

COURSE DESCRIPTIONS

Faculty	Science and Information Technology				
Department	Mathematics	NQF level	6		
Course Title	Euclidean and Non-Euclidean Geometry	Code	505261	Prerequisite	505102
Credit Hours	3	Theory	3	Practical	0
Course Leader	Osama Ala'yed	email	alayedo@Jadara.edu.jo		
Lecturers	Osama Ala'yed	emails	alayedo@Jadara.edu.jo		
Lecture time	13:00-14:30 Sun-Tues	Classroom	D403		
Semester	First Semester	Production	2012	Updated	2020

Short Description

Introduction to Euclidean Geometry. Postulates, congruency, similarity of triangles. Introduction to regular polygons, Circles, Locus, Analytic Geometry and transformations in the plane, Introduction to non-Euclidean Geometry.

Course Objectives

Upon successful completion of the course, the student will be able to:

- 1) recognize undefined geometric objects, like point and line, and define geometric objects like segment, ray, and circle;
- 2) use different criteria of congruency to determine congruent sides or angles in different triangles;
- 3) use properties of arcs in circles to deduce the measure of angles inscribed in circles, or construct tangent to circles;
- 4) use Euclid's fifth postulate to deduce the measure of angles between parallel lines;
- 5) recognize when two triangles are similar, and use this to prove theorems like Pythagora's Theorem, or to compute the length of segments in a given triangle;

Learning Outcomes

A. Knowledge - Theoretical Understanding

a1. Demonstrate the basic concepts and theories of Euclidean and non- Euclidean Geometry.

B. Knowledge - Practical Application

a2. Relate the sides and angles of similar and congruent figures and solve problems involving similar figures.

C. Skills - Generic Problem Solving and Analytical Skills
b1. Analyze the given data to solve problems using algebraic techniques such as solving linear equations and evaluating formulas.
D. Skills - Communication, ICT, and Numeracy
b2. Use theoretical knowledge in solving problems such as calculating area and perimeter of polygons and circles.
E. Competence: Autonomy, Responsibility, and Context
c1. Evaluate different types of transformations (Translations, Reflections, Rotations).
Teaching and Learning Methods
<ul style="list-style-type: none"> Lecture, Group work, and discussion
Assessment Methods
<ul style="list-style-type: none"> Lecture, Group work, and discussion Midterm exam, Final exam, Class Assignment and Project Observation of student contribution in team work and project presentation

Course Contents					
W	Hours	CLOs	Topics	Teaching & Learning Methods	Assessment Methods
1	1.5	a1	Historical background of geometry, Undefined terms of geometry	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
	1.5	a1	Lines segments, Circles	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
2	1.5	a1	Angles, Triangles	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
	1.5	a1	Pairs of angles, Proof by deductive reasoning	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
3	1.5	a1	Determining the hypothesis and conclusion	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
	1.5	a1	Introduction to congruence	Lectures, discussions, and solving selected problems	Participation question, quiz, homework

4	1.5	a1, b1	Isosceles and equilateral triangles	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
	1.5	a1, b1	Isosceles and equilateral triangles (Cont.)	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
5	1.5	a1, b1	Parallel lines	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
	1.5	a1, b1	Sum of the measure of angles of triangles	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
6	1.5	a1, b1	Parallelograms	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
	1.5	a1, b1	Medians and Midpoints	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
7	1.5	a1, b1	The circle: Circle relationships	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
	1.5	a1, b1	Ratios, Proportions	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
8	1.5	a1, b1	Proportional Segments, Similar Triangles	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
	1.5	a1, b1	Midterm Exam 30%		
9	1.5	a1, b1	Mean Proportionals in a Right Triangle ,	Lectures, discussions, and solving selected problems	Participation question, quiz, homework

	1.5	a1, b1	Pythagorean Theorem, Regular polygons,	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
10	1.5	a1, b1	Relationship of segments in regular polygons of 3, 4 and 6 sides	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
	1.5	a1, b1	Relationship of segments in regular polygons of 3, 4 and 6 sides (cont.), Area of regular polygon	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
11	3	a1, b1, c1	Ratios of segments and areas of regular polygons	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
12	1.5	a1, b1, c1	Areas of combination figures	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
	1.5	a1, b1, c1	Graphs	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
13	1.5	a1	Areas in analytic geometry	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
	1.5	b2	Proving theorems in analytic geometry.	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
14	1.5	b1, b2	Introduction to Transformations, Transformation Notation	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
	1.5	b1, b2	Translations, Reflections, Rotations	Lectures, discussions, and solving selected problems	Participation question, quiz, homework

15	1.5	a1	Non-Euclidean Geometry: The Foundations of Geometry, The Postulates of Euclidean Geometry	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
	1.5	a1	The Fifth Postulate Problem, Different Geometries	Lectures, discussions, and solving selected problems	Participation question, quiz, homework
16	Final Exam				

Infrastructure	
Textbook	Rich, B., & Thomas, C. (2018). Schaum's Outline of Geometry, McGraw-Hill Education.
References	Greenberg, <i>Euclidean & Non-Euclidean Geometry</i> , 3 rd edition. Freeman Publishers.
Required reading	
Electronic materials	
Other	

Course Assessment Plan							
Assessment Method		Grade	CLOs				
			a1	a2	b1	b2	c1
First(Midterm)		30	15	6	9	0	0
Second (if applicable)							
Final Exam		50	10	10	10	10	10
Coursework		20					
Coursework assessment methods	Assignments	4	0	0	0	4	0
	Case study						
	Discussion and interaction	10	2	2	2	2	2
	Group work activities						
	Labtests and assignments						
	Presentations						
	Quizzes	6	0	0	0	6	0
Total		100	27	18	21	22	12

Plagiarism

Plagiarism is claiming that someone else's work is your own. The department has a strict policy regarding plagiarism and, if plagiarism is indeed discovered, this policy will be applied. Note that punishments apply also to anyone assisting another to commit plagiarism (for example by knowingly allowing someone to copy your code).

Plagiarism is different from group work in which a number of individuals share ideas on how to carry out the coursework. You are strongly encouraged to work in small groups, and you will certainly not be penalized for doing so. This means that you may work together on the program. What is important is that you have a full understanding of all aspects of the completed program. In order to allow proper assessment that this is indeed the case, you must adhere strictly to the course work requirements as outlined above and detailed in the coursework problem description. These requirements are in place to encourage individual understanding, facilitate individual assessment, and deter plagiarism.

