MATH 3353, INTRODUCTION TO ABSTRACT ALGEBRA

Fall Semester, 2014

Mathematics Department, Dr. Evelyn Potter, Department Chair

COURSE DESCRIPTION

An introduction to algebraic structures. Topics include sets, operations, relations, groups, subgroups, equivalence classes, Lagrange's Theorem, homomorphisms, rings, and ideals.

COURSE SEQUENCE IN CURRICULUM

MATH 3353 follows MATH 3323.

PRE-REQUISITE INFORMATION

MATH 3323.

INSTRUCTOR INFORMATION

Name:	Dr. Barbara Benitez-Gucciardi
E-mail:	bbenitez@hbu.edu
Office Phone:	281-649-3050
Office Location:	N207
Office Hours:	Announced in class or by appointment
Web Page Address, Web Board, ListServ:	Blackboard

LEARNING RESOURCES

Course Text:	Elements of Modern Algebra, 7th edition (Gilbert/Gilbert)
Laboratory Text	None
Supplementary Text:	None
Other Required Materials:	LaTex

COURSE OBJECTIVES

Purpose of the course:

MATH 3353 is a survey of elementary topics in abstract algebra, with emphasis on groups. Although it is intended as an introduction to pure mathematics, both theoretical and computational aspects of the subject are treated extensively.

Aims for the course:

To present the material involved with an introductory course in abstract algebra. These topics include logic, axioms, groups, examples of groups, group structure, and homomorphisms.

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

1. Describe and use fundamental structures of abstract algebra, specifically definitions, properties and examples of various types of groups.
2. Apply concepts of abstract algebra to solve problems.
3. Be proficient in the use of axiomatic reasoning.
4. Construct proofs.
5. Describe the meaning of operations and how these operations relate to one another.
6. Work with homomorphisms.

7. Demonstrate an understanding of the relevance of algebraic properties in the study of number systems.
8. Develop the skills of reading rigorous definitions and proofs of theorems.
9. Derive and investigate mathematics conjectures and use them to develop and evaluate mathematical arguments.
10. Typeset basic mathematics using LaTex.

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 three regularly scheduled exams and a comprehensive final exam. In addition, homework assignments will be collected regularly. Extra credit projects may be available if appropriate.

Grading standards:

Homework	30%
Exams (2)	40%
Final	30%
TOTAL	600 points

The grading scale is:

Assignment of final grade is based on the average of the points above:
A: 90% or greater
B: 80% or greater and less than 90%
C: 70% or greater and less than 80%
D: 60% or greater and less than 70%
F: less than 60%

PROFICIENCIES:

Technology component:

Maple may be in this course to do iterative work, such as generating cyclic subgroups or as a research instrument to investigate current ideas, developments, interests, and opinions related to the field of abstract algebra. Students will also use LaTex to typeset mathematics and to turn in portions of assignments.

Designated essay/writing component:

The entire course focuses on the writing of proofs for theorems.

Reading component:

Students are required to read the textbook and other textbooks that involve proving theorems.

Oral communication component:

Active participation in class is expected.

Mathematics component:

Entire course.

Critical thinking component:

This is a course in foundational mathematics that emphasizes proof writing.

LATE WORK & TEST POLICY

Late work:

Two late homework assignments will be accepted without penalty. Any additional late submissions will be counted as a zero for that assignment.

Missed classes

Students may accumulate at most three unexcused absences without any penalty. For each additional unexcused absence, a penalty of 1 point will be deducted from the final average obtained in the class with a maximum penalty of 10 points.

Missed exams:

Make-up exams may be given if the absence was for a verifiable, excused absence.

EVALUATION

Method 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 OUTLINE - ***include table, calendar, or topical outline with dates***

Topics Covered:

1. Fundamentals
2. The integers
3. Groups
4. More on groups
5. Rings, integral domains
6. More on rings
7. Real and complex numbers
8. Polynomials

Topics will be covered from the list above as class time permits

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**.