The University of Jordan

الجامعة الاردنية

Form: Course Syllabus	Form Number	EXC-01-02-02A
	Issue Number and Date	2/3/24/2022/2963 05/12/2022
	Number and Date of Revision or Modification	
	Deans Council Approval Decision Number	2/3/24/2023
	The Date of the Deans Council Approval Decision	23/01/2023
	Number of Pages	09

1.	Course Title	Modern Algebra 2
2.	Course Number	0331442
3.	Credit Hours (Theory, Practical)	3
	Contact Hours (Theory, Practical)	3+0
4.	Prerequisites/ Corequisites	0331341
5.	Program Title	B.S. in Mathematics
6.	Program Code	
7.	School/ Center	Science
8.	Department	Department of Mathematics
9.	Course Level	Obligatory major requirement
10.	Year of Study and Semester (s)	3rd year, 1st or 2nd semester
11.	Other Department(s) Involved in Teaching the Course	None
12.	Main Learning Language	English
13.	Learning Types	■Face to face learning □Blended □Fully online
14.	Online Platforms(s)	■Moodle ■Microsoft Teams
15.	Issuing Date	13 – 10 – 2024
16.	Revision Date	

17. Course Coordinator:

Name: Dr. Emad Abuosba   Contact hours:

Office number: 308   Phone number: 22088

Email: eabuosba@ju.edu.jo

18. Other Instructors:

Name:

Office number:

Phone number:

Email:

Contact hours:

Name:

Office number:

Phone number:

Email:

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19. Course Description:

As stated in the approved study plan.

Rings, subrings, integral domains, factor rings and ideals. Ring homomorphisms; polynomial rings; factorization of polynomials; reducibility and irreducibility tests; divisibility in integral domains; principal ideal domains and unique factorization domains.

20. Program Student Outcomes (SO's):

(To be used in designing the matrix linking the intended learning outcomes of the course with the intended

learning outcomes of the program)

7. Utilize research methods, critical and creative thinking skills to assess and analyze information) to solve

problems properly, then draw valid reasoning and logical conclusions leading to true consequences.

21. Course Intended Learning Outcomes (CLO's):

(Upon completion of the course, the student will be able to achieve the following intended learning outcomes)

1. Learn introductory concepts, and apply basic theorems and proof techniques of rings, integral domains and fields

2. Define, interpret, and analyse fundamental principles and theory concerning subrings, ideals, principal ideals, prime ideals, maximal ideals, quotient rings, Boolean rings, and direct sum of rings.

3. Know and apply the concepts of ring homomorphisms and isomorphisms.
4. Know facts about division algorithm of polynomials over fields and its consequences. Apply various irreducibility tests of polynomials.
5. Know the concepts of divisibility, primes, irreducibles, unique factorization domains, principal ideal domains and Euclidian Domains.

Course CLOs	The learning levels to be achieved					
	Remembering	Understanding	Applying	Analysing	evaluating	Creating
CLO 1		●	●			
CLO 2				●		
CLO 3		●				
CLO 4			●			
CLO 5					●	

22. The matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program:

SOs / CLOs of the course	SO (1)	SO (2)	SO (3)	SO (4)	SO (5)	SO (6)	SO (7)	SO (8)
CLO 1							●	
CLO 2							●	
CLO 3							●	
CLO 4							●	
CLO 5							●	

23. Topic Outline and Schedule:

Week	Lecture	Topic	CLO/s Linked to the Topic	Learning Types Face to Face (FF) Blended (BL) Fully Online (FO)	Platform Used	Synchronous (S) Asynchronous (A)	Evaluation Methods	Learning Resources
1	1.1	Introduction to Rings: Definition and Examples.	7	Face-to-face	Teams	S	Tests	Textbook
	1.2	Properties of Rings.	7	Face-to-face	Teams	S	Tests	Textbook
	1.3	Properties of Rings.	7	Face-to-face	Teams	S	Tests	Textbook
2	2.1	Subrings	7	Face-to-face	Teams	S	Tests	Textbook
	2.2	Exercises 1, 2, 4, 6, 8, 13, 17-19, 23, 25, 26, 28, 29, 31, 38, 39, 42, 43, 45, 46, 49, 50, 51.	7	Face-to-face	Teams	S	Tests	Textbook
	2.3	Integral Domains: Definition and Examples, Fields, Characteristic of a Ring.	7	Face-to-face	Teams	S	Tests	Textbook
3	3.1	Integral Domains: Definition and Examples, Fields, Characteristic of a Ring.	7	Face-to-face	Teams	S	Tests	Textbook
	3.2	Integral Domains: Definition and Examples, Fields, Characteristic of a Ring.	7	Face-to-face	Teams	S	Tests	Textbook
	3.3	Exercises 4- 16, 20, 22, 26, 28, 30-32, 38, 40, 42, 45a, 48, 53-56.	7	Face-to-face	Teams	S	Tests	Textbook
4	4.1	Ideals and Factor Rings: Ideals, Factor Rings, Prime Ideals and Maximal Ideals.	7	Face-to-face	Teams	S	Tests	Textbook
	4.2	Ideals and Factor Rings: Ideals, Factor Rings, Prime Ideals and Maximal Ideals.	7	Face-to-face	Teams	S	Tests	Textbook

	4.3	Ideals and Factor Rings: Ideals, Factor Rings, Prime Ideals and Maximal Ideals.	7	Face-to-face	Teams	S	Tests	Textbook
5	5.1	Ideals and Factor Rings: Ideals, Factor Rings, Prime Ideals and Maximal Ideals.	7	Face-to-face	Teams	S	Tests	Textbook
	5.2	Ideals and Factor Rings: Ideals, Factor Rings, Prime Ideals and Maximal Ideals.	7	Face-to-face	Teams	S	Tests	Textbook
	5.3	Exercises 6-8, 11, 13, 14, 16, 18, 22, 24, 26-28, 32-37, 39, 45-47, 51, 56, 59, 60.	7	Face-to-face	Teams	S	Tests	Textbook
6	6.1	Ring Homomorphisms: Definition and Examples, Properties of Ring Homomorphisms, The Field of Quotients.	7	Face-to-face	Teams	S	Tests	Textbook
	6.2	Ring Homomorphisms: Definition and Examples, Properties of Ring Homomorphisms, The Field of Quotients.	7	Face-to-face	Teams	S	Tests	Textbook
	6.3	Ring Homomorphisms: Definition and Examples, Properties of Ring Homomorphisms, The Field of Quotients.	7	Face-to-face	Teams	S	Tests	Textbook
7	7.1	Ring Homomorphisms: Definition and Examples, Properties of Ring Homomorphisms, The Field of Quotients.	7	Face-to-face	Teams	S	Tests	Textbook
	7.2	Ring Homomorphisms: Definition and Examples, Properties of Ring Homomorphisms, The Field of Quotients.	7	Face-to-face	Teams	S	Tests	Textbook

	7.3	Exercises 5, 6, 8, 10, 13, 15, 16, 18, 20, 18, 20, 23-28, 31-36, 44-46, 49-51, 60, 65.	7	Face-to-face	Teams	S	Tests	Textbook
8	8.1	Polynomial Rings: Notation and Terminology, The Division Algorithm and Consequences.	7	Face-to-face	Teams	S	Tests	Textbook
	8.2	Polynomial Rings: Notation and Terminology, The Division Algorithm and Consequences	7	Face-to-face	Teams	S	Tests	Textbook
	8.3	Polynomial Rings: Notation and Terminology, The Division Algorithm and Consequences	7	Face-to-face	Teams	S	Tests	Textbook
9	9.1	Polynomial Rings: Notation and Terminology, The Division Algorithm and Consequences	7	Face-to-face	Teams	S	Tests	Textbook
	9.2	Polynomial Rings: Notation and Terminology, The Division Algorithm and Consequences	7	Face-to-face	Teams	S	Tests	Textbook
	9.3	Exercises 2, 3, 6, 9-17 odd, 21-23, 25, 26, 29-31, 38, 39, 42, 43, 47.	7	Face-to-face	Teams	S	Tests	Textbook
10	10.1	Factorization of Polynomials: Reducibility Tests, Irreducibility Tests, Unique Factorization in Z[x].	7	Face-to-face	Teams	S	Tests	Textbook
	10.2	Factorization of Polynomials: Reducibility Tests, Irreducibility Tests, Unique Factorization in Z[x].	7	Face-to-face	Teams	S	Tests	Textbook
	10.3	Factorization of Polynomials: Reducibility Tests, Irreducibility Tests, Unique Factorization in Z[x].	7	Face-to-face	Teams	S	Tests	Textbook
11	11.1	Factorization of Polynomials: Reducibility Tests, Irreducibility Tests, Unique Factorization in Z[x].	7	Face-to-face	Teams	S	Tests	Textbook
	11.2	Factorization of Polynomials: Reducibility Tests, Irreducibility Tests, Unique Factorization in Z[x].	7	Face-to-face	Teams	S	Tests	Textbook

	11.3	Exercises 2 - 11, 13, 21, 22, 24-26, 31, 32.	7	Face-to-face	Teams	S	Tests	Textbook
12	12.1	Divisibility and Integral Domains: Irreducibles and Primes, Unique Factorization Domains, Euclidian Domains.	7	Face-to-face	Teams	S	Tests	Textbook
	12.2	Divisibility and Integral Domains: Irreducibles and Primes, Unique Factorization Domains, Euclidian Domains.	7	Face-to-face	Teams	S	Tests	Textbook
	12.3	Divisibility and Integral Domains: Irreducibles and Primes, Unique Factorization Domains, Euclidian Domains.	7	Face-to-face	Teams	S	Tests	Textbook
13	13.1	Divisibility and Integral Domains: Irreducibles and Primes, Unique Factorization Domains, Euclidian Domains.	7	Face-to-face	Teams	S	Tests	Textbook
	13.2	Divisibility and Integral Domains: Irreducibles and Primes, Unique Factorization Domains, Euclidian Domains.	7	Face-to-face	Teams	S	Tests	Textbook
	13.3	Exercise 1-5, 8, 12, 13-15, 17,18, 20-23, 25, 27, 28, 30, 31, 36.	7	Face-to-face	Teams	S	Tests	Textbook
14	14.1	Revision Exercises	7	Face-to-face	Teams	S	Tests	Textbook
	14.2	Revision Exercises	7	Face-to-face	Teams	S	Tests	Textbook
	14.3	Revision Exercises	7	Face-to-face	Teams	S	Tests	Textbook
15	15.1	Revision Exercises	7	Face-to-face	Teams	S	Tests	Textbook
	15.2	Revision Exercises	7	Face-to-face	Teams	S	Tests	Textbook
	15.3	Revision Exercises	7	Face-to-face	Teams	S	Tests	Textbook

24. Evaluation Methods:

Opportunities to demonstrate achievement of the CLOs are provided through the following assessment

methods and requirements:

Evaluation Activity	Mark	Topic(s)	CLO/s Linked to the Evaluation activity	Period (Week)	Platform
Midterm	30	Introduction to rings. Integral domains. Ideals and factor rings. Ring homomorphisms	1+2+3	8	On Campus
Second	20	Polynomial rings. Factorization polynomials.	4+5	11	On Campus
Final	50	All topics		Final exams period	On Campus

25. Course Requirements:

(e.g.: students should have a computer, internet connection, webcam, account on a specific

software/platform…etc.):

-An account on Microsoft Teams.

26. Course Policies:

According to university regulations, attendance is mandatory. If a student is unable to attend a class, then he/she should contact the instructor. If a student misses more than 10% of the classes without excuse, then he/she will be assigned a falling grade in class.

In cases of extreme emergency or serious illness, the student will be allowed to make up the missed exams. Times and dates for makeup exams will be assigned later.

There are severe sanctions for cheating, plagiarizing and any other form of dishonesty. The university regulations on cheating will be applied to any student who cheats in exams or on any homework.

27. References:

A- Required book(s), assigned reading and audio-visuals:

Contemporary Abstract Algebra, by J. Gallian. (9th edition)

B- Recommended books, materials, and media:

1. A First Course in Abstract Algebra by J. Fraleigh.

2. Topics in Algebra by I. Herstein.
Abstract Algebra: an introduction, by T. Hungerford.

28. Additional information:

	Signature:	Date:
Name of the Instructor or the Course Coordinator: **Prof. Emad A. Abuosba**	……………………………	13 – 10 – 2024
Name of the Head of Quality Assurance Committee/ Department: **Prof. Manal Ghanem**	Signature: ……………………………	Date: …………………
Name of the Head of Department: **Prof. Baha Alzalg**	Signature: ……………………………	Date: …………………
Name of the Head of Quality Assurance Committee/ School of Science: **Prof. Emad A. Abuosba**	Signature: ……………………………	Date: …………………
Name of the Dean or the Director: **Prof. Mahmoud I. Jaghoub**	Signature: ……………………………	Date: …………………