Oct. 7	3.3 The Completeness Axiom 3.4 Topology of the Reals	Homework 06
7	Oct. 14	3.5 Compact Sets	Homework 07
8	Oct. 21	4.1 Convergence 4.2 Limit Theorems	Homework 08
9	Oct. 28	4.3 Monotone Sequences and Cauchy Sequences	Homework 09
10	Nov. 4	5.1 Limits of Functions 5.2 Continuous Functions	Homework 10
11	Nov. 11	<b>Exam II</b> 5.2 Continuous Functions 5.3 Properties of Continuous Functions	Homework 11
12	Nov. 18	6.1 The Derivative	Homework 12
13	Nov. 25	6.2 The Mean Value Theorem	Homework 13
14	Dec. 2	Review	
15	Dec. 9	<b>Final Exam</b>	

Last update: 8/17/2013