جامعة الزيتونة الأردنية
Al-Zaytoonah University of Jordan
كلية العلوم وتكنولوجيا المعلومات
Faculty of Science and Information Technology

" عراقة وجودة"
"Tradition and Quality"

Detailed Course Description - Course Plan Development and Updating Procedures/ Mathematics Department	QF01/0408-3.0E

Faculty	Faculty of Science and Information Technology	Department	Mathematics
Course number	0101323	Course title	Abstract Algebra (1)
Number of credit hours	3	Pre-requisite/co-requisite	Number Theory 0101212

Brief course description

Groups and Subgroups, Cyclic Groups, Permutation Groups, Homomorphisms Of Groups, Isomorphism's Of Groups, Direct Product Of Groups, Cosets and LaGrange's Theorem, Normal Subgroups and Factor Groups, The First Isomorphism Theorem.

	Course goals and learning outcomes
Goal 1	To provide students with a good understanding of the theory of modern algebra and to introduce the basic concepts of abstract algebra.
Learning outcomes	1.1 Students will have a working knowledge of important mathematical concepts in abstract algebra such as definition of a group, order of a finite group and order of an element. 1.2 Students will be knowledgeable of different types of subgroups such as normal subgroups, cyclic subgroups and understand the structure and characteristics of these subgroups. 1.3 give examples of equivalence relations, groups, subgroups, cyclic groups, group homomorphisms and isomorphisms 1.4 Students will be introduced to and have knowledge of many mathematical concepts studied in abstract mathematics such as permutation groups, factor groups and Abelian groups.
Goal 2	To help students develop the ability to prove theorems and solve problems.
Learning outcomes	2.1 Students will see and understand the connection and transition between previously studied mathematics and more advanced mathematics. The students will actively participate in the transition of important concepts such homomorphisms & isomorphisms from discrete mathematics to advanced abstract mathematics. 2.2 Students will gain experience and confidence in proving theorems. 2.3 A blended teaching method will be used requiring the students to prove theorems give the student the experience, knowledge, and confidence to move forward in the study of mathematics. 2.4 Construct correct logical arguments and understand and critique the reasoning of others.

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Textbook	Contemporary Abstract Algebra. By: Joseph A. Gallian
Supplementary references	1) Abstract Algebra. By: I. N. Herstien 2) Abstract Algebra. By: Abraham P. Hilman and Gerald L. Alexan 3) Abstract Algebra. By: A. P. Hillman and G. W. Alexanderson 4) Groups, rings and field. By: T. S Blyth and E. F. Robertson.

Course timeline				
Week	**Number of hours**	**Course topics**	**Pages (textbook)**	**Notes**
01	1 1 1	Groups: definition and examples.	42 – 46	
02	1 1 1	The set $z_n = \{o,1,\ldots.n\text{-}1\}$ is a group under addition. The set R^n is a group under component wise addition.	46 – 50	
03	1 1 1	Uniqueness of the identity in a group and the cancellation low. The order of a group, the order of an element in a group.	50 – 56	
04	1 1 1	Definition of a subgroup, one-step subgroup test, two step subgroup test and finite subgroup test.	59 – 64	
05	1 1 1	‹a› = { a^n: n in z }, a in G, is a subgroup of a group G. z(G) and c(a) are also subgroups of G.	65 – 71	
06	1 1 1	Cyclic groups, the criterion for $a^i = a^j$, the generators of cyclic groups. **First Exam 20%**	73 – 85	
07	1 1 1	The permutation groups, cycle notation with the properties of permutations, product of disjoint cycles.	94 – 103	
08	1 1 1	Even and odd permutations. Even permutations form a subgroup of the group of permutations.	104 – 116	
09	1 1 1	Isomorphisms, def. and examples. Properties of isomorphisms.	120 – 134	
10	1 1 1	Cosets and Lagrange's theorem, properties of cosets. If G is finite group then the order of any subgroup divide the order of the group.	137 – 141	
11	1 1 1	Any group of prime order is cyclic. External direct product of groups. Classification of groups of order 4.	141 – 152	
12	1 1	Normal subgroups and factor groups. Normal subgroup test.	177 - 183	

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	1	**Second Exam 20%**		
13	1 1 1	Any subgroup of abelian group is normal. Let G be a finite group of order n, p prime divides n then G has an element of order p.	183 – 195	
14	1 1 1	Group homomorphism, def. examples. Kernel of a homomorphism. The first isomorphism theorem.	199 – 206	
15	1 1 1	Rings, subrings, integral domain, factor rings and ideals.	236 – 243	
16	1 1 1	**Final Exam 50%**	-	

Theoretical course evaluation methods and weight	Participation = 10% First exam 20% Second exam 20% Final exam 50%	**Practical (clinical) course evaluation methods**	Semester students' work = 50% (Reports, research, quizzes, etc.) Final exam = 50%

Approved by head of department		**Date of approval**	

Extra information (to be updated every semester by corresponding faculty member)

Name of teacher	Hamza Alzaareer	Office Number	**9130**
Phone number (extension)	423	Email	**h.alzaareer@zuj.edu.jo**
Office hours			