

**Fayetteville State University**  
**College of Arts and Sciences**  
**Department of Mathematics & Computer Science**  
**MATH 412 Advanced Calculus**  
**Fall 2011**

**I. Locator Information:**

Instructor: Dr. Zhenlu Cui

Course # and Name: MATH 412 Advanced Calculus

Semester Credit Hours: 3

Office hours: 1pm-4pm, MW; 2pm-4pm, F

Day and Time Class Meets: MWF, 4-4:50pm

Office Location: SBE 307D

Office Phone: 672-1164

Email address: zcui@uncfsu.edu

Homepage: http://faculty.uncfsu.edu/zcui

**In case FSU must close for an emergency during the semester, instruction will continue using Blackboard.**

**FSU Policy on Electronic Mail:** Fayetteville State University provides to each student, free of charge, an electronic mail account ([studentid@broncos.uncfsu.edu](mailto:studentid@broncos.uncfsu.edu)) that is easily accessible via the Internet. The university has established FSU email as the primary mode of correspondence between university officials and enrolled students. Inquiries and requests from students pertaining to academic records, grades, bills, financial aid, and other matters of a confidential nature must be submitted via FSU email. Inquiries or requests from personal email accounts are not assured a response. The university maintains open-use computer laboratories throughout the campus that can be used to access electronic mail.

Rules and regulations governing the use of FSU email may be found at <http://www.uncfsu.edu/PDFs/EmailPolicyFinal.pdf>

**II. Course Description:**

A comprehensive and rigorous study of the concepts of limit, continuity, topology on the real line, properties of continuous functions, Mean Value Theorem, and Taylor's Formula, and calculus of several variables. Prerequisites: MATH 242 and MATH 260.

**III. Disabled Student Services:**

In accordance with Section 504 of the 1973 Rehabilitation Act and the Americans with Disabilities Act (ACA) of 1990, if you have a disability or think you have a disability to please contact the Center for Personal Development in the Spaulding Building, Room 155 (1<sup>st</sup> Floor); 910-672-1203.

**IV. Textbook:**

James R. Kirkwood: Introduction to Real Analysis, 2nd edition. Waveland Press, INC., 1995. ISBN: 978-1-57766-232-7.

**V. Student Learning Outcomes:**

Upon completion of this course, students will be able to:

- Have a working knowledge of the basic concepts in analysis such as limit, continuity, topology on the real line, properties of continuous functions, Mean Value Theorem, Taylor's Formula, and calculus of one variable.
- Understand, formulate and write basic mathematical proofs.
- Apply definitions, axioms, theorems and corollaries in problem solving.

## VI. Grading policy:

### Grading Scale

A= 90 - 100%      B= 80 - 89%      C= 70 - 79%      D= 60 - 69%      F= Below 60%

Homework/Quiz/Project: 60%, Midterm: 20%, Final: 20%

**Attendance Requirements:** Attendance is MANDATORY. **Bonus** may be given according to a student's classroom behavior

**Homework:** Homework will be collected and graded. Students who do not turn in homework may expect to receive a grade of 0 for these assignments. The lowest two will be dropped. No late homework will be accepted.

**Exams:** There will a midterm exam and a final exam. Make-up exams will be given ONLY in the case of documented absences due to family emergencies, illness or official university functions.

### Other:

The instructor will respect all students and will make every effort to maintain a classroom climate that promotes learning for all students. Students must accept their responsibility for maintaining a positive classroom environment by abiding by the following rules:

1. Students are expected to arrive to class on time, remain in class until dismissed by the instructor, and refrain from preparing to leave class until it is dismissed.
2. Student/teacher relationships, as well as relationships among peers, must be respectful at all times.
3. Students are not permitted to wear heap hones or other paraphernalia that may be distracting to the classroom environment.
4. Students must refrain from any activity that will disrupt the class; this includes turning off cell phones and pagers.
5. Students are not permitted to use profanity in the classroom.
6. Students will not pass notes or carry on private conversations while class is being conducted.

## VII. Tentative Course Outline:

- 1.1 Set and Functions
- 1.2 Properties of the Real Numbers as an Ordered Field
- 1.3 The Completeness Axiom

- 2.1 Sequence of Real Numbers
- 2.2 Subsequences
- 2.3 The Bolzano-Weierstrass Theorem

- 3.1 Topology of the Real Numbers

### **Midterm Exam**

- 4.1 Limits and Continuity
- 4.2 Monotone and Inverse Functions

- 5.1 The Derivative of a Function
- 5.2 Some Mean Value Theorems

### **Final Exam**

### **VIII. Teaching Strategies:**

The teaching strategies used for the majority of the course are face-to-face lectures and discussion.

### **IX. Bibliography**

- Borden, Robert S., A Course in Advanced Calculus. Dover Pubns. 1998.  
Fitzpatrick, Patrick M., Real Analysis. PWS Publishing Co. 1996.  
Gaskill, Herbert S. and P.P. Narayanaswami, Elements of Real Analysis, Prentice Hall, 1998.  
Kannan, Rangachary, Advanced Analysis. Springer Verlag. 1996.  
Kaplan, Wilfred, Advanced Calculus. Addison-Wisley Pub Co. 1992.  
Kosmala Witold A., Advanced Calculus: A Friendly Approach. Prentice Hall. 1998.  
Wade, W.R., An introduction to Analysis, Prentice Hall, 2000.