

**SOUTHERN UNIVERSITY and A&M COLLEGE
DEPARTMENT OF MATHEMATICS**

**MATH 131
COLLEGE MATHEMATICS II**

CATALOG DESCRIPTION: The emphasis of this course is problem solving and comprehension. Topics included are sets, logic, counting methods, geometry, probability, and statistics. This course is designed for education majors and those students needing only six credit hours of mathematics.

INSTRUCTOR'S EMPHASIS: The role of the instructor is not only to teach the suggested content, but to teach pedagogy as well. The instructor shall provide activities to promote critical thinking and emphasize various techniques that afford students the opportunity and skills needed to solve problems, study the results, make and test conjectures, and give heuristic proofs in support of the conjectures. In some instances, the instructor will demonstrate systematic step-by-step solutions to provide students with confidence and competence to solve problems on their own. Algebraic and graphic approaches shall be employed to solve and describe relations as they pertain to "real" world phenomena. Also, the instructor shall de-emphasize the "drill and skill" approach and provide an intuitive approach that will allow students to understand conceptually and think analytically and critically.

INTENDED AUDIENCE: This course is an introduction to a variety of topics which permeate the field of mathematics. It is designed to provide students, who are enrolled in a non-science degree program and whose curriculum require only six hours of mathematics, some essential mathematical concepts and skills that are needed in their respective field.

COURSE CREDIT: 3 hours

PREREQUISITES: A student should possess a good background in arithmetic, satisfactory knowledge in algebra, and a positive attitude toward learning mathematics.

Textbook: Mathematical Ideas, 11th edition, by Miller, Heeren, and Hornsby, Addison Wesley Publishers, 2008

GENERAL GOALS:

1. To acquaint students with a variety of topics which span the field of mathematics.
2. To illustrate how basic concepts form the foundation in many mathematical topics.
3. To provide activities that will enhance creative thinking skills.
4. To teach students how to give reasonable explanations, both orally and in writing, of concepts encountered.
5. To provide the necessary skills needed to solve and check real world problems.
6. To satisfy three hours of the mathematics requirements for graduation.

Learning Outcomes: Upon successful completion of this course, the student will be able to:

1. Demonstrate the ability to use logic by constructing truth tables from real-world phenomena.
2. Demonstrate knowledge of terms in set theory by recalling definitions of symbols and terminology.
3. Demonstrate the ability to perform set operations by finding the intersection, union, and complement of sets.
4. Demonstrate the ability to solve problems involving surveys by obtaining cardinal numbers and using Venn diagrams.
5. Demonstrate the ability to count directly and indirectly by listing systematically in tree diagrams and product tables.
6. Demonstrate competence with the fundamental counting principle by solving involving multiple part tasks.
7. Demonstrate the ability to translate words into symbolic language by solving real-world problems using the fundamental counting principle.
8. Demonstrate knowledge of factorial notation by evaluating expressions involving factorial symbolism.
9. Demonstrate understanding of arranging objects by contrasting permutations and combinations.
10. Demonstrate knowledge of evaluating subsets by comparing the number obtained from combinations to Pascal's triangle.
11. Demonstrate the ability to compute probability by using the theoretical and empirical formulas.
12. Demonstrate the ability to compute probability by listing systematically.
13. Demonstrate the ability to compute probability of events involving the connectives "and", "or", and "not" by using the general addition and the complement rules.
14. Demonstrate knowledge of statistical techniques by collecting and analyzing data gathered via hands-on projects.
15. Demonstrate the ability to obtain information from data by grouping in frequency distributions, graphing, and computing measures of central tendency and dispersion.

COURSE CONTENT:

A. The Basic Concepts of Set Theory

- 2.1 Symbols and Terminology
- 2.2 Venn Diagrams and Subsets
- 2.3 Set Operations and Cartesian Products
- 2.4 Cardinal Numbers and Surveys

B. Introduction to Logic

- 3.1 Statements and Quantifiers
- 3.2 Truth Tables and Equivalent Statements

- 3.3 The Conditional
- 3.4 More on the Conditional
- 3.5 Analyzing Arguments with Truth Tables

C. Counting Methods (Chapter 10)

- 11.1 Counting by Systematic Listing
- 11.2 Using the Fundamental Counting Principle
- 11.3 Using Permutations and Combinations
- 11.4 Using Pascal's Triangle and the Binomial Theorem

D. Probability

- 12.1 Basic Concepts
- 12.2 Events Involving “Not” and “Or”
- 12.3 Events Involving “And”

F. Statistics

- 13.1 Frequency Distributions and Graphs
- 13.2 Measures of Central Tendency
- 13.3 Measures of Dispersion

COURSE EXPECTATIONS AND STUDENT SUPPLEMENTS

1. EXPECTATIONS

Students are expected to have the skills prerequisite for this course. Students are encouraged to use the computers in the Math Lab or other resources to review the prerequisite skills for this course.

2. THE MATHEMATICS LABORATORY (MATH LAB)

The MATH LAB is located in 318 T.T. Allain Hall. Each class will be scheduled at the beginning of the semester for orientation. The Laboratory will be open for general use at designated times. The Lab's hours of operation will be announced to each class and posted.

Laboratory resources that are designed to help the student to achieve the objectives of the course include:

- a) individual tutoring;
- b) computerized practice and tutoring; and
- c) internet access to online tutorials.

3. OTHER RESOURCES that are designed to help the student achieve the objectives of the course include:

- a) *MyMathLab* - This software provides diagnostic testing and tutorial help online using MyMathLab Tutorial Software. Students can take practice chapter tests correlated to the

textbook, receive individualized study plans based on these test results, work practice problems for areas in which they need improvement, receive tutorial instruction in those topics, and take further test to gauge their progress.

- b) Personal tutoring is available free of charge at the Center for Student Success in 107 Stewart Hall. Contact Dr. Jaquator Hamer Lawrence at 771 – 4312 for details.

4. CLASS ATTENDANCE

All students enrolled in Math 131 are expected to attend classes regularly and punctually. Excessive absences and tardiness will be noted. The student is responsible for keeping up with course work, whether or not an absence is excused.

5. EXITING MATH 131

To exit Math 131 the student must have a semester grade of “C” or higher.

SUPPLEMENTARY READINGS:

1. Wright, D. Franklin, **Arithmetic for College Students**, D. C. Heath and Company.
2. Setek, William M., **Fundamentals of Mathematics**, Glencoe Publishing Company, Inc.
3. Apostle, H. G., **A Survey of Basic Mathematics**, Little, Brown, and Company.
4. Lipschutz, Seymour, **Set Theory and Related Topics**, *Schaum's Outline Series*, McGraw-Hill, Inc.
5. Ayres, Jr. Frank and Schmidt, Philip A., **College Mathematics**, *Schaum's Outline Series*, McGraw-Hill, Inc.

INSTRUCTIONAL TECHNIQUES:

1. Lectures and other activities in the classroom.
2. Use of computers in the Mathematics Laboratory (Room 318, T. T. Allain).
3. Conference Hours (Question and Answer, and Problem Solving).
4. Study Sessions (Classroom, Mathematics Laboratory, and Library).
5. Group Sessions at the chalkboard.
6. Use of an Overhead Projector.

EVALUATION OF STUDENTS:

Students will be evaluated on the basis of scores earned on the following:

- a. 50-minute examinations (the number to be determined by the instructor)
- b. One Final Examination
- c. Quizzes
- d. Points awarded for participating in classroom activities
- e. Bonus assignments

GRADING SCALE:

Average Grade

90 - 100 **A**

80 - 89 **B**

70 - 79 **C**

60 - 69 **D**

BELOW 60 **F**

DISABILITY POLICY: *If you have a documented disability, then please discuss it with personnel at 771-3950 in Room 125 of Blanks Hall. A learner that is considered as having a disability is to provide the professor with an official letter from the Department of Special Education 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.