



Course Specification

— (Postgraduate)

Course Title: Differential Geometry
Course Code: 202617-3
Program: Master of Pure Mathematics
Department: Mathematics and Statistics
College: Science
Institution: Taif university
Version: 1
Last Revision Date: 20\5\2023



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A. General information about the course:

1. Course Identification:

1. Credit hours: (3)			
2. Course type			
A.	<input type="checkbox"/> University	<input type="checkbox"/> College	<input checked="" type="checkbox"/> Department <input type="checkbox"/> Track
B.	<input checked="" type="checkbox"/> Required		<input type="checkbox"/> Elective
3. Level/year at which this course is offered: Level 1/First Year			
4. Course general Description:			
<p>This course covers the following fundamentals of differential Geometry: Topological perquisites – Topological manifolds – Differential manifolds – Differential submanifolds – Tangent and co-Tangent spaces – Vector fields on manifolds – Covariant derivatives – Curvature tensors.</p>			
5. Pre-requirements for this course (if any):			
None.			
6. Pre-requirements for this course (if any):			
None.			
7. Course Main Objective(s):			
<ol style="list-style-type: none"> 1. Study topological perquisites 2. Study topological manifolds 3. Study differential manifolds 4. Study differential submanifolds 5. Study tangent and co-tangent spaces 6. Study vector fields on manifolds 7. Study covariant derivatives 8. Study curvature tensors 			

2. Teaching Mode: (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	√	100%
2	E-learning	-	-
3	Hybrid	-	-



No	Mode of Instruction	Contact Hours	Percentage
	<ul style="list-style-type: none"> Traditional classroom E-learning 		
4	Distance learning	-	-

3. Contact Hours: (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	
5.	Others (specify).....	
	Total	45

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	Recognize topological prerequisites and topological manifolds.	K1	<ul style="list-style-type: none"> Lectures 	<ul style="list-style-type: none"> Exams Assignments
1.2	Describe differential manifolds and differential submanifolds	K3	<ul style="list-style-type: none"> Lectures 	<ul style="list-style-type: none"> Exams Assignments
2.0	Skills			
2.1	Apply the recognitions of the differential manifolds and submanifolds to find covariant derivatives curvature tensors	S1	<ul style="list-style-type: none"> Lectures 	<ul style="list-style-type: none"> Exams Assignments
2.2	Demonstrate the tangent and co-tangent spaces and vector fields on manifolds	S5	<ul style="list-style-type: none"> Lectures 	<ul style="list-style-type: none"> Exams Assignments





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
3.0	Values, autonomy, and responsibility			
3.1	Participate effectively within groups and independently.	V1	<ul style="list-style-type: none"> Projects. 	Through the oral presentation of the projects
3.2	Give responsibility for learning importance and continuing personal and professional development.	V2	<ul style="list-style-type: none"> Projects. 	Through the oral presentation of the projects

C. Course Content:

No	List of Topics	Contact Hours
1	Topological prerequisites	3
2	Topological manifolds	6
3	Differential manifolds	6
4	Differential submanifolds	6
5	Tangent and co-tangent spaces	6
6	Vector fields on manifolds	6
7	Covariant derivatives	6
8	Curvature tensors	6
Total		45

D. Students Assessment Activities:

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Assignments, projects and homework	Continues	10 %
2.	Midterm exam	6th -7th	20%
3.	Final exam	16-17	70%

*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	John M. Lee, Introduction to smooth manifolds, Springer, 2002
Supportive References	An Introduction to Modern Differential Geometry. B. B. SINHA.
Electronic Materials	https://link.springer.com/book/10.1007/978-1-4419-7400-6
Other Learning Materials	None



2. Educational and Research Facilities and Equipment Required:

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms
Technology equipment (Projector, smart board, software)	data show
Other equipment (Depending on the nature of the specialty)	None

F. Assessment of Course Quality:

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students, Program Leader	Direct& Indirect
Effectiveness of students assessment	Faculty, Program Leader	Direct
Quality of learning resources	Students, Faculty	Indirect
The extent to which CLOs have been achieved	Faculty	Direct& Indirect
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval Data:

COUNCIL /COMMITTEE	Department Council
REFERENCE NO.	
DATE	7/4/1445