



### Maths 312 Course Syllabus

<b>1. College:</b>	Science											
<b>2. Department:</b>	Mathematics											
<b>3. Program:</b>	B.Sc.											
<b>4. Course code:</b>	MATHS312											
<b>5. Course title:</b>	ABSTRACT ALGEBRA II											
<b>6. Course credits:</b>	Lecture Hours: 3			Lab Hours: 0			Credit Hours: 3					
<b>7. Pre-requisites:</b>	MATHS 311											
<b>8. Course web-page:</b>	-											
<b>9. Course coordinator:</b>	Dr. Ahmed Matar											
<b>10. Academic year:</b>	2017-2018											
<b>11. Semester:</b>	✓	First						Second				Summer
<b>12. Textbook(s):</b>	A First Course in Abstract Algebra, J. B. Fraleigh, 7th edition, Addison-Wesley Publishing, Inc											
<b>13. References:</b>	a) Abstract Algebra, Dummit and Foote, 3 <sup>rd</sup> edition, John Wiley and Sons, Inc. b) Topics in Algebra, I. N. Herstein, 2 <sup>nd</sup> edition, John Wiley and Sons, Inc.											
<b>14. Other resources used (e.g. e-Learning, field visits, periodicals, software, etc.):</b>												
<b>15. Course description (from the catalog):</b>	Rings. Fields. Integral domains. Subrings. Ideals. Factors rings. Homomorphism of rings. Isomorphism theorems. Prime ideals. Maximal ideals. Euclidean domain. The Gaussian Integers. Principal ideal domains. Unique factorization domains. Polynomial rings. Factorization of polynomials. Gauss lemma. Eisenstein criterion.											
<b>16. Course Intended Learning Outcomes (CILOs):</b>	<i>Students who successfully complete this course should be able to:</i>											
	<i>Mapping to PILOs</i>											
<b>CILOs</b>	a	b	c	d	e	f	g	h	i	j	k	
1. Define rings, sub-rings and ideals.	✓	✓	✓					✓				
2. Distinguish between different types of rings such as commutative rings, integral domains, division rings and fields.	✓	✓	✓	✓		✓		✓	✓			
3. Prove certain results about rings.	✓	✓				✓						
4. Differentiate between the types of ideals such as prime and maximal ideals.	✓	✓	✓	✓	✓	✓		✓		✓	✓	
5. Infer when a quotient ring is an integral domain or a field.	✓	✓	✓	✓		✓		✓	✓	✓	✓	
6. Construct examples of objects in ring theory.	✓	✓	✓	✓		✓		✓	✓	✓	✓	
7. Prove the fundamental	✓	✓				✓	✓	✓				

isomorphism theorems.											
8. Apply isomorphism theorems to rings.	✓	✓	✓	✓		✓		✓	✓	✓	✓
9. Illustrate the similarity between polynomials over a field and the ring of integers.	✓	✓	✓	✓		✓		✓	✓	✓	✓
10. Classify rings as a Euclidean domain, principal domain or a unique factorization domain.	✓	✓	✓	✓		✓		✓	✓	✓	✓

<b>17. Course assessment:</b>			
<i>Assessment Type</i>	<i>Number</i>	<i>Weight</i>	<i>Date(s) &amp; Materials</i>
Mid Term	<b>02</b>	40%	<b>Test 1: 2/11/17 Test 2: 7/12/17</b>
Homework	<b>10</b>	20%	
Final	<b>01</b>	40%	<b>Comprehensive</b>
<b>Total</b>	<b>13</b>	100%	

<b>18. Attendance Policy:</b>
<i>Extracts from the University Bulletin regarding withdrawal and enforced withdrawal:</i>
<i>A student's absence from lectures or classes in excess of 25% of the total assigned session will result in an automatic withdrawal of the student from the course, regardless of the causes for his/her absence.</i>
<i>a) A grade of (W) is given to a student who misses 25% or more of the total sessions assigned to the course if he/she presents a valid excuse for his/her absence.</i>
<i>b) A grade of (WF) is given to a student who misses 25% or more, but with no valid excuse.</i>

<b>19. Academic Honesty and Plagiarism:</b>
<i>All students are expected to follow the specific rules of academic honesty and plagiarism as per The Regulation of Professional conduct Violations for University of Bahrain Students, decision # 4/2006. Please refer the UoB website-Deanship of Students Affairs-Guidance Office.</i>

<b>20. Course Weekly Breakdown:</b>					
<b>Week</b>	<b>Date</b>	<b>Sections -Topics covered</b>	<b>CILOs</b>	<b>Teaching Method</b>	<b>Assessment</b>
1	17/09/17	18: Rings and Fields	1	Lecturing & Problem solving	Homework Tests Final Exam
2	24/09/17	18: Basic Properties of Rings and Fields	1	Lecturing & Problem solving	Homework Tests Final Exam
3	01/10/17	27: Subrings and Ideals	1	lecturing Problem solving	Homework Tests Final Exam
4	08/10/17	27: Subrings and Ideals	1	Lecturing & Problem solving	Homework Tests Final Exam
5	15/10/17	26: Prime and Maximal Ideals	1	Lecturing & Problem solving	Homework Tests Final Exam
6	22/10/17	26: Quotient Rings	1	Lecturing & Problem solving	Homework Tests Final Exam
7	29/10/17	13: Homomorphisms	1, 2	Lecturing & Problem solving	Homework Tests Final Exam
8	5/11/7	<b>Mid-Semester break</b>			
9	12/11/17	13: Homomorphisms Theorems	1,2	Lecturing & Problem solving	Homework Tests Final Exam
10	19/11/17	22: Rings of Polynomials	1-4	Lecturing & Problem solving	Homework Tests Final Exam
11	26/11/17	23: Rings of Polynomials	1-4	Lecturing & Problem solving	Homework Tests Final Exam
11	03/12/17	23: Rings of Polynomials	1-4	Lecturing & Problem solving	Homework Tests Final Exam
12	10/12/17	45: Unique Factorization Domains	1-4	Lecturing & Problem solving	Homework Tests Final Exam
13	17/12/17	46: Euclidean Domains	9 9	Lecturing & Problem solving	Homework Tests Final Exam
14	24/12/17	47: Gaussian Integers	9	Lecturing & Problem solving	Homework Tests Final Exam
15	31/12/17	47: Gaussian Integers	9	Lecturing & Problem solving	Quiz Homework Final Exam
16	17/09/17	Review			