

Philadelphia University	 PHILADELPHIA UNIVERSITY <small>THE WAY TO THE FUTURE</small>	Approval date:
Faculty of Science		Issue:
Department of Math		Credit Hours: 3
Academic Year 2023/2024		Bachelor

Course information

Course#	Course title	Prerequisite
0250342	Abstract Algebra 1	0250251
Course type <input type="checkbox"/> University Requirement <input type="checkbox"/> Faculty Requirement <input checked="" type="checkbox"/> Major Requirement <input type="checkbox"/> Elective <input checked="" type="checkbox"/> Compulsory		Section 3 Class time Sat. 8:15 – 9:30 Room # 6717

Instructor Information

Name	Office No.	Phone	Office Hours	E-mail
Ahmad Hamdan	Sci. 819	2341	Sat.–Tue. 10:10 – 11:00 Sun. Tue. 12:40 – 13:30	ahamdan@philadelphia.edu.jo

Course Delivery Method

Course Delivery Method			
<input checked="" type="checkbox"/> Physical	<input type="checkbox"/> Online	<input type="checkbox"/> Blended	
Learning Model			
Percentage	Synchronous	Asynchronous	Physical
	0%	0%	100%

Course Description

This course introduces topics in group theory: groups, subgroups, abelian groups, cyclic groups, normal subgroups, groups of permutations, Alternating groups, the Theorem of Lagrange, direct products, homomorphisms, factor groups, Isomorphism Theorems.

Course Learning Outcomes

Number	Outcomes	Corresponding Program outcomes *
Knowledge		
K1	Define and give examples of groups.	K_p1
K2	Understand subgroups and test them.	K_p2
K3	Recognize the cyclic groups.	K_p1
K4	Describe the cosets and their elements	K_p1
K5	Understand the permutation groups and the dihedral groups.	K_p1
K6	Understand isomorphism theorems of groups and apply them.	K_p2
K7	Understand the factor groups and calculate them.	K_p2
S1	Finding examples for theorems.	S_p1
S2	Reading and writing mathematical proofs.	S_p1

S3	Extend the concepts of mathematics to abstract notions.	S_p1
C1	Gaining knowledge and experience of working with many pure mathematical problems.	C_p4
C2	Working independently and managing time wisely.	C_p2

* According to learning outcomes of the faculty of pharmacy.

Learning Resources

Course textbook	Joseph A. Gallian, Contemporary Abstract Algebra , 10 th Edition 2021, Taylor & Francis Group, LLC.
Supporting References	-John B. Fraleigh, A First Course in Abstract Algebra , 7 th Edition 2003, Addison Wesley. -I.N. Herstein, Topics in Algebra , 2 nd Edition 1975, Wiley.
Supporting websites	https://www.d.umn.edu/~jgallian/
Teaching Environment	<input checked="" type="checkbox"/> Classroom <input type="checkbox"/> laboratory <input type="checkbox"/> Learning platform <input type="checkbox"/> Other

Meetings and Subjects Timetable

Week	Topic	Learning Methods	Tasks	Learning Material
1	Explanation of the study plan for the course, and what is expected to be accomplished by the students. Technology Preliminaries: Moodle. Introduction to Groups	Lecture		Course Syllabus Suggested Questions for Practice
2	Elementary Properties of Groups.	Lecture		Ch2: 4,5,6,7,8,9,11,16,22, 25,26,27,32,33,34,35,38,49
3	Finite Groups and Subgroups.	Lecture		Ch3: 1,2,4,6,15,18,19,20, 26,32,33,34,37,42,45,46,53, 67, 69,79
4-5	Cyclic Groups.	Lecture	Quiz (10 pts)	Ch4: 1,2,5,7,8,10,12,13,21, 28,29,33,37,40,55,63,65,74
5-6	Permutation Groups.	Lecture		Ch5: 1,3,5,6,10,11,16,19,24, 27,28,29,32,34,36,37,42,45
7	Isomorphisms.	Lecture		Ch6: 1,3,4,5,7,9,10,11, 14,17,20,24,28,35,37
8	Cosets and Lagrange's Theorem.	Lecture		Ch7: 1,2,3,4,5,7,8,15, 16, 17, 22,25,34
9	External Direct Product. Quotient Groups.	Lecture	Quiz (10 pts)	Ch8: 3,5,6,7,8,9,11,12,15,16 18,20,22,26,31,36,39,42,52, 53
10	Normal Subgroups..	Lecture		
11	Factor Groups.	Lecture		Ch9: 1,2,6,7,8,11,12,13,14, 15,17,18,19,24,27,37,38,43, 54
12	Group Homomorphisms.	Lecture		
13	Isomorphism Theorems.	Lecture	Assign ment	Ch10: 8,9,11,14,15,16,17, 18,20,21,24,25,31,32,33,34, 35,40,47,48,49,56,58
14	The Group of Automorphisms.	Lecture		
15	Classification of Groups of small orders.	Lecture		Ch 11: 1,2,3,4,7,8,9,13, 15, 33,43,46
16	Final Exam			

* Includes: Lecture, flipped Class, project-based learning, problem-solving based learning, collaborative learning

Course Contributing to Learner Skill Development

Using Technology
Communication Skills
Improve the communication skills of the student by giving oral quizzes and discuss the assignments at the class
Application of Concepts Learnt

Assessment Methods and Grade Distribution

Assessment Methods	Grade Weight	Assessment Time (Week No.)	Link to Course Outcomes
Mid Term Exam	30%	8	K1, K2,K3,K4, C1
Various Assessments *	30%	Continuous	S1, S2, S3, C1, C2
Final Exam	40%	15	K1, K2, K3, K4, K5, K6, K7 C1
Total	100%		

* Includes: quizzes, In-class and out-of-class assignments, presentations, reports, videotaped assignments, and group or individual projects.

Alignment of Course Outcomes with Learning and Assessment Methods

Number	Learning Outcomes	Learning Method*	Assessment Method**
Knowledge			
K1	Define and give examples of groups.	Lecture	Exam
K2	Understand subgroups and test them.	Lecture	Quiz
K3	Recognize the cyclic groups.	Lecture	Exam
K4	Describe the cosets and their elements	Lecture	Exam
K5	Understand the permutation groups and the dihedral groups.	Lecture	Exam
K6	Understand the isomorphism theorems of groups and apply them.	Lecture	Exam
K7	Understand the factor groups and calculate them.	Lecture	Exam
Skills			
S1	Finding examples for theorems.	Lecture	Assignment
S2	Reading and writing mathematical proofs.	Problem-Solving	Quiz
S3	Extend the concepts of mathematics to abstract notions.	Lecture	Quiz
Competencies			
C1	Gaining knowledge and experience in working with many pure mathematical problems.	Discussion	Assignment
C2	Working independently and managing time wisely.	Discussion	Assignment

* Includes: Lecture, flipped Class, project-based learning, problem-solving-based learning, collaborative learning

** Includes quizzes, in-class and out-of-class assignments, presentations, reports, videotaped assignments, and group or individual projects.

Course Policies

Policy	Policy Requirements
Passing Grade	The minimum passing grade for the course is (50%) and the minimum final mark recorded on the transcript is (35%).

Missing Exams	<ul style="list-style-type: none"> Missing an exam without a valid excuse will result in a zero grade to be assigned to the exam or assessment. A Student who misses an exam or scheduled assessment, for a legitimate reason, must submit an official written excuse within a week from an exam or assessment due date. A student who has an excuse for missing a final exam should submit the excuse to the dean within three days of the missed exam date.
Attendance	The student is not allowed to be absent more than (15%) of the total hours prescribed for the course, which equates to six lecture days (M, W) and six lectures (S, T). If the student misses more than (15%) of the total hours prescribed for the course without a satisfactory excuse accepted by the dean of the faculty, s/he will be prohibited from taking the final exam, and the grade in that course is considered (zero), but if the absence is due to illness or a compulsive excuse accepted by the dean of the college, then withdrawal grade will be recorded.
Academic Honesty	Philadelphia University pays special attention to the issue of academic integrity, and the penalties stipulated in the university's instructions are applied to those who are proven to have committed an act that violates academic integrity, such as: cheating, plagiarism (academic theft), collusion, and violating intellectual property rights.

Program Learning Outcomes to be Assessed in this Course

Number	Learning Outcome	Course Title	Assessment Method	Target Performance level
K_p1	Understand the main concepts of groups and subgroups and identify different types of them.	Abstract Algebra 1	Quizzes + Exams	75% of the students have a degree above 8/10
K_p2	Use Isomorphisms theorems to find and classify different groups.	Abstract Algebra 1	Quizzes + Exams	65% of the students have a degree above 7/10
S_p1	Write Abelian and Non-Abelian groups that satisfy the theorem conditions	Abstract Algebra 1	Assignment + Exams + Quizzes	100% of the students have a degree above 8/10

Description of Program Learning Outcome Assessment Method

Number	Detailed Description of Assessment
K_p1	Short quizzes mainly (2) with 10 points each
K_p2	Short quizzes mainly (2) with 10 points each
S_p1	Assignment with 10 points

Assessment Rubric of the Program Learning Outcome

Construct during the course.