

Course Name: INTRODUCTION TO ABSTRACT ALGEBRA
(MATH2411)

Level: 2

Semester: 2

Number of Credits: 3

Pre-requisites: (MATH 1141 & MATH 1152) or (M10A & M10B)

RATIONALE: At the core of any Mathematics Programme are Real Analysis, Linear and Abstract Algebra. The course being proposed is a first course in Abstract algebra and covers the fundamental mathematical structures found in algebra.

AIM: To equip students with the necessary tools to deal with the abstractions in Mathematics.

COURSE DESCRIPTION: In this course we build and define basic structures that rely on sets and binary operations. We start with systems, defined with one binary operation and move on to systems with two binary operations. The course will be taking a formal approach containing definitions, theorems, lemmas and proofs. Examples will be interspersed throughout.

LEARNING OBJECTIVES: At the end of the course, students will be able to:

1. define basic algebraic structures
2. define and differentiate between a group, a ring and a field

CONTENT

(a) Permutations

Order, parity, transpositions

(b) Groups

Definition and examples, Lagrange Theorem, Homomorphisms, Quotient Groups

(c) Rings

Definition and examples of rings

(d) Fields

Definition and examples, polynomials of fields

TEACHING METHODOLOGY: There will be a total of 39 contact hour. The course will be delivered via lectures and tutorials in the ratio of 2 to 1: New material will be presented in lectures with the help of a white board and a projector. Exercise sheets will be discussed during tutorial sessions. This will be interactive and less formal than lectures. Lecture notes, exercise sheets, solutions and interesting readings will be posted on the OURvle webpage:

<http://ourvle.mona.uwi.edu/>

ASSESSMENT: The course assessment will have a course-work component worth 30% and a final exam worth 70%. The Final theory exam will be two hours in length. The Coursework consists of

One one-hour in-class In-semester examination 20%

Two take-home graded assignments (problem papers) 5% each

REFERENCE MATERIAL:

Books:

1. HERSTEIN, I. N. *Abstract Algebra, 3rd edition*. Wiley 1999. ISBN-10: 9780471010906 (Prescribed)
2. ROTMAN, Joseph. *A First Course in Abstract Algebra, 3rd edition*, Prentice Hall, 2005. ISBN-10: 0131862677 (Recommended)

Online Resources:

1. http://mathforum.org/library/topics/modern_algebra

This is a website associated with Drexel University. Here students will find a variety of lecture notes and join in online discussions

2. http://www.math.niu.edu/~beachy/abstract_algebra/guide/

Here students will find a very nice study guide. It contains a variety of questions with many of the solutions.