Fall 2018 ** MTH 427/527 – Advanced Calculus I ** Course Syllabus ** Dr. Ari Aluthge (A-luth-gay)

Course Numbers: MTH 427 – Sec. 101 (CRN 3052), MTH 527 – Sec. 101 (CRN 3067)
Course Title: Advanced Calculus I – Three credit hours.
Textbooks: An Introduction to Analysis, 4th Edition by William R. Wade
Prerequisites: MTH 231 + MTH 300
Class Meeting Times: TR: 2:00 – 3:15
Classroom: Smith 518

Instructor: Dr. Ari Aluthge (Pronounced: A-luth-gay)
Office: Smith Hall 716 Phone: 696 3050 Email: aluthge@marshall.edu
Office Hours: MW: 9:00 AM – 12:00 PM or by appointment

Course Objectives: To provide a rigorous treatment of the real number system, continuity and differentiability of functions of a single variable, integration of functions of a single variable, infinite series of real numbers, and infinite series of functions.

Course Contents:

- **The Real Number System:** Field Axioms, Well-ordering principle, Completeness axiom, Functions, etc.
- **Sequences of Real Numbers:** Limit theorems, Bolzano-Weierstrass theorem, Cauchy sequences, Limit supremum/infimum, etc.
- **Continuity of Functions of a Single Variable:** One- and Two-sided limits, Continuity, Uniform continuity, etc.
- **Differentiability of Functions of a Single Variable:** The derivative, Differentiability theorems, Mean Value Theorem, Inverse Function theorem, etc.
- **Integrability of Functions of a Single Variable:** Riemann integral, Fundamental Theorem of Calculus, Improper integrals, etc.
- **Infinite Series of Real Numbers:** Series with nonnegative terms, Convergence, Alternating series, estimation of series, etc.
- **Infinite Series of Functions (Time Permitting):** Uniform convergence of series and sequences, Power series and Analytic Functions.
- **For MTH 527 only:** *Sections 2.5, 5.5, 5.6, 6.5, 6.6, and 7.5 (time permitting). Students will study these sections on their own and do some additional homework.

Expected Coverage of the Material: Most of Chapters 1 - 6 in the textbook. (* Sections for MTH 527 only)

Learner Outcomes: Upon completion of this course, students will have a clear understanding of major concepts of calculus of functions of a single variable. They will be able provide logical and valid proofs of mathematical statements and results in real analysis and related fields. They will be able to read and understand advanced books and research articles in real analysis and related topics. This course will also prepare students for further studies courses in real analysis and related subjects.

Your Grade: Two tests (200 points total), weekly homework assignments (200 points total), and a comprehensive final exam (100 points total) will be given.

Maximum possible total points = 500

A = [450, 500], B = [400, 450), C = [350, 400), D = [300, 350)
F = [0, 300) or missing the final exam.

Important Days: Test 1: Tuesday, October 2
Test 2: Thursday, November 15
Final Exam: Thursday, December 13 – (12:45 – 2:45)

Blackboard: Information about the course such as syllabus, assignment schedules, additional course material, and your grades will be posted on Blackboard. Students should log in to MUonline on a regular basis to check their assignments and grades.

University Policies: By enrolling in this course, you agree to the University Policies listed below. Please read the full text of each policy be going to www.marshall.edu/academic-affairs and clicking on "Marshall University Policies." Or, you can access the policies directly by going to http://www.marshall.edu/academic-affairs/?page_id=802 Academic Dishonesty/ Excused Absence Policy for Undergraduates/ Computing Services Acceptable Use/ Inclement Weather/ Dead Week/ Students with Disabilities/ Academic Forgiveness/ Academic Probation and Suspension/ Academic Rights and Responsibilities of Students/ Affirmative Action/ Sexual Harassment

Make-up Exams and Missing Assignments: Make-up tests will be given for excused absences only. Students must verify their absences with the dean of students. No make-up homework will be given (more than 10 homework assignments will be given and the best 10 homework assignments will be counted). Assignments must be turned in on time (no exceptions)

Class Attendance and Excused Absences: Students are required to attend the class every day with their textbook. They must come to class on time and stay in the class for the entire period. Students are responsible for the material discussed in the class on each day even if they miss the class on that day. Please refer to page 121 of the Undergraduate Catalog (http://www.marshall.edu/ucomm/catalog/interim.htm) for details regarding the university excused absence policy. Any excused absence must be verified by the Dean of Students. Student must also notify the instructor of any absence at the earliest convenient time. Daily attendance will be taken.

Academic Honesty: I expect my students to be honest and hard working individuals. Students should not attempt to cheat on exams or on assignments. It is not difficult to catch cheating and cheaters will be dealt seriously. Please read pages 101 – 107 of the undergraduate catalog for more details. Students are allowed and encouraged to study and do homework with other students in the class.

Cell Phones: Please turn of cell phones before entering the classroom. This will not be tolerated.

Tentative Weekly Schedule

Week	Coverage of material and other assignments
Week #1 (8/20 – 8/24)	Sections 1.2 – 1.3
Week #2 (8/27 – 8/31)	Sections 1.3 – 1.4
Week #3 (9/3 – 9/7)	Sections 1.5– 1.6
Week #4 (9/10 – 9/14)	Sections 2.1 – 2.2
Week #5 (9/17 – 9/21)	Sections 2.3 – 2.4 (*2.5 for MTH 527 only)
Week #6 (9/24 – 9/28)	Sections 3.1 – 3.2, Catch-up and review
Week #7 (10/1 – 10/5)	Test #1, Section 3.3
Week #8 (10/8 – 10/12)	Sections 3.4 - 4.1
Week #9 (10/15 – 10/19)	Sections 4.2 – 4.3
Week #10 (10/22 – 10/26)	Sections 4.4 – 4.5
Week #11 (10/29 – 11/2)	Sections 5.1 – 5.2
Week #12 (11/5 – 11/9))	Sections 5.3 – 5.4 (*5.5, *5.6 for MTH 527 only)
Week #13 (11/12 – 11/16)	Section 6.1, Catch-up and review, Test 2
Week #14 (11/19 – 11/23)	Thanksgiving Holiday – No classes
Week #15 (11/26 – 11/30)	Sections 6.2 – 6.4 ((*6.5, *6.6 for MTH 527 only)
Week #16 (12/3 – 12/7)	
Week #17 (12/10 – 12/14)	Final exam on Thursday, December 13, 12:45 – 2:45