SOUTHERN UNIVERSITY AND A&M COLLEGE
DEPARTMENT OF MATHEMATICS

MATH 462
Real Analysis

I. Descriptive Information

A. Course Number: 462

B. Course Title: Real Analysis

C. Catalog Description: The course covers the following major concepts and
theorems: Axioms of the real numbers, supremum, infimum, upper limits, open
and closed sets in nR, compactness, the Bolzano-Weierstrass and Heine-Borel
Theorems, continuity and differentiability of functions, the Riemann Integral, The
L'Hôpital's Rule, The Taylor's and the Mean Value Theorems, and metric spaces.

D.   Instructor's Emphasis: As the first part of a sequential two-semester course on
Real analysis, this course is designed to provide fundamental concepts of analysis,
including classical theory of functions of a real variable, differentiation and
integration of real functions, as well as some fundamental topics in general
topology and metric space theory. Emphasis will be placed on the understanding
of the proofs and the applications of the major theorems. Instructor will consider
the active participation of the students discussing the concepts and theorems
relevant to the course.

E. Course Credit : 3 hours

F. Prerequisites: Successful completion of Math 364.

G. Intended Audience: This course is intended for students who are majoring in
Mathematics and Sciences and who have completed their Calculus sequence
courses.

II. Specification of Course Goals and Learning Outcomes

A. General Goals: The general goals of this course are to:
1. Provide the background information in Analysis necessary for the student to
obtain a Bachelor degree in Mathematics or Mathematics Education, or a
closely related field.
2. Provide prerequisite training for other advanced 400-level courses in Real
Analysis and Topology.

B. Learning Outcomes
   Completing the course students will acquire basic skills that will be measured considering the following learning outcomes:

1. Students will be able to demonstrate competence with elementary properties of sets by proving identities involving union and intersection and Cartesian Products of sets.

2. Students will be able to demonstrate competence with elementary properties of functions by proving results involving composite functions and inverse functions.

3. Students will be able to use mathematical induction to prove results involving natural numbers.

4. Students will be able to demonstrate competence with the algebraic and order properties of real numbers.

5. Students will be able to to demonstrate competence with properties of real numbers by finding supremum and infimum of sets and using the completeness property of real numbers.

6. Students will be able to demonstrate competence with elementary properties of sequences by finding limits and proving results involveing sum/difference/product/quiotients of sequences.

7. Students will be able to apply the monotone convergence theorem to prove convergence of bounded monotone sequences.

8. Students will be able to demonstrate ability to use Taylor Theorem, the Mean value Theorem, and use L'Hôpital's Rule to compute limits of functions.

C. Statement of Course Content
   The treatment of the material is very standard in undergraduate courses of analysis. It covers general theory of functions of a real variable, Riemann integration theory and elementary topics in general topology including metric spaces.

III. Textbook:
   R. G. Bartle, "Introduction to Real Analysis", 3rd Ed, 2000, John Wiley & Sons, Inc., New York, NY.

ATTENDANCE: See Southern University catalog regarding class attendance.

ACADEMIC DISHONESTY: Students are expected to adhere to honesty and integrity in work submitted for credit in this course which follows the SUBR's Code of Conduct. (Refer to current Catalog.)

DISABILITY STATEMENT: Students that are considered as having a disability are to provide the professor with a letter from the Department of Special Education stating the appropriate accommodations required of this course. If you have a documented disability, then please discuss it with personnel at 771-3950 in Room 125 of Blanks Hall.

Evaluation of Grades: Course grade will be based on quizzes, homework assignments, Midterm test and a comprehensive final examination.

Quizzes and homework assignments (and attendance) are worth 100 points. Midterm test and the final examination are worth 100 points each. There will be no make up test for tests missed without prior permission.

(Total possible points 300.)
A: 270-300
B: 240-269
C: 210-239
D: 180-209

General Reading Sources:
S. Galovich, "Doing Mathematics, an Introduction to Proofs and Problem Solving", 2nd Ed., Thomson, Brooks/Cole. 2007.

Robert G. Bartle, "The Elements of real Analysis," 1964, Wiley, New York, NY.

Murray H. Protter, "Basic Elements of real analysis," 1998, Springer, New York, NY.

Disability Statement: If you have a documented disability, then please discuss it with personnel at 771-3546 in Room 246 Blanks Hall. Learners, those considered having a disability, are to provide the professor with a letter from Professor P. Hebert through the Office of Disability Service stating the appropriate accommodations required of this course.

Disclaimer: These activities and assignments are tentative. Changes may occur due to assessment of learners by the professor and due to the professor.