

**MA 334: Introductory Real Analysis I**  
**Alabama School of Math and Science**  
**Classroom/Office:** S201  
**Web site:** mathemartiste.com  
**Office Hours:** Mon, Tues, Wed, Fri 10:00-10:55 (3<sup>rd</sup> per), Wed 2:45-4:40 (8<sup>th</sup> & 9<sup>th</sup> per/"after school")

**Winter 2017-18**  
**Instructor:** Sarah Brewer  
**Office Phone:** 251.441.2127  
**Email:** sbrewer@asms.net (best way to contact me)

## Syllabus

**Course Description:** This course is designed to provide students with the theoretical context of concepts encountered in the Calculus sequence. Topics include sequences and series of real numbers, suprema and infima, Cauchy sequences, open sets and accumulation points in Euclidean space, completeness, compactness, connectedness, continuity, Intermediate Value Theorem, differentiation of functions of one variable, integration of functions of one variable, pointwise and uniform convergence, Mean Value Theorem, Taylor's Theorem, Inverse Function Theorem, Implicit Function Theorem.

**Prerequisites:** "A" in both MA201 Differential Calculus and MA202 Integral Calculus or permission of the instructor.

**Text:** Reed, *Fundamental Ideas of Analysis*, 10th edition.

Supplementary Text: Rudin, *Principles of Mathematical Analysis*.

**Grade determination:** Final grades will be determined by total points earned out of total points possible. Regular homework assignments, quizzes, and tests will be given, as well as a final exam. A presentation on a topic of the student's choosing will also be completed for a grade.

**Make-up policy:** Any homework checks, quizzes, or tests missed due to unexcused absences will receive a grade of zero. Homework assigned during a student's absence must be turned in within three days of the student returning to class.

**Attendance and Tardiness Policy:** Three tardies count as one unexcused absence. A student with three unexcused absences may be assigned a grade of WF for the course. Students are responsible for acquiring any missed notes and assignments (as these are posted on the web, this should not be a problem, but check with a classmate to see if you missed anything not posted).

### Tentative Schedule

Week 1 – November 6-10

- 1.1 The Real Numbers
- 1.2 Sets and Functions

Week 2 – November 13-17 (11/17 is a short day)

- 1.3 Cardinality
- 1.4 Methods of Proof

Week 3 – November 27 – December 1

- 2.1 Convergence
- 2.2 Limit Theorems

Week 4 – December 4-8 (12/6 is 1<sup>st</sup> grade posting; 12/8 is Parents' Day)

- 2.4 Cauchy Sequences

Week 5 – December 11-12

- 2.5 Supremum and Infimum
- 2.6 The Bolzano-Weierstrass Theorem

Week 6 – December 18-20 (12/20 is a short day); January 4

- 3.1 Continuity
- 3.2 Continuous Functions on Closed Intervals

Week 7 – January 8-12 (01/10 is 2<sup>nd</sup> grade posting)

- 3.3 The Riemann Integral
- 4.1 Differentiable Functions

Week 8 – January 16-19 (No class 01/15)

- 4.2 The Fundamental Theorem of Calculus

Week 9 – January 22-26

- 4.3 Taylor's Theorem

Week 10 – January 29-February 2; February 5 (01/31 is 3<sup>rd</sup> grade posting)

- 4.5 Inverse Functions

Final Exams – February 6-9