



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	07

1.	Course Title	Algebra II
2.	Course Number	0301742
3.	Credit Hours (Theory, Practical)	3
	Contact Hours (Theory, Practical)	3
4.	Prerequisites/ Corequisites	0331741
5.	Program Title	Master in Mathematics
6.	Program Code	
7.	School/ Center	Science
8.	Department	Mathematics
9.	Course Level	Elective
10.	Year of Study and Semester (s)	2 nd year, 1 st and 2 nd semesters
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	11 th November 2024
16.	Revision Date	

17. Course Coordinator:

Name: Manal Ghanem	Contact hours:
Office number: 321	Phone number: 22101
Email: m.ghanem@ju.edu.jo	



18. Other Instructors:

Name:

Office number:

Phone number:

Email:

Contact hours:

Name:

Office number:

Phone number:

Email:

Contact hours:

19. Course Description:

As stated in the approved study plan.

R-modules, products and sums of *R*-modules, exact sequences and split exact sequences, simple and semisimple *R*-modules, essential and small submodules, the ring of endomorphisms of an *R*-modules, projective and injective modules, regular rings, the radical and socle of an *R*-module, Noetherian, and Artinian *R*-modules. Field extensions, algebraic elements, splitting fields.

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)

1. Read, analyze and write logical arguments to prove mathematical and statistical concepts and theorems.
3. Communicate with mathematical and statistical ideas clearly and consistently, in writing and verbally
7. Work effectively within work teams and communicate scientific knowledge and results with peers and experts in the field.
8. Apply methodologies and ethics of scientific research in preparation of scientific research in mathematics field.

**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. Understand the fundamental properties of R -modules, and specific submodules.
2. Demonstrate the ability to interpret and construct exact and split exact sequences of R -modules.
3. Apply the theories of projective and injective R -modules to address problems in module theory and explore their implications in exact sequences.
4. Examine the concepts of the radical and socle of an R -module, as well as the ring of endomorphisms, to understand their importance in module analysis and structure theory.
5. Analyze the structural properties of Noetherian and Artinian R -modules.
6. Demonstrate an understanding of the algebraic structure of polynomial rings and power series rings.
7. Utilize the process of localization to solve problems involving ring and module structures.
8. Solve problems related to field extensions, including algebraic elements and splitting fields, demonstrating their applications in abstract algebra and module theory.
9. Use the electronic library to find solutions and articles and represent his work in front of his colleagues.
10. Write small essays and work with small teams.

Course CLOs	The learning levels to be achieved					
	Remembering	Understanding	Applying	Analysing	evaluating	Creating
1	•	•		•		
2	•	•	•	•		
3		•		•		
4		•		•		
5	•	•	•	•		
6	•	•		•		
7		•	•	•		
8		•				
9			•	•		•
10			•	•		•



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

Program SO's Course CLO's	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)	•		•					
CLO (6)	•							
CLO (7)	•		•				•	
CLO (8)	•		•				•	
CLO (9)	•		•				•	•
CLO (10)							•	•

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	R-Modules	1	BL	Classroom	S	Homework & Exam	Textbook
	1.2	R-Modules	1	BL	Moodle	A	Homework & Exam	Textbook, You Tube
2	2.1	Module Homomorphism	1	BL	Classroom	S	Homework & Exam	Textbook
	2.2	Quotient Modules	1	BL	Moodle	A	Homework & Exam	Textbook, You Tube
3	3.1	Exact Sequence	2	BL	Classroom	S	Homework & Exam	Textbook



	3.2	Exact Sequence	2	BL	Moodle	A	Homework & Exam	Textbook, You Tube
4	4.1	Split Exact Sequence	2	BL	Classroom	S	Homework & Exam	Textbook
	4.2	Direct Sum and Direct Products of modules	1	BL	Moodle	A	Homework & Exam	Textbook, You Tube
5	5.1	Free Modules	1	BL	Classroom	S	Homework & Exam	Textbook
	5.2	Free Modules	1	BL	Moodle	A	Homework & Exam	Textbook, You Tube
6	6.1	Projective Modules	3	BL	Classroom	S	Homework & Exam	Textbook
	6.2	Projective Modules	3	BL	Moodle	A	Homework & Exam	Textbook, You Tube
7	7.1	Injective Modules	3	BL	Classroom	S	Homework & Exam	Textbook
	7.2	Injective Modules	3, 10	BL	Moodle	A	Homework & Exam	Textbook, You Tube
8	8.1	The radical and Socle of an R-module	4	BL	Classroom	S	Homework & Exam	Textbook
	8.2	Noetherian Rings and Artinian Modules	5	BL	Moodle	A	Homework & Exam	Textbook, You Tube
9	9.1	Noetherian Rings and Artinian Modules	5	BL	Classroom	S	Homework & Exam	Textbook
	9.2	Noetherian Rings and Artinian Modules	5, 10	BL	Moodle	A	Homework & Exam	Textbook, You Tube
10	10.1	Tensor Product of Modules	1	BL	Classroom	S	Homework & Exam	Textbook
	10.2	Tensor Product of Modules	1	BL	Moodle	A	Homework & Exam	Textbook, You Tube
11	11.1	Ring of Polynomials	6	BL	Classroom	S	Homework & Exam	Textbook
	11.2	Power series Ring	6, 9	BL	Moodle	A	Homework & Exam	Textbook, You Tube
12	12.1	Localization	7	BL	Classroom	S	Homework & Exam	Textbook
	12.2	Localization	7, 9	BL	Moodle	A	Homework & Exam	Textbook, You Tube
13	13.1	Local Rings	7	BL	Classroom	S	Homework & Exam	Textbook
	13.2	Field Extensions	8	BL	Moodle	A	Homework & Exam	Textbook, You Tube
14	14.1	Algebraic Elements	8	BL	Classroom	S	Homework & Exam	Textbook



	14.2	Algebraic Elements	8	BL	Moodle	A	Homework & Exam	Textbook, You Tube
15	15.1	Splitting fields	8	BL	Classroom	S	Homework & Exam	Textbook
	15.2	Splitting fields	8	BL	Moodle	A	Homework & Exam	Textbook, You Tube
16							Final Exam	

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	25	Modules	1, 2	6	Classroom
Assignments	20	Modules and Rings	1-9	1-14	Moodle
Essay and Presentation	15	Modules and Rings	9, 10	11-13	Classroom and Moodle
Final Exam	40	Modules and Rings	1-8		

25. Course Requirements:

(e.g.: students should have a computer, internet connection, webcam, account on a specific software/platform...etc.):

26. Course Policies:

1. The student is not allowed to take the course and its pre-requisite in the same time.
2. Attendance is absolutely essential to succeed in this course. You are expected to attend every class; please notify your instructor if you know you are going to be absent. All exams must be taken at the scheduled time. Exceptions will be made only in extreme circumstances, by prior arrangement with the instructor.
3. If a student is absent for more than 10% of lectures without an excuse of sickness or due to other insurmountable difficulty, then he/she shall be barred from the final examination also he/she will get a failing grade in this course.
4. Medical certificates shall be given to the University Physician to be authorized by him. They should be presented to the Dean of the Faculty within two weeks of the student's ceasing to attend classes.



5. Test papers shall be returned to students after correction. His/her mark is considered final after a lapse of one week following their return.
6. Cheating is prohibited. The University of Jordan regulations on cheating will be applied to any student who cheats in exams or on home works.

27. References:

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

Algebra by Thomas Hungerford, 2nd edition.

Abstract Algebra by David Dummit and Richard Foote, 3rd edition.

B- Recommended books, materials, and media:

Introduction to commutative algebra by Atiyah and MacDonald, 1st edition.

28. Additional information:

Name of the Instructor or the Course Coordinator: Prof. Manal Ghanem	Signature:	Date: 11/11/2024
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: