



Course Specifications

Course Title:	Differential Geometry
Course Code:	MTH 473
Program:	Bachelor
Department:	Department of Mathematics
College:	College of Science,
Institution:	Al Majma'ah University, KSA

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A. Course Identification

1. Credit hours: 04
2. Course type
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"/>
3. Level/year at which this course is offered: Eight
4. Pre-requisites for this course (if any): Math 242
5. Co-requisites for this course (if any): -----

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60 %	
2	Blended	30 %	
3	E-learning	10 %	
4	Distance learning		
5	Other		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	42
2	Laboratory/Studio	12
3	Tutorial	6
4	Others (specify)	
	Total	

B. Course Objectives and Learning Outcomes

<p>1. Course Description Briefly describe the equation of curve, curve length, equation of osculating plane, curvature and torsion and their radius, Gaussian, main and principle curvature</p>
<p>2. Course Main Objective Students are expected to Improve their concepts about Tangent lines, Normal, Principal and Binormals, Curvature and Torsion, Circle of Curvature, Helices, Evolute and Involute, Geodesic Curvatures</p>

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	Knowledge and Understanding	

CLOs		Aligned PLOs
1.1	Deepen students' concepts	K1
1.2	Improve students understanding and awareness.	S3
1.3	Expand students' exposure to solve the problems	C2
1...		
2	Skills :	
2.1	Ability to think analytically and critically;	
2.2	Ability to understand and analyze the mathematical problems	
2.3	Students can complete assignments in due time;	
2...	Students can actively and critically participate in class activities;	
3	Values:	
3.1	Students can act responsibly and ethically in conducting their work;	
3.2	Students can communicate, negotiate and evaluate their strengths and weaknesses as team members.	
3.3		
3...		

C. Course Content

No	List of Topics	Contact Hours
1	Theory of curves in R^3 -Regular curves	
2	arc length and parametrization, Natural parametrization	
3	Serret-Frenet apparatus, Existence and uniqueness theorem for space curves	
4	Bertrand curves- Involutes and evolutives-Local theory of surfaces-Simple surfaces-Coordinate transformations-Tangent vectors & tangent spaces	
5	First and second fundamental forms, Normal and geodesic curvature	
...		
Total		

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	Theory of curves in R^3 -regular curves - Arc length Normal, Bi-normal unit vector Natural – Tangent parametrization.		
1.2	Curvature and Torsion - Serret-Frenet apparatus, Existence of uniqueness theorem for space curves.		
...	First and 2nd fundamental forms First and 2nd fundamental forms –Gaussian and Mean Curvature,-Equation and roots of principle curvature		
2.0	Skills		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.1	Outline the logical thinking and enable students to analyses the mathematical problems.		
2.2	Enable the students to create a mathematical problems and provide the best solution		
...			
3.0	Values		
3.1			
3.2			
...			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	The target of the learning outcomes is achieved, which indicates that the teaching strategy and the assessment tools are suitable in this course.		
2	The target of the learning outcomes is achieved, which indicates that the teaching strategy and the assessment tools are suitable in this course.		
3	The target of the learning outcomes is achieved, which indicates that the teaching strategy and the assessment tools are suitable in this course.		
4	The target of the learning outcomes is achieved, which indicates that the teaching strategy and the assessment tools are suitable in this course.		
5	The target of the learning outcomes is achieved, which indicates that the teaching strategy and the assessment tools are suitable in this course.		
6			
7			
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 :

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	<ul style="list-style-type: none"> • M.D. Carmo, Differential Geometry of Curves and Surfaces, Birkhauser, Boston, 1992. • M. M. Lipschutz, Schaum's Outline of Differential Geometry, McGraw-Hill, New York, 1969.
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Essential References Materials	<ul style="list-style-type: none"> M.D. Carmo, Differential Geometry of Curves and Surfaces, Birkhauser, Boston, 1992.
Electronic Materials	<ul style="list-style-type: none"> Google Laptop and Internet Connection in the classroom
Other Learning Materials	<ul style="list-style-type: none"> Find more and more website related to mathematical logic http://www.cmi.univ-mrs.fr/ http://www.arxiv.org/ http://www.lms.ac.uk/ http://www.ams.org/

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Lecture room with speakers and internet access.
Technology Resources (AV, data show, Smart Board, software, etc.)	Desktop or laptop with internet facility
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Data show to facilitate going over students' papers in class

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Weekly assignments		
Class quizez		
Class participarion		
Positive use of website		
Mid term exams		
Final exams		

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	
Reference No.	
Date	