هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

T-104
2022

Course Specification

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Course Specification

Course Title:	**Differential Geometry**
Course Code:	**433Math-3**
Program:	**B.Sc. of Mathematics**
Department:	**Mathematics**
College:	**Art and Science**
Institution:	**Najran University**
Version:	1
Last Revision Date:	**07-05-2023**

Table of Contents:

A. General information about the course:

Course Identification					
1. Credit hours:	3				
2. Course type					
a.	University ☐	College ☐	Department☐	Track☐	Others☐
b.	Required ☒	Elective☐			
3. Level/year at which this course is offered:	**8 / 4**				
4. Course general Description					
This course covers curves in the plane and R^3. Reparameterizations by arch length, curvature and torsion. Fernet's theorem, osculating plane, normal plane, rectifying plane, involutes, evolutes, Bertrand curves, global properties of curves, local and intrinsic properties, simple closed curves, isoperimetric inequality, four vertex theorem, spherical indicatrix, surfaces in R^3, smooth surfaces, examples of surfaces, the second fundamental form, length of curves on surfaces, surface area, the second fundamental forms, Gaussian formula, the normal and geodesic curvature, principle curvature, mean and Gaussian curvatures, geodesics and spherical image.					
5. Pre-requirements for this course (if any): Analytic Geometry					
6. Co- requirements for this course (if any):					
7. Course Main Objective(s)					
Apply calculus and its applications to the geometry of curves and surfaces in space.					

1. Teaching mode (**mark all that apply)**

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	3	100%
2.	E-learning		
3.	Hybrid • Traditional classroom • E-learning		
4.	Distance learning		

2. 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	Define curves in plane and space (3D).	K1	Lecture Scientific discussions	Quiz Written Exam Homework
1.2	Describe curvature, torsion and associated curves to a space curve.			
2.0	Skills			
2.1	Construct surfaces in space (3D).	S2	Lecture Scientific discussions	Quiz Written Exam Homework
2.2	Describe regular surfaces and regular curves.			
2.3	Explains principle, mean, and Gaussian curvatures.			
3.0	Values, autonomy, and responsibility			

C. Course Content

No	List of Topics	Contact Hours
1.	Review of vectors and vectors valued functions.	9
2.	Curves in the plane and R^3.Reparametrization by arch length, Curvature and torsion.	12
3.	Osculating plane, Normal plane, Rectifying plane.	9
4.	Frenet-Serret apparatus, examples, Frenet-Serret Theorem	6
5.	Introduction to the local theory of surfaces, Coordinate	6

	transformations.	
6.	First and second fundamental form.	3
Total		45

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	First Exam	6-8	20
2.	Second Exam	11=13	20
3.	assignments and quizzes	During classes	10
	Final Exam	16-18	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	نصار حسن عبدالعال السلمي، الهندسة التفاضلية ،2008، مكتبة الرشد.
Supportive References	Willmore (1980), Introduction to Differential Geometry, Oxford.
Electronic Materials	https://www.ams.jhu.edu/~mmiche18/120a.1.10w/index.html
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture Hall by the number of seats = 25 seat approximately.
Technology equipment (projector, smart board, software)	• Data show • Smart Board • Wi Fi
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Student	Student Questionnaire (Indirect)
Effectiveness of students	Peer Reviewer	Rubrics (Indirect)

Assessment Areas/Issues	Assessor	Assessment Methods
assessment		
Quality of learning resources		
The extent to which CLOs have been achieved	Faculty	Direct
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Council of Mathematics Department
REFERENCE NO.	14441017-0208-00014
DATE	17-10-1444H