



## Course Specifications

<b>Course Title:</b>	Introduction to Geometry	
<b>Course Code:</b>	MTH 271	
<b>Program:</b>	B.Sc in Mathematics	
<b>Department:</b>	Mathematics Department	
<b>College:</b>	College of Science	
<b>Institution:</b>	Majmaah University	

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## A. Course Identification

<b>1. Credit hours:</b> 3(2+1)
<b>2. Course type</b>
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
<b>3. Level/year at which this course is offered:</b> Third Level/Second year
<b>4. Pre-requisites for this course (if any):</b> PMTH 127
<b>5. Co-requisites for this course (if any):</b> N/A

### 6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	32	70 %
2	Blended	9	20 %
3	E-learning	4	10 %
4	Correspondence		
5	Other		

### 7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	25
2	Laboratory/Studio	0
3	Tutorial	15
4	Others (specify) Seminars and presentations	15
	<b>Total</b>	

## B. Course Objectives and Learning Outcomes

### 1. Course Description

This course covers the concepts of plane and solid analytic geometry calculus. So the topics to will be covered are:

- Plane Analytic Geometry: The Cartesian and polar coordinates – The straight line in its different forms – Equation of two straight lines – The circle – Transformation and rotation of axes – Conic sections in general form.

- Solid Analytic Geometry: Rectangular, spherical and cylindrical coordinates – The distance between two points- Direction cosines of a line – Angle between two lines – The plane in space – The line in space – Quadric surfaces (Cylinder- Cone – Sphere – Ellipsoid – Hyperboloid of one sheet – Hyperboloid of two sheets – Elliptic paraboloid – Hyperbolic paraboloid).

## 2. Course Main Objective

This course aims to study the analytic geometry on the plane and solid based on coordinates in plane and space. As consequence there are many applications such as:

- the different form equation of line, circle, conic sections, plane and straight line in space.
- quadric surfaces (cylinder- cone – sphere – ellipsoid – hyperboloid of one sheet – hyperboloid of two sheets – elliptic paraboloid – hyperbolic paraboloid).

## 3. Course Learning Outcomes

CLOs		Aligned PLOs
1	<b>Knowledge and Understanding</b>	
1.1	<u>Recognize</u> Straight Line, Locus, Conic Sections and <u>write</u> the geometrical structure generated by conics.	K1
1.2	<u>Define</u> the Cartesian and polar coordinates, the circle, conic sections, rectangular coordinates, the line and the plane in space.	K1
1.3	<u>Reproduce</u> and <u>State</u> Locus, Circle, Parabola, ellipse and <u>named</u> Circle, parabola, ellipse etc. – Conic Sections.	K3
1.4	<u>Recognize</u> the quadric surfaces such as cylinder, cone, sphere, ellipsoid, hyperboloid of one sheet, hyperboloid of two sheets, elliptic paraboloid and hyperbolic paraboloid.	K3
2	<b>Skills :</b>	
2.1	The students will be able to analyze the general knowledge of geometry.	C2
2.2	The students will explain and interpret a general knowledge of analytic geometry such as graphing conics section in two and three dimensions and finding their properties	C2
3	<b>Values:</b>	
3.1		
3.2		
3.3		
3...		

## C. Course Content

No	List of Topics	Contact Hours
1	The Cartesian and polar coordinates – The straight line in its different forms – Equation of two straight lines	6
2	Transformation and rotation of axes– The circle – Conic sections in general form.	6

3	Rectangular, spherical and cylindrical coordinates – The distance between two points- Direction cosines of a line – Angle between two lines.	9
4	The plane in space – The line in space	9
5	Cylinder - Cone – Sphere	9
6	Ellipsoid – Hyperboloid of one sheet – Hyperboloid of two sheets – Elliptic paraboloid – Hyperbolic paraboloid	6
<b>Total</b>		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
<b>1.0</b>	<b>Knowledge and Understanding</b>		
1.1	<ul style="list-style-type: none"> <li>- Having the knowledge of different coordinates in plane and space.</li> <li>- Identify the different form of equation of conic sections and their properties.</li> <li>- Knowledge of plane and straight line in space.</li> <li>- Knowledge of quadric surfaces (Cylinder- Cone – Sphere – Ellipsoid – Hyperboloid of one sheet – Hyperboloid of two sheets – Elliptic paraboloid – Hyperbolic paraboloid).</li> </ul>	<p><b>Direct teaching:</b> Inquiry-based instruction PowerPoints and discussions</p> <p><b>Aimed teaching:</b> Discovery and oral questions</p>	<ul style="list-style-type: none"> <li>• Homework</li> <li>• Quiz</li> <li>• Midterms</li> <li>• Final Exams</li> <li>• E-exam</li> <li>• Oral Exam</li> </ul>
1.2			
...			
<b>2.0</b>	<b>Skills</b>		
2.1	The students will be able to write geometrical problems in mathematical forms.	<p><b>Direct teaching:</b> Lectures Differentiation</p> <p><b>Aimed teaching:</b> Discovery and oral questions</p> <p><b>Indirect teaching:</b> Peer Learning</p>	<ul style="list-style-type: none"> <li>• Homework</li> <li>• Quiz</li> <li>• Midterms</li> <li>• Final Exams</li> </ul>
2.2	The students will explain and interpret a general knowledge of geometry such as graphing of conic sections and finding the different form of equations of line and plane.	<p><b>Direct teaching:</b> Lectures</p> <p><b>Aimed teaching:</b> Discovery and oral questions</p>	<ul style="list-style-type: none"> <li>• Homework</li> <li>• Quiz</li> <li>• Midterms</li> <li>• Final Exams</li> </ul>

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
...		<b>Indirect teaching:</b> Peer Learning	
<b>3.0</b>	<b>Values</b>		
3.1	The students should be able to formulate and solve mathematical problems such as: - finding the different types of equations of a conics sections - the study of point, line and plane in three dimensional	<b>Direct teaching:</b> Lectures <b>Aimed teaching:</b> Discovery and oral questions <b>Indirect teaching:</b> Cooperative Learning	<ul style="list-style-type: none"> <li>• Homework</li> <li>• Quiz</li> <li>• Midterms</li> <li>• Final Exams</li> </ul>
3.2			
...			

## 2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	1	Midterm 1	7th week
2	3	Homework	Through of semester
3	4	Quizzes	Through of semester
4	5	Electronic Test	13th week
5	6	Presentation	Through of semester
6	7	Final exam	End of semester
7	1	Midterm 1	7th week
8			

\*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:**

- 1- 4-office hours per week in the lecturer schedule.
  - Sunday 13-15.
  - Tuesday 13-15.
- 2- The contact with students by e-mail and website.
- 3- activation of the virtual classrooms and academic guidance via Black Board LMS.

## F. Learning Resources and Facilities

### 1. Learning Resources

<b>Required Textbooks</b>	<ul style="list-style-type: none"> <li>• Artzy Rafael, Linear Geometry, Dover, 2008</li> <li>• Swokowski, Calculus with Analytic Geometry, 6<sup>th</sup> edition.</li> </ul>
<b>Essential References Materials</b>	<ol style="list-style-type: none"> <li>1. Earl W. Swokowski, Algebra and Trigonometry with Analytic Geometry, Cengage Learning, 2011.</li> <li>2. George B. Thomas and Ross L. Finney: Calculus and Analytic Geometry (9<sup>th</sup> Edition), 1995</li> </ol>
<b>Electronic Materials</b>	<p><a href="http://www.sciencedirect.com/">http://www.sciencedirect.com/</a>  <a href="http://www.siam.org//">http://www.siam.org//</a></p>
<b>Other Learning Materials</b>	

### 2. Facilities Required

Item	Resources
<b>Accommodation</b> (Classrooms, laboratories, demonstration rooms/labs, etc.)	- Classroom with capacity of 30-students. - Computer Lab of Mathematics Department
<b>Technology Resources</b> (AV, data show, Smart Board, software, etc.)	Mathematical software packages like MATHEMATICA
<b>Other Resources</b> (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	<p><a href="https://www.intmath.com/plane-analytic-geometry/intro.php">https://www.intmath.com/plane-analytic-geometry/intro.php</a>  <a href="http://mathworld.wolfram.com/topics/Geometry.html">http://mathworld.wolfram.com/topics/Geometry.html</a></p>

## G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students/ internal committee	Direct (Students evaluation electronically organized by Deanship of registration and admission)/ Verification of students' papers
Extent of achievement of course learning outcomes	Staff members (Peer Reviewer)	Indirect (Frequent meetings consultation among the teaching staffs)

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Quality of learning resources.	Staff members (course coordinators)	Direct (Meeting between course coordinators and the tutors)

**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

<b>Council / Committee</b>	Mathematics Department
<b>Reference No.</b>	27
<b>Date</b>	8/8/1442 H -21/3/2021 G

Head of Department

**Dr. Muqrin Almuqrin**


