



Course Specification

— (Bachelor)

Course Title: **Analytic Geometry**

Course Code: **241 Math**

Program: **B. Sc. Mathematics**

Department: **Mathematics**

College: **Science**

Institution: **Jazan University**

Version: **2023**

Last Revision Date: 2/2023

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A. General information about the course:

1. Course Identification

1. Credit hours: 3 h

2. Course type

A. University ☐ College ☐ Department ☒ Track ☐ Others ☐
B. Required ☒ Elective ☐

3. Level/year at which this course is offered: Level 4/Year 2

4. Course general 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

5. Pre-requirements for this course (if any): Non

6. Co- requirements for this course (if any): Non

7. Course Main Objective(s)

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

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	33	100%
2.	E-learning		
3.	Hybrid <ul style="list-style-type: none"> • Traditional classroom 		



No	Mode of Instruction	Contact Hours	Percentage
	• E-learning		
4.	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	3
5.	Others (specify)	
	Total	33

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

Code	Course Learning Outcomes	Code of CLOs aligned with program	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.	K1	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.	K2	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.	K3	Lectures, Web based work, Classroom discussions.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
2.0	Skills			





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
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	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.	S2	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.	S3	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.	S4	Lectures, Web based work, Classroom discussions.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
3.0	Values, autonomy, and responsibility			
3.1	Cultivate a mathematical attitude and nurture the interest.	V1	Group work, problem solving, web based work	Assignments, Discussion
3.2	Realize the importance of responsibilities through different modes of practice, competition and related activities.	V2	Group work, problem solving, web based work	Assignments, Discussion
3.3	Inculcating values and ethics in thought, expression and deed.	V3	Group work, problem solving, web based work	Assignments, Discussion



C. Course Content

No	List of Topics	Contact Hours
1.	<i>Basics concepts related to different forms of equations of lines</i>	6
2.	<i>Pair of straight lines their angles and bisectors of angles</i>	6
3	<i>Circles and their types with tangent and normal concepts on them</i>	6
4	<i>Conic Section basics and their rough sketches</i>	6
5	<i>Parabola, ellipse and hyperbola with centered at origin and other points</i>	6
6	<i>Three dimensional geometry their different concepts and coordinate system related to them</i>	3
Total		33

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Homework	3	5%
2.	First exam.	6	20%
3.	Second exam.	10	20%
4	Homework	11	5%
5	Final exam.	12	50%

*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	<i>Analytic Geometry 6th Edition, Brooks Douglas R. Riddle, Col. Publ., Co. 1995.</i>
Supportive References	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. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms, Computer Lab.
Technology equipment (projector, smart board, software)	Data show; Smart Board; Pics, Drawing Software



Items	Resources
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students, Peer and program leader	Indirect (Course Evaluation Survey)- Indirect peer evaluation
Effectiveness of students assessment	Students, Program assessment committee	Direct/ Indirect
Quality of learning resources	Students, Faculty members	Indirect
The extent to which CLOs have been achieved	Instructor	Direct/Indirect
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Board Of Mathematics Department
REFERENCE NO.	2306
DATE	07/09/1444 A. H.; 29/03/2023 A. D.

