Philadelphia University	PHILADELPHIA UNIVERSITY THE WAY TO THE FUTURE	**Approval date:**
Faculty of Science		**Issue:**
Department of Math		**Credit hours: 3**
Academic year 2025/2026	**Course Syllabus**	**Bachelor**

Course information

Course#	Course title	Prerequisite
0250262	**Modern Euclidean Geometry 1**	**Set Theory**

Course type			Class time	Room #
☐ University Requirement	☐ Faculty Requirement		SM 11:15-12:30	6719
☒ Major Requirement	☐ Elective	☒ Compulsory		
Degree / NQF Level	☐ Diploma degree (6)	☒ Bachelor degree (7)		

Instructor Information

Name	Office No.	Phone No.	Office Hours	E-mail
Ahmad Hamdan	819	2341	SM 09:45 – 11:00 ST 09:45 – 11:00	ahamdan@philadelphia.edu.jo

Course Delivery Method

Course Delivery Method			
☒ **Physical**	☐ **Online**	☐ **Blended**	
Learning Model			
Precentage	**Synchronous**	**Asynchronous**	**Physical**
	0%	**0%**	**100%**

Course Description

This course presents, from a modern point of view, Books I, II, III, and VI, as well as parts of Books IV, XI, XII, and XIII of Euclid's Elements. These include thorough treatments of the geometry of the triangle, the geometry of the circle, and the theory of Platonic figures.

Course Learning Outcomes

Number	Outcomes	Corresponding Program outcomes *
Knowledge		
K1	Understand the basic concepts of congruence, similarity of triangles, and study the most remarkable theorems mentioned in Euclid's Elements, ordinary and constructible, in Euclidean geometry; Neutral and non-Neutral geometries.	**K_p1**
K2	Study the theorems of Euclidean geometry that were discovered after Euclid, such as the theorems of Ptolemy, Heron, Brahmagupta, Stewart, Euler, and others.	**K_p1**
K3	The student should be able to use the tools from logic and modern branches of mathematics as trigonometry and algebra, mastery of different methods of proofs.	**K_p2**
Skills		

S1	Students will apply construction and ordinary theorems to solve different problems in geometry.	**S_p1**
S2	The student should be able to use the geometry of triangles and circles in real-life problems.	**S_p2**
S3	The student should be able to use software (e.g., GeoGebra) to transform problems in triangles, circles, and Platonic solids visually as needed.	**S_p4**
Competencies		
C1	Students will develop the ability to communicate their mathematical reasoning and problem-solving processes effectively, both in writing and orally.	**C_p1**
C2	Students will develop the ability to communicate with their colleagues during the preparation of their presentations.	**C_p2**

* According to learning outcomes of the faculty of pharmacy.

Learning Resources

Course textbook	• Classical Geometry- Euclidean, Transformational, Inversive, and Projective. I. E. Leonard, J. E. Lewis, A. C. F. Liu, and G. W. Tokarsky, John Wiley & Sons, Inc. 1st 2014, • Euclidean and Non-Euclidean Geometries – Part A (Informal Lecture Notes), Mowaffaq Hajja, 1st ed., 2011.
Supporting References	• Geometry, from Euclid to Knots, S. Stahl, Prentice Hall, 1st 2003. • Introduction to Geometry, H. S. M. Coxeter, John Wiley & Sons, Inc. 2nd ed. 1969. • Geometry for College Students, I. M. Isaacs, American Mathematical Society, 1st ed. 2001.
Supporting websites	• GeoGebra: https://www.geogebra.org/ • https://mathcs.clarku.edu/~djoyce/java/elements/
Teaching Environment	☒**Classroom** ☐ **laboratory** ☐**Learning platform** ☐**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. Mathematics Before Euclid	Lecture		Course Syllabus
2	Euclid's Proof of the Pythagorean Theorems, and Content and Axiomatic Structure of Euclid's *Elements*	Lecture		Euclid's Book I
3	Euclid's Book I (a): The Neutral Construction Theorems	Lecture		Euclid's Book I (a)
4	Euclid's Book I (a): The Neutral Ordinary Theorems	Lecture	Quiz	Euclid's Book I (a)
5	Euclid's Book I (b): The Non-Neutral Theorems	Lecture		Book I (b)
6	Euclid's Book II: Law of Cosines	Lecture		Euclid's Book II
7	Euclid's Book II: Theorems of Apollonius and Stewart	Lecture	Quiz	Book XIV
8	Euclid's Book VI: Similarity	Lecture	Midterm	Euclid's Book VI

9	Euclid's Book VI: Law of Sines, and Heron's Formula	Lecture		Book VI
10	Euclid's Book III: The Circle	Lecture		Euclid's Book III
11	Ptolemy's Theorem, Brahmagupta's Formula	Lecture	Quiz	*Almagest*
12	Euclid's Book V: Constructability of Regular Polygons, and the Modern Theory of Euclidean Constructability	Lecture		Euclid's Book IV
13	Platonic and Archimedean Solids	Lecture		Euclid's Book XIII
14	Platonic and Archimedean Solids	Lecture		Book XIII
15	Euler's $V - E + F$ Formula	Lecture	Quiz	
16	**Final Exam**			

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

Course Contributing to Learner Skill Development

Using Technology
• Students will use mathematical software (e.g., GeoGebra) to transform problems related to triangles, circles, and Platonic solids into visual problems, enhancing their programming and analytical skills for academic and practical applications.
Communication Skills
• Group projects and discussions foster collaboration, communication, and teamwork skills
Application of Concepts Learnt
• Students apply geometric concepts to real-world problems, strengthening their problem-solving skills.

Assessment Methods and Grade Distribution

Assessment Methods	Grade Weight	Assessment Time (Week No.)	Link to Course Outcomes
Midterm Exam	**30%**	**8**	**K1, K3, S1**
Various Assessments *	**30%**	**Continuous**	**All course outcomes**
Final Exam	**40%**	**16**	**K1, K2, K3, S1, S2**
Total	**100%**		

* Includes: quiz, in class and out of class assignment, presentations, reports, videotaped assignment, group or individual projects.

Alignment of Course Outcomes with Learning and Assessment Methods

Number	Learning Outcomes	Learning Method*	Assessment Method**
Knowledge			
K1	Understand the basic concepts of congruence, similarity of triangles, and study the most remarkable theorems mentioned in Euclid's Elements, ordinary and constructible, in Euclidean geometry; Neutral and non-Neutral geometries.	Lecture	**Exam Quiz Homework**
K2	Study the theorems of Euclidean geometry that were discovered after Euclid, such as the theorems of Ptolemy, Heron, Brahmagupta, Stewart, Euler, and others.	Lecture	=

K3	The student should be able to use the tools from logic and modern branches of mathematics as trigonometry and algebra, mastery of different methods of proofs.	Lecture	=
Skills			
S1	Students will apply construction and ordinary theorems to solve different problems in geometry.	Lecture	=
S2	The student should be able to use the geometry of triangles and circles in real-life problems.	Lecture	=
S3	The student should be able to use software (e.g., GeoGebra) to transform problems in triangles, circles, and Platonic solids visually as needed.	Collaborative learning	=
Competencies			
C1	Students will develop the ability to communicate their mathematical reasoning and problem-solving processes effectively, both in writing and orally.	Collaborative learning	**Homework**
C2	Students will develop the ability to communicate with their colleagues during the preparation of their presentations.	Collaborative learning	**Presentation**

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

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

Course Polices

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	• 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 of the 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.