Course Specification
(Bachelor)

Course Title:	**Euclidean and Analytic Geometry**
Course Code:	**MAT 1381**
Program:	**Bachelor of Science in Applied Mathematics**
Department:	**Mathematics and Statistics**
College:	**Science**
Institution:	**Imam Mohammad Ibn Saud Islamic University**
Version:	**2024 – V1**
Last Revision Date:	**08/10/2024**

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours:					
3 (2 Lectures, 0 Lab, 2 Tutorial)					
2. Course type					
A.	☐University	☐ College	☒program	☐Track	☒ Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered:					
Level 6 / Year 3 or Level 7 / Year 4					
4. Course general Description:					
This course, Foundations of Euclidean Geometry and Analytic Geometry, offers a comprehensive introduction to key concepts in both Euclidean and analytic geometry. Students will explore fundamental principles of plane geometry, including circles, polygons, area calculations, and classical theorems, while also examining transformations and properties in two and three dimensions. The course emphasizes the coordinate systems used in analytic geometry, covering lines, conic sections, and spatial transformations. Through lectures and practical applications, students will develop essential skills in geometric reasoning and analytical thinking, providing a solid foundation for further study in mathematics.					
5. Pre-requirements for this course (if any):					
None					
6. Co-requisites for this course (if any):					
None					
7. Course Main Objective(s):					
The main goal is to equip students with a solid understanding of fundamental geometric concepts and their applications, fostering critical thinking and problem-solving skills. By integrating Euclidean and analytic geometry, students will learn to analyze and visualize geometric relationships, apply mathematical reasoning to real-world problems, and prepare for advanced studies in mathematics and related disciplines.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	0	0%
3	Hybrid	**0**	**0%**

No	Mode of Instruction	Contact Hours	Percentage
	• Traditional classroom • E-learning		
4	Distance learning	0	0%

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	0
3.	**Field**	0
4.	**Tutorial**	30
5.	**Others (specify)**	0
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

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Code	*Course Learning Outcomes*	*Code of CLOs aligned with program*	*Teaching Strategies*	*Assessment Methods*
1.0	**Knowledge and understanding**			
1.1	**describe fundamental concepts of Euclidean geometry.**	**K1**	**Lectures, class discussions, and interactive activities.**	**Quizzes, written exams, and concept maps.**
1.2	**Explain principles of analytic geometry, including lines and conic sections.**	**K1, K2**	**Visual aids, group work, and problem-solving sessions.**	**Written assignments and practical exercises.**
	Identify relationships between geometric figures and their properties.	**K1, K2**	**Case studies and hands-on activities.**	**Project work and presentations.**
2.0	**Skills**			

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
2.1	Apply techniques of Euclidean Geometry to prove similarity between figures.	S1	Lectures, problem-solving, Classroom discussions	Direct: Regular Exams, Lab Assignments, Practical exam
2.2	Report cartesian equations of points, lines, and planes.	S2	Lecturing, Interactive learning.	Direct: Assignments, Practical exam
2.3	Demonstrate the connection between Euclidean and Analytic Geometries.	S3	Lecturing, Interactive learning.	Direct: Assignments, Practical exam
2.4	Draw graphs of main figures in cartesian coordinates.	S4	Lectures, problem-solving, Classroom discussions.	Direct: Regular Exams, Lab Assignments, Practical exam
3.0	**Values, autonomy, and responsibility**			
3.1	Work individually.	V1	Lectures, problem-solving, Classroom discussions	Direct: Regular Exams, Lab Assignments, Practical exam
3.2	Develop personal values and attributes such as honesty, empathy and respect for others.	V2	Lectures, problem-solving, Classroom discussions	Direct: Regular Exams, Lab Assignments, Practical exam

C. Course Content

No	List of Topics	Contact Hours
1.	**Fundamentals of Euclidean Geometry** Basic notions of the Euclidean Geometry of the plane; Circles and polygons; Areas, Thales, Pythagoras, Pappus; The power of the circle Classical theorems in geometry.	15
2.	**Transformations and Measurements in Euclidean Geometry** Transformations of the plane; Circle measurement; Areas in the plane Symmetry and congruence; Lines and planes in space.	10
3.	**Analytic Geometry in Two Dimensions**	10

No	List of Topics	Contact Hours
	Coordinate system of two dimensions; Lines and circles; Conic sections: Parabola, ellipse, hyperbola; Transformations of axes; Curves in polar coordinates; Convex sets and intersections.	
4.	**Analytic Geometry in Three Dimensions** Coordinate system of three dimensions (Solid Analytic Geometry); Lines and planes in space; Surfaces and their properties; Transformations of axes in three dimensions; Curves in polar coordinates; Convex sets and intersections in three dimensions.	**15**
5.	**Areas and Volumes in Euclidean Space** Areas in space; Volumes of solids; Surface area calculations; Relationships between area and volume.	**10**
	Total	**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	**Homeworks, Mini projects**	**During the semester**	**10%**
2.	**First Midterm**	**Week 5-6**	**25%**
3.	**Second Midterm**	**Week 10-11**	**25%**
4.	**Final Exam**	**Week 15-16**	**40%**

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	***Lectures on Euclidean Geometry, Volumes 1 and 2***, by Paris Pamfilos, Springer, Cham, Switzerland, 2024, ISBN-13: 978-3-031-48905-1. ***Analytic Geometry***, by Douglas F. Riddle, Cengage Learning, 1995, ISBN-13: 978-0534948542.
Supportive References	***Essential Geometry with Analytic Geometry: A Self-Teaching Guide,*** by Tim Hill, , 2020, ISBN-13: 979-8624376793. ***Mastering Euclidean Geometry: An Intermediate Guide,*** by Evangelos Goudentzikis, 2024. ***Geometry,*** by Charles Bass, Hall and Kennedy Johnson, Prentice Hall, 2006, ISBN-13: 978-0131314320.
Electronic Materials	**None**
Other Learning Materials	**None**

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	▪ Each classroom should be equipped with a whiteboard and a projector. ▪ Laboratories should be equipped with computers and an internet connection.
Technology equipment (projector, smart board, software)	The rooms should be equipped with data show and Smart Board
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Each student will complete two evaluation forms during the semester and at the end of the course.
Effectiveness of Students' assessment	Instructor	At the end of each semester, the course instructor should complete the course report, which includes a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.
Quality of learning resources	Students	Each student will complete two evaluation forms during the semester and at the end of the course.
The extent to which CLOs have been achieved	Instructor	At the end of each semester, the course instructor should complete the course report, which includes a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.
Other	None	

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	MATHEMATICS AND STATISTICS DEPARTMENT COUNCIL
REFERENCE NO.	8/1446
DATE	05/04/1446 (08/10/2024)