FAYETTEVILLE STATE UNIVERSITY
College of Arts and Sciences
Department of Mathematics and Computer Science

COURSE SYLLABUS **Fall 2010**

I. LOCATION INFORMATION:

Course Number & Name: MATH 521-01: Real Analysis I
Semester Hours of Credit: 3
Total Contact hours for Class: 45
Time Class Meets: TR: 7:30-8:45pm . Where Class Meets: SBE 108
Instructor's name: Dr. Bo Zhang. Office Location: SBE 348

Office Telephone: 672-1786
E-mail Address: bzhang@uncfsu.edu
Website: http://faculty.uncfsu.edu/bzhang

Office Hours: TR: 1:00-3:30 & 6:00-7:30pm
Department Office Location: SBE 339
Department Office Telephone: 672-1294

FSU Policy on Electronic Mail: Fayetteville State University provides to each student, free of charge, an electronic mail account (username@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:

The first course of a three-semester sequence in real analysis, including such topics as real number system, element of point set topology and metric spaces, sequences and series of real numbers, continuity, differentiation, integration, the Reimann-Stieltjes integral, sequences and series of functions, pointwise and uniform convergence, functions of several variables, implicit function, and inverse function theorem. Prerequisite: Math 412 or Math 461 or consent of department.

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 (1st Floor); Tel: 910-672-1203.

IV. (a) TEXTBOOKS:

Manfed Stoll, Introduction to Real Analysis, Addison Wesley, 2001.

(b) CALCULATOR: Graphing Calculator & Mathematical Software: Maple V10.

V. STUDENT LEARNING OUTCOMES:

Demonstrate the knowledge of basic concepts in introductory real analysis such as functions and sequences of real numbers.

Demonstrate the knowledge of limits of functions, continuity, structure of point sets, metric spaces and the ability to solve problems related to these fundamental concepts.

Demonstrate the knowledge of differentiation rules with related concepts and the ability to apply L'Hopsital's rule to solve limit problems.

Demonstrate the knowledge of Riemann integration theory and the ability to apply the Fundamental Theorem of Calculus to solve integral related problems.

Demonstrate the knowledge of infinite series and sequences of functions and ability to apply differentiation and integration rules to sequences and series.

Demonstrate the ability to use graphing calculators and mathematical software such as Maple V to solve practical problems.

VI. Course Requirements and Evaluation Criteria-

The grading scale and weights given to various activities for evaluation are given below.
Tests-50% Homework & Class Commitment-**2**5% Final Exam-20% Project-5%
A 90-100% **B** 80-89% **C** 70-79% **D** 60-69% **F** Below 60%

COURSE REQUIREMENTS-

1. It is the responsibility of the students to avail themselves of all class meetings, tutorial sessions, and individual help from their instructors.

2. Students are expected to enter the classroom on time and remain for the full class period. Students should not make other appointments in conflict with their class schedule

3. All tests will be announced well in advance of their administration. A make-up test will be given only if the student has a documented and valid written justification for unavoidable absence from the test.

4. Students are expected to enter the classroom on time and remain until the class ends. Three late arrivals and early departures will constitute an absence from the class.

5. Students must refrain from smoking, eating and drinking in the classroom. The rights of others must be respected at all times.

6. Students are encouraged to ask questions of the instructor in class and to respond to those posed by the instructor. They should not discourage others from raising or answering questions. Often, other students have the same questions which they wish to ask, but are hesitant to do so.

7. Students are expected to complete all class assignments and to spend adequate time on their class work to insure that the course outcomes are met. At least two hours of home study is expected for each class hour.

8. Talking in class between students is strictly unacceptable. Discussions should be directed to the instructor.

9. Dishonesty on graded assignments will not be tolerated! Students must neither give nor receive any assistance on any work to be graded. the University's cheating policy will be applied for any violations. The minimum penalty will be a grade of zero (0) on the assignment.

10. Students are not allowed to bring babies and children to class.

VII. Academic Support Resources- Academic Assistance Program "Smartthinking" is available to all FSU students; access through http://blackboard.uncfsu.edu. Mathematical software such Maple V and Mathematica are installed in FSU Computer Labs.

VIII. Course outlines (See Attached Schedule)
*** Subject to change for optimum benefit of the class**

IX. Teaching Strategies:

The majority of the material of the course will be given in lecture format. There is a short review before and after each lecture. There will be a comprehensive review after the completion of each chapter. Graphing calculators and Maple (mathematical software) will be used in the class to help students develop a firm grasp of the underlying mathematical concepts. Selected student research project will be introduced during the semester.

X. References:

1. R. G. Bartle and D. R. Sherbert, Introduction to real analysis, John Wiley & Sons, Inc., 2000.
2. P. Fitzpatrick, Real Analysis, PWS Publishing Company, 1996.
3. James R. Kirkwood, An Introduction to Analysis, PWS Pub. Company, 1995.
4. J. R. Marsden, Elementary Classical Analysis, Freman & Co. publishers, 1990.
5. B. M. Markarov, M. G. Goluzina, A. A. Lodkin, and A. N. Podkorytov, Selected Problems in Real Analysis, American Mathematical Society, 1992.
6. W. Rudin, Principles of Mathematical Analysis, McGraw-Hill, 1976.
7. William R. Wade, An Introduction to Real Analysis, Prentice Hall, 2000.
8. Houshang H. Sohrab, Basic Real Analysis, Birkhauser, Boston, 2003.

***VIII Course Outline** (continued)

Dates	Lecture
THU: 08/19	[1.3] Mathematical Induction
TUE: 08/24	[1.4] The least upper bound property
THU: 08/26	[1.7] Countable and uncountable sets
	[2.1] Convergent sequences
TUE: 08/31	[2.2] Limit theorems
THU: 09/02	[2.3] Monotone sequences
	[2.4] Subsequences and the Bolzano-Weierstrass theorem
TUE: 09/07	[2.5] Limit superior and inferior of a sqence
THU: 09/09	[2.6] Cauchy sequences

***VIII Course Outline** (continued)

Dates	Lecture
TUE: 09/14	[3.1] Open and closed sets
	[3.2] Compact sets
THU: 09/16	[3.3] The Cantor set
	[4.1] Limit of a function
TUE: 09/21	[4.2] Continuous functions
	[4.3] Uniform continuity
THU: 09/23	[4.4] Monotone functions and discontinuity
	Exam #1
TUE: 09/28	[5.1] The derivative
	[5.2] The mean value theorem
WED: 09/30	[5.3] L'Hospital's rule
	[5.4] Newton's method
TUE: 10/05	[6.1] The Riemann Integral
THU: 10/07	[6.2] Properties of the Riemann integral
TUE: 10/12	[6.2] Properties of the Riemann integral
	[6.3] Fundamental Theorem of Calculus
THU: 10/14	[6.4] Improper Riemann integral (**Fall Break-10/15)**
TUE: 10/19	[6.5] The Riemann-Stieltjes integral
THU: 10/21	[7.1] Convergence tests
	[7.2] The Dirichlet Test
TUE: 10/26	[7.3] Absolute and Conditional Convergence
	[7.4] Square summable sequence
THU: 10/28	**Exam #2**
TUE: 11/02	[8.1] Pointwise Convergence and interchange of limits
THU: 11/04	[8.2] Uniform convergence
TUE: 11/09	[8.3] Uniform convergence and continuity
	[8.4] Uniform convergence and integration
THU: 11/11	Veteran's Day Holiday
TUE: 11/16	[8.5] Uniform convergence and differentiation
THU: 11/18	[8.6] The Weierstrass Approximation Theorem
TUE: 11/23	[8.7] Power series expansions
	[9.1] Orthogonal functions
THU: 11/25	Thanksgiving Holiday
TUE: 11/30	[9.2] Completeness and Parseval's Equality
THU: 12/02	Review for final Exam
****	**Final Exam**