

Course Syllabus
MATH 2302, FOUNDATIONS OF ARITHMETIC AND NUMERATION
Spring Semester, 2013-14
Mathematics Department, Dr. Ernest Pyle, Department Chair

COURSE DESCRIPTION

A study, from an advanced perspective, of the concepts and skills involved in arithmetic and numeration. Topics include sets, rational numbers (whole numbers and place value, fractions, integers and decimals), number theory, properties and algebraic reasoning, arithmetic operations, percents, ratios, and proportions. Problem solving is emphasized. This course, designed for education majors, may not be counted as part of the mathematics major or minor or meet the Liberal Arts Core Curriculum math proficiency requirement.

COURSE SEQUENCE IN CURRICULUM

This course is required for all students majoring in Elementary Education (EC-6) or Mathematical Studies (4-8). It may not be used to fulfill the mathematics requirement for the Liberal Arts Core Curriculum or to demonstrate mathematical proficiency.

PRE-REQUISITE INFORMATION

MATH 1305 or a higher level mathematics course.

INSTRUCTOR INFORMATION

Name: Sharon Beal
E-mail: sbeal@hbu.edu
Office Phone: 281-649-3744
Office Location: Brown 152
Office Hours: Tuesday, Thursday 1:30-2:30 or by appointment
Web Page Address, Web Board, ListServ: Blackboard

LEARNING RESOURCES

Course Text: *A Problem Solving Approach to Mathematics for Elementary School Teachers*, 11th ed., by Rick Billstein, Shlomo Libeskind, and Johnny Lott, Pearson Publishing Company, 2013, ISBN 9780321828026. Same text used for MATH 2303.

Laboratory Text: None
Supplementary Text: None
Other Required Materials: MyMathLab Access Card and a scientific calculator (graphing calculators, such as a TI-84 Plus or a TI-89 may not be used in this course).

COURSE OBJECTIVES

Purpose of the course:

This course is intended to provide elementary and middle school teachers with a foundation for teaching mathematics in early grades, with an emphasis on problem solving and algebraic operations. Topics include operations on sets, systems of numeration, number theory, properties of the real number system, the four basic operations of arithmetic, and estimation.

Aims for the course:

Students will develop critical reasoning skills and problem solving competency in the following areas: Sets, systems of numeration, number theory, properties of real numbers, algebraic operations, and numerical estimation. In addition to learning how to use various rules and formulas, they will develop an understanding of why they are valid and how they are derived.

On completion of this course, students should be able to:

1. Formulate and solve a variety of word problems that can be solved using the four basic operations of arithmetic.
2. Use deductive, inductive, and intuitive reasoning to formulate and solve problems.
3. Appreciate the role of discussion in learning mathematics and the value of notation and vocabulary as tools for enhancing communication.
4. Be aware of the connections between mathematics and areas to which math can be applied.
5. Be able to create and use mathematical representations to model and interpret mathematical ideas and concepts.
6. Complete TExES competencies.

RELATION TO DEPARTMENTAL GOALS AND PURPOSES

The Mathematics/Physics Department "...will offer an academically rigorous, undergraduate curriculum in classical and modern mathematics. The curriculum will prepare students majoring in mathematics and mathematical studies for careers and further education in mathematics and will encourage a lifetime of learning."

"...will provide academically rigorous and modern courses in mathematics to support other programs at the University."

"...will offer courses to enable all graduates of the University to become mathematically literate and develop useful skills in mathematics."

"...will provide the appropriate administrative processes, facilities, research experiences, and faculty to achieve the goals stated above."

RELATION TO COLLEGE GOALS AND PURPOSES

"...to prepare students for careers and further education in the natural sciences and mathematics in a nurturing Christian environment. The College will also serve the HBU community by providing science and mathematics classes that empower HBU students to meet the goals and requirements of their field of study and enrich their liberal arts education."

RELATION TO THE PURPOSE STATEMENT OF THE UNIVERSITY

University mission and purpose statement from the Houston Baptist University Catalog, 2009-2010: "...to provide a learning experience that instills in students a passion for academic, spiritual, and professional excellence as a result of our central confession, "Jesus Christ is Lord"

"...Committed to providing a responsible and intellectually stimulating environment that:

- fosters spiritual maturity, strength of character, and moral virtue as the foundation for successful living
- develops professional behaviors and personal characteristics for life-long learning and service to God and to the community

- meets the changing needs of the community and society
- remains faithful to the ‘**Nature of the Institution**’ statement”

“...Promotes learning, scholarship, creative endeavor, and service”.

ATTENDANCE

Please see the official Attendance Policy in the HBU Classroom Policy on Blackboard. Students missing more than 25% of the class will be given a failing grade.

ACADEMIC ACCOMODATIONS

Students needing learning accommodations should inform the professor immediately and consult the Academic Accommodations section of the HBU Classroom Policy posted on Blackboard.

COURSE REQUIREMENTS & GRADE SCALE

Course requirements:

Each student will take four exams in addition to a comprehensive final exam. Homework will be assigned and graded using MyMathLab, an online grading program. The four lowest homework grades may be dropped. Extensions may be requested for up to four homework assignments.

Grading standards:

Course grading is as follows:

Homework(MyMathLab)& Quizzes	20%
Class Participation	10%
4 Tests	40%
Final Exam	30%

The grading scale is:

A = 90 – 100; B = 80 – 89; C = 70 – 79; D = 60 – 69; F = Below 60.

PROFICIENCIES:

Technology component:

Students will use scientific calculators to solve problems and use MyMathLab, an online program, for completing homework assignments.

Designated essay/writing component:

Some questions on examinations may require essay-type answers.

Reading component:

Students are required to read the textbook. They are responsible for all assigned material even if it is not covered in class.

Oral communication component:

Students will be expected to participate in class discussions and present assigned topics to the class.

Mathematics component:

Entire course.

Critical thinking component:

Students are required to read, understand and analyze problems, develop solution strategies, implement these strategies to solve the problems, then interpret and verify their results.

LATE WORK & TEST POLICYLate work:

Students may request an extension for up to four homework assignments done using MyMathLab; however, there will be a 10% penalty for any work completed after the date the assignment was due.

Missed tests:

A grade of 0 will be assigned for any test missed because of an unexcused absence. The grade on the final exam will be used in place of the first test missed because of an **excused** absence. A makeup test will be given for any subsequent test missed because of an **excused** absence. **All absences will be assumed to be unexcused unless written evidence, such as a note from an attending physician, is presented to demonstrate otherwise.**

EVALUATIONMethod of student appraisal of faculty:

Students will be given an opportunity to appraise the professor by completing the IDEA Faculty Evaluation Questionnaire, and/or the COSM course evaluation at the end of the semester. The instructor, the department chairman and dean will review the responses of the students after the completion of the course.

Method of evaluating student response to course:

Students will be given an opportunity to describe their response to the course by completing the IDEA Faculty Evaluation Questionnaire and/or the COSM course Evaluation at the end of the course. The instructor, the department chairman and dean will review the responses of the students after the completion of the course.

LABORATORY DRESS CODE

Students may be asked in advance to wear closed-toed shoes and long pants during certain experimental procedures.

LABORATORY CONDUCT AND SAFETY

Not applicable.

TOPICAL OUTLINETopics Covered:

- I. An Introduction to Problem Solving
 - a. Mathematics and Problem Solving
 - b. Explorations with Patterns
 - c. Reasoning and Logic
- II. Numeration Systems and Sets
 - a. Numeration Systems
 - b. Describing Sets
 - c. Other Set Operations and Their Properties
- III. Whole Numbers and Operations on Whole Numbers
 - a. Algorithms for Addition and Subtraction
 - b. Algorithms for Multiplication and Division
 - c. Mental Arithmetic and Estimation for Whole Number Calculations
- IV. Number Theory
 - a. Divisibility
 - b. Prime Numbers and Composite Numbers
 - c. Greatest Common Divisors and Least Common Multiples
 - d. The Fundamental Theorem of Arithmetic
 - e. Modular Arithmetic
- V. Integers
 - a. Addition and Subtraction of Integers
 - b. Multiplication and Division of Integers
- VI. Rational Numbers and Proportional Reasoning
 - a. The Set of Rational Numbers
 - b. Addition, Subtraction, and Estimation of Rational Numbers
 - c. Multiplication and Division of Rational Numbers
 - d. Ratios, Proportions, and Proportional Reasoning
- VII. Decimals and Percents
 - a. Introduction to Decimals
 - b. Operations on Decimals
 - c. Nonterminating Decimals, Rounding Off
 - d. Percents and Interest
- VIII. Real Numbers and Algebraic Thinking
 - a. The Set of Real Numbers
 - b. Algebraic Variables
 - c. Polynomials
 - d. Solving Algebraic Equations
 - e. Solving Systems of Algebraic Equations
 - f. The Cartesian Coordinate System

Homework: Homework assignments will be made daily but only homework assigned using MyMathLab will be graded. In addition to the problems assigned using MyMathLab, students are strongly encouraged to work as many problems from the textbook as their time permits. A list of recommended problems will be posted on Blackboard. The assignments made with MyMathLab provide only the minimal amount of homework needed; the additional problems found on Blackboard provide additional depth and will give you a much better idea of what to expect on a test—the more of these you do, the greater your chances will be to be successful in this course.

Tentative Schedule:

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
January 20		22		24
1.1 Math & Problem Solving		1.1 cont. 1.2 Explorations w/ Patterns		1.2 cont. 1.3 Reasoning & Logic

27		29		31
1.3 cont.		2.1 Numeration Systems		2.1 cont. 2.2 Describing Sets
February 3		5		7
2.2 cont. 2.3 Set Operations & Properties		Census Date 2.3 cont.		Test 1 – Chs. 1 & 2
10		12		14
3.1 Addition & Subtraction of Whole Numbers		3.2 Algorithms for Whole-Number Addition & Subtraction		3.3 Multiplication & Division of Whole Numbers
17		19		21
3.4 Algorithms for Whole-Number Multiplication & Division		3.5 Mental Math & Estimation		4.1 Divisibility
24		26		28
4.1 cont. 4.2 Prime & Composite Numbers		4.3 Greatest Common Divisor & Least Common Multiple		4.3 cont.
March 3		5		7
Test 2 – Chs. 3 & 4		5.1 Integers & Operations of Addition & Subtraction		5.1 cont. 5.2 Multiplication & Division of Integers
17		19		21
5.2 cont.		6.1 Set of Rational Numbers		6.1 cont. 6.2 Addition, Subtraction of Rational Numbers
24		26		28
6.2 cont.		6.3 Multiplication, Division of Rational Numbers		6.3 cont. 6.4 Ratios, Proportions & Reasoning
31		April 2		4
6.4 cont.		Test 3 - Chs. 5 & 6		Last Day to Drop with a "W" 7.1 Intro to Decimals
7		9		11
7.2 Operations on Decimals		7.2 cont. 7.3 Nonterminating Decimals		7.3 cont. 7.4 Percents & Interest

7.4 cont.	14		8.1 Real Numbers	16		Good Friday Holiday	18
8.2 Variables	21		8.2 cont. 8.3 Equations	23		8.3 cont.	25
8.4 Functions	28		8.5 Equations in a Cartesian Coordinate System	30		8.5 cont.	May 2
Test 4 – Chs. 7 & 8	5		Final Review	7		Final Review	9

The content of this outline and the attached schedule are subject to change at the discretion of the professor.

Student Signature – I have read and understand the syllabus for this class. I understand that the content of this syllabus and the topical outline are subject to change at the discretion of the professor. I have read and understand the HBU Classroom Policy posted on Black Board. **I promise to uphold the Code of Academic Integrity at Houston Baptist University and will not tolerate its violation by others.**