هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد NCAAA T4 2020

Course Specifications

Course Title:	**Analytic Geometry**
Course Code:	**241 Math**
Program:	**B. Sc. Mathematics**
Department:	**Mathematics**
College:	**Science**
Institution:	**Jazan University**

Table of Contents

A. Course Identification

1. Credit hours: 03
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: Level 3/Year 2
4. Pre-requisites for this course (if any)**: 212 Math**
5. Co-requisites for this course (if any)**: None**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	45	100%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	42
2	**Laboratory/Studio**	
3	**Tutorial**	3
4	**Others** (specify)	
	Total	45

B. Course Objectives and Learning Outcomes

1. Course Description

This course is designed to provide students with

- **Basic Concepts** Identification of conic sections through its equations, conversion of the general equation of conic section to the standard formula.
- **Cartesian and polar coordinate systems** and relations of the conversion from one to other, types of equations of lines, condition for collinearity and concurrency.
- **Second degree** equation of pair of straight lines.
- **Conic sections** represented by the general equation of second degree in two variables (a pair of straight line, circle, a parabola, ellipse and hyperbola).
- **The circle** Tangent and normal to circles, orthogonal circles, combine equation of a Circle and a line.
- **Parabola**, ellipse and hyperbola, their general and standard equation and Sketching.
- **3D Geometry** and coordinate conversion between them, direction cosines and direction ratios, plane in the space and various forms of plane, bisecting planes in the space, system of planes.

2. Course Main Objective

After finishing the course, the student is expected to be familiar with the following:

- Application of analytic geometry for solving different problems.

- Second degree equations for pair of straight lines and circle.
- Conic sections and their deep knowledge with coordinate systems.
- Some software used in drawing figures of different conic sections.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Distinguish mathematical concepts relevant to Straight lines and their different forms with Cartesian and polar coordinate systems.	K1
1.2	Identify background science, features and structure of mathematical problem in pair of straight lines and circles with angle and their bisectors, Conic sections and 3D geometries.	K2
1.3	Explain notations and concepts required for the solution of Mathematical problem in Parabola, ellipse and hyperbola with centered at origin and at other points. Line and plane equations in space.	K3
2	**Skills :**	
2.1	Apply aspects relevant to different forms of equations of lines, pair of straight lines, circles, tangent and normal to the circles, conic sections and plane in a space.	S1
2.2	Compute numerical quantities for various parameters to approximate the solution in draw figures and explain their equations of pair of lines, types of circles their properties, parabola, ellipse and hyperbola, plane and line in a space.	S2
2.3	Apply various mathematical rules, techniques and theorems in Application on drawing and classifying different figures, equations and their related line and angle bisector properties.	S3
2.4	Solve mathematical problem using critical thinking in lines, pair of lines, circles, conics, 3 dimensional concepts.	S4
3	**Values:**	
3.1	Cultivate a mathematical attitude and nurture the interest.	V1
3.2	Realize the importance of responsibilities through different modes of practice, competition and related activities.	V2
3.3	Inculcating values and ethics in thought, expression and deed.	V3

C. Course Content

No	List of Topics	Contact Hours
1	Basics concepts related to different forms of equations of lines	6
2	Pair of straight lines their angles and bisectors of angles	6
3	Circles and their types with tangent and normal concepts on them	6
4	Conic Section basics and their rough sketches	9
5	Parabola, ellipse and hyperbola with centered at origin and other points	9
6	Three dimensional geometry their different concepts and coordinate system related to them	9
Total		45

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	Distinguish mathematical concepts relevant to Straight lines and their different forms with Cartesian and polar coordinate systems.	Lectures, Web based work, Classroom discussions.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
1.2	Identify background science, features and structure of mathematical problem in pair of straight lines and circles with angle and their bisectors, Conic sections and 3D geometries.	Lectures, Web based work, Classroom discussions.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
1.3	Explain notations and concepts required for the solution of Mathematical problem in Parabola, ellipse and hyperbola with centered at origin and at other points. Line and plane equations in space.	Lectures, Web based work, Classroom discussions.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
2.0	**Skills**		
2.1	Apply aspects relevant to different forms of equations of lines, pair of straight lines, circles, tangent and normal to the circles, conic sections and plane in a space.	Lectures, Web based work, Classroom discussions.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
2.2	Compute numerical quantities for various parameters to approximate the solution in draw figures and explain their equations of pair of lines, types of circles their properties, parabola, ellipse and hyperbola, plane and line in a space.	Lectures, Web based work, Classroom discussions.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
2.3	Apply various mathematical rules, techniques and theorems in Application on drawing and classifying different figures, equations and their related line and angle bisector properties.	Lectures, Web based work, Classroom discussions.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
2.4	Solve mathematical problem using critical thinking in lines, pair of lines, circles, conics, 3 dimensional concepts.	Lectures, Web based work, Classroom discussions.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
3.0	**Values**		
3.1	Cultivate a mathematical attitude and nurture the interest.	Group work, problem solving, web based work	Assignments
3.2	Realize the importance of	Group work, problem	Assignments

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	responsibilities through different modes of practice, competition and related activities.	solving, web based work	
3.3	Inculcating values and ethics in thought, expression and deed.	Group work, problem solving, web based work	Assignments

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homework	3	5%
2	First exam.	6	20%
3	Second exam.	12	20%
4	Homework	14	5%
5	Final exam.	16	50%

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

Each group of students assigned to a teaching staff that will be available for help and academic guidance office hours at specific hours on daily basis. At least be available 8 hours per week.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	*Analytic Geometry 6th Edition, Brooks Douglas R. Riddle, Col. Publ., Co. 1995.*
Essential References Materials	2D and 3D geometry related materials and applications based on them.
Electronic Materials	Websites dedicated to Analytic Geometry available on the internet
Other Learning Materials	**- 2D and 3D** Figure drawing packages - Power point presentations and other hand outs posted on the course website or on Blackboard.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms, Computer Lab.
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show; Smart Board; Pics, Drawing Software
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	Students, Peer and program leader	Indirect (Course Evaluation Survey)- Indirect peer evaluation
Assessment	Students, Program assessment committee	Direct/ Indirect
Extent of achievement of course learning outcomes	Instructor	Direct/Indirect
Quality of learning resources	Students, Faculty members	Indirect

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	**Board Of Mathematics Department**
Reference No.	**12th Meeting Of The Board Of Mathematics Department 1441-1442**
Date	**14/6/1442 A. H.; 27/1/2021 A. D.**