



## Course Specifications

<b>Course Title:</b>	Differential Geometry
<b>Course Code:</b>	MATH 463
<b>Program:</b>	Bachelor of Science in Mathematics
<b>Department:</b>	Mathematics
<b>College:</b>	Science
<b>Institution:</b>	University of Tabuk

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<b>1</b>	<b>Knowledge and Understanding</b>	
1.1	Students will be able to recall concepts of local theories of curves and surfaces.	K1
1.2		
<b>2</b>	<b>Skills :</b>	
2.1	Students will be able to solve complex problems using the concept and techniques of differential geometry .	S3
2.2	Students will be able to apply differential geometry concepts to problems from various fields of science.	S3
2.3	Students will be able to communicate mathematical concepts effectively and clearly.	S5
<b>3</b>	<b>Values:</b>	
3.1	Students will be able to develop enhanced self-learning.	V1
3.2	Students will be able to work independently and in groups.	V2

### C. Course Content

No	List of Topics	Contact Hours
1	Curves, Arc length, Tangent vector, Curvature.	3 Hrs
2,3	Curvature , Principal Normal, and Bi-normal, Serret-Frenet Formulae	6Hrs
4	Torsion, Gauss Curvature	3Hrs
5	Normal section, Principal curvature.	3Hrs
6	<b>Mid-Exam#1</b>	
6	Theories of Curves	3Hrs
7	Spaces in R3 surfaces of revolution,	3Hrs
8,9	Fundamental forms, metric form, intrinsic properties	6Hrs
10	Second Fundamental form,	3Hrs
11	<b>Mid-Exam#2</b>	
11	Frenet frame, normal curvature	3Hrs
12	Gauss Curvature in detail	3Hrs
13	Principal curvature	3Hrs
14	Christoffel symbols	3Hrs
15	<b>Revision &amp; Final Exam</b>	3Hrs
<b>Total</b>		<b>45Hrs</b>

### 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	Students will be able to recall concepts of local theories of curves and surfaces.	Introducing new ideas through case study Lectures Class Discussions	Quizzes I II Midterm Exams Final Exams Homework assignments
<b>2.0</b>	<b>Skills</b>		



2.1	Students will be able to solve complex problems using the concept and techniques of differential geometry .	Lectures Class Discussions	Quizzes I II Midterm Exams Final Exams Homework assignments.
2.2	Students will be able to apply differential geometry concepts to problems from various fields of science.		
2.3	Students will be able to communicate mathematical concepts effectively and clearly.		
2.4			
<b>3.0</b>	<b>Values</b>		
3.1	Students will develop enhanced self-learning.	Lectures Class Discussions Group discussion	Quizzes Homework assignments Group work
3.2	Students will be able to work independently and in groups.		

## 2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Home works and Assignments and Quizzes	Weekly basis	10%
2	Mid Exam-I	6th week	25%
3	Mid Exam-II	11th week	25%
4	Final Exam	At end of the Semester	40%

\*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 :**

Six office hours per week in the lecturer schedule.

## F. Learning Resources and Facilities

### 1. Learning Resources

<b>Required Textbooks</b>	Andrew Pressley, Elementary Differential Geometry (Springer undergraduate mathematics series), Springer-Verlag London, □□□□□□
<b>Essential References Materials</b>	<ol style="list-style-type: none"> <li>1. M. Berger and B. Gostiaux, Differential Geometry: Manifolds, Curves, and Surfaces, Springer-Verlag New York Inc., 1988.</li> <li>2. Victor Andreevich Toponogov, Differential Geometry of Curves and Surfaces, (Birkhauser Boston, c/o Springer Science +Business Media Inc., 233 Spring Street, New York, NY 10013, USA).</li> </ol>
<b>Electronic Materials</b>	None



<b>Other Learning Materials</b>	None
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## 2. Facilities Required

Item	Resources
<b>Accommodation</b> (Classrooms, laboratories, demonstration rooms/labs, etc.)	1. Lecture room with maximum capacity of 30 students and equipped with White Board, Overhead projector and internet connection.  2. Library
<b>Technology Resources</b> (AV, data show, Smart Board, software, etc.)	Projectors
<b>Other Resources</b> (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None

## G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students	Direct and Indirect
Extent of achievement of course learning outcomes	Teachers	Direct
Quality of learning resources	Students	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

<b>Council / Committee</b>	Program and study plan committee
<b>Reference No.</b>	
<b>Date</b>	25/08/2021

