



Jordan University of Science and Technology
Faculty of Science & Arts
Mathematics Department

MATH741 Abstract Algebra (1)

First Semester 2017-2018

Course Catalog

3 Credit Hours. In this course we study the following subjects : Rings, zero-divisors and units, Polynomial Rings, Matrix Rings, integral domain and fields, Ring Homomorphism., Ideals. (right ideals and left ideals). Factor Rings, Isomorphism Theorems for rings. Maximal ideals, Prime ideals, Radicals of ideals, Primary ideals .The Chinese Remainder Theorem for rings. Euclidean Domains. Principle Ideal Domains. Unique Factorization Domains, Irreducibility Criteria., Module, submodules, Module Homomorphism. Isomorphism Theorems for modules. Prime submodules , maximal submodules, primary submodules . Generation of modules direct sum and free modules. The Chinese Remainder Theorem for module Noetherian R-modules. Finitely generated R-modules.

Text Book

Title	Abstract Algebra
Author(s)	David S. Dummit and Richard M. Foote
Edition	3rd Edition
Short Name	TextBook
Other Information	2003

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref 1	Algebra; an Approach via Module Theory	William A. Adkins and Steven H. Weintraub	1st Edition	Graduate Texts in Mathematics, Vol. 136. Springer-Verlag, 1992.
Ref 2	Algebra	Hungerford, Thomas W.	1st Edition	Graduate Texts in Mathematics, Vol. 73. Springer-Verlag, 2003.
Ref 3	Algebra.	Lang, S.	1st Edition	Graduate Texts in Mathematics, Vol. 211. Springer-Verlag, 2002.

Instructor

Name	Dr. Khaldoun Al-Zoubi
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Office Location	23451
Office Hours	Sun : 10:30 - 11:30 Mon : 10:00 - 11:30 Tue : 11:30 - 13:00 Wed : 11:30 - 12:30 Thu : 09:30 - 10:30
Email	kfzoubi@just.edu.jo

Class Schedule & Room
Section 1: Lecture Time: Thu : 14:30 - 17:30 Room: SF05

Tentative List of Topics Covered		
Weeks	Topic	References
Weeks 1, 2	Chapter 7 Introduction to Rings: Basic Definitions and Examples. Examples: Polynomial Rings, Matrix Rings. zero-divisors and units (left zero-divisor, right zero-divisor, left inverse , right inverse) , integral domain and fields, division ring, Subrings	From TextBook
Week 3	Chapter 7: Polynomial Rings, Ring Homomorphism, Properties of Ideals. (right ideals and left ideals)	From TextBook
Weeks 4, 5, 6	Chapter 7: Factor Rings, Isomorphism Theorems for rings (First Ring Isomorphism Theorem, Second Ring Isomorphism Theorem, Third Ring Isomorphism Theorem, Fourth Ring Isomorphism Theorem) Maximal ideals, Prime ideals, Radicals of ideals, Primary ideals, The Chinese Remainder Theorem.	From TextBook
Week 7	Chapter 8: Euclidean Domains. Principle Ideal Domains. Unique Factorization Domains.	From TextBook
Week 8	Chapter 9: Definitions and Basic Properties. Polynomial Rings Over Fields I. Polynomial Rings that are U.F.D.s.	From TextBook
Week 9	Chapter 9: Irreducibility Criteria. Polynomial Rings Over Fields II.	From TextBook
Week 10	Chapter 10: Basic Definitions and Examples, Submodules , Module Homomorphism.	From TextBook
Weeks 11, 12	Chapter 10: Quotient Modules, Isomorphism Theorems for modules (First module Isomorphism Theorem, Second module Isomorphism Theorem, Third module Isomorphism Theorem, Fourth module Isomorphism Theorem	From TextBook
Weeks 13, 14	Chapter 10: Prime submodules , maximal submodules, primary submodules	From TextBook
Week 15	Chapter 10: Generation of modules direct sum and free modules, The Chinese Remainder Theorem for modules, Noetherian R-modules , Finitely generated R-modules	From TextBook
Week 16	Final Exam Week	

Mapping of Course Objectives to Program Student Outcomes¹	Assessment method
Define, illustrate, and apply the concepts of rings, division ring integral domain, fields. [3a, 1e]	1st Exam
Define, illustrate, and apply the concepts of, left (right) zero-divisor, left (right) inverse, Ideals, factor rings and ring homomorphism. [2a, 1e]	1st Exam
Define, illustrate, and apply the concepts of Maximal ideals, prime ideals, primary ideals, Radicals of ideals. [1a, 1e]	
Learn the rings of polynomials and factorization of polynomials over a field. [1a, 1e]	
Define, illustrate, and apply the concepts of Euclidean Domains (ED), Unique Factorization Domains and Principle Ideal Domains. [1a]	
Define, illustrate, and apply the concepts of modules, submodules , module homomorphism and isomorphism theorems for modules [2a, 1e]	
Define, illustrate, and apply the concepts of prime submodules, primary submodules, maximal submodules. [2a, 1e]	
Define, illustrate, and apply the concepts of Noetherian modules and Finitely generated modules [1a]	

Relationship to Program Student Outcomes (Out of 100%)										
a	b	c	d	e	f	g	h	i	j	k
70				30						

Evaluation	
Assessment Tool	Weight
1st Exam	25%
2nd Exam	25%
final Exam	50%

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Abstract Algebra: books for free online reading: algebraic structures, groups, rings, fields, modules, vector spaces, algebras. Abstract Algebra for Polynomial Operations by Maya Mohsin Ahmed, 2009, 210 pp, 700KB, PDF. Abstract Algebra I by Marcel B. Finan, 2004, PDF. Abstract Algebra: The Basic Graduate Year by Robert B. Ash, 2002, PDF. Abstract Algebra: Theory and Applications by Thomas Judson, 2009, 428 pages, 1.5MB, PDF. Advanced Algebra by Anthony W. Knap, 2016, 758 pp, 10MB, PDF. This page helps students who have encountered terms from abstract algebra and need to quickly brush up their knowledge. For in depth discussion of abstract algebra, go to In Depth WikiBook on Abstract algebra. @Definitions: Groups, Rings, Fields. @Examples: Groups, Rings, Fields. Problem Solving Forum -- post your problems or solutions. Online Textbooks -- learn abstract algebra. Buy Textbooks. Definitions.