A	**Course Title & Number**	**ABSTRACT ALGEBRA II: MTH 531**
B	**Pre/Co-requisite(s)**	Admission to MSMTH program
C	**Number of credits**	3
D	**Faculty Name**	Prof. Ayman Badawi
E	**Term/ Year**	Spring 2014
F	**Sections**	

CRN	Course	Days	Time	Location
21475	MTH 531	W	6:00pm – 8:30pm	Phys. 116

G	**Instructor Information**	

Instructor	Office	Telephone	Email
Ayman Badawi	NAB 262	2573	I prefer: abadawi@aus.edu

Office Hours: By appointment

H	**Course Description from Catalog**	Continuation of MTH 530. Rings: integral domains, unique factorization domains, ring with zero-divisors and modules over a principal ideal domain (PID). Application to linear algebra: rational and Jordan canonical form. Fields extension. Galois Theory.
I	**Course Learning Outcomes**	Upon completion of the course, students will be able to: • Develop mathematical proofs and reason abstractly in exploring properties of rings; • Demonstrate an understanding of the intellectual structure of algebra and its major theorems, definitions, axioms, and problems; • Demonstrate an understanding of the definitions, axioms, and major theorems underlying the algebraic structures of rings, and fields; • Write mathematics in a precise, effective, and understandable way; • Apply the concepts of rings, and fields to solve problems in which their use is fundamental to obtaining and understanding the solution; • Use and apply homomorphism theory between rings; • Use theorems of the course to analyze the structure of rings; • Perform calculations and proofs using Galois theory.
J	**Textbook and other Instructional Material and Resources**	Primary: Instructor class notes. Reference: David S. Dummit and Richard M. Foote, *Abstract Algebra*- Third Edition
K	**Teaching and Learning Methodologies**	The teaching and learning tools used in this course to deliver the subject matter include black board with chocks (if available) but the current white board and markers will do, formal lectures, class discussions, student presentation of proofs on the board..
L	**Grading Scale, Grading**	**Grading Scale**

Distribution, and Due Dates

Excellent	
A	Equals 4.00 grade points
Meet Expectation	
A-	Equals 3.80 grade points
B+	Equals 3.30 grade points
B	Equals 3.00 grade points
Below Expectation	
B-	Equals 2.70 grade points
C+	Equals 2.30 grade point
C	Equals 2.00 grade point
Fail	
F	Equals 0.00 grade points
Academic Integrity Violation Fail	
XF	Equals 0.00 grade points
Withdrawal Fail	
WF	Equals 0.00 grade points

Grading Distribution

Assessment	Weight	Date
Homework	25 %	
Mid-Term one	20 %	
Mid-Term two	20%	
Final Exam	35%	Comprehensive
Total	100 %	

M Explanation of Assessments

Exams, homework assignments will include proofs. So students are expected to master some of the techniques that are commonly used in Abstract Algebra

N Student Academic Integrity Code Statement

Student must adhere to the Academic Integrity code stated in the graduate catalog.

SCHEDULE

*Note: **Tests and other graded assignments due dates are set.** No addendum, make-up exams, or extra assignments to improve grades will be given.*

#	WEEK	CHAPTER/SECTIONS	NOTES
1	1	**Rings, Fields, Subrings, and Ideals**	Definition Examples
2	3	**Prime Ideals, Maximal Ideals, Quotient rings and Ring Homomorphism**	Definition Examples Proofs of some main results
5	2	**Rings of Polynomials, Power Series, and Factorization**	Examples Proofs of some main results
7	2	**Modules, Homomorphisms and Exact Sequences**	Definition Examples Proofs
9	1	**Review for Midterm Exam 1** **Midterm Exam 1**	Exam 1: Covers all above
10	1	**Free Modules, Projective and Injective Modules**	Examples Proofs
11	1	**Modules over Principal Ideal Domains and Noetherian Domains**	Definition Examples Proofs

			Application
12	1	**Matrices, Determinant, Rational and Canonical Form**	Examples Proofs
13	2	**Field Extensions**	Definitions Examples Proofs
15	1	**Galois Extension Field**	Examples Proofs
16	1	**Review before a comprehensive final exam**	