



Forman Christian College, Lahore
(A Chartered University)
Department of Mathematics

Differential Geometry\ MATH 308
Fall 2020

Dr. Nazish Shahid, Associate Prof.
Room No. S-352

Office hrs. Mon, Wed, Fri 1:00 PM-1:55 PM
Tues, Thur: 12:20 PM- 01:20 PM

Note: For other than office hours get an appointment.

nazishshahid@fccollege.edu.pk

Course Details:

Course Timings: TR 11:00 AM - 12:15 PM
Class Room: S- 412
Credits: 3hrs
Prerequisite: MATH 203 or MATH 301
Section: A

Recommended Books and Notes:

- **Differential Geometry, A first course by D. Somasundaram**
- **Elementary Topics in Differential Geometry, J. A. Thorpe, Springer**
- **Lecture Notes (available with the copier of S-Block)**
- **Links of youtube video lectures posted on Moodle**

Goals:

- To be able to study geometric figures using the methods of calculus
- To understand the basic difference between differential geometry and algebraic geometry
- To comprehend the definition of surface to form a firm foundation towards the understanding of modern differential geometry
- To have complete understanding of fundamental concepts of the differential geometry of curves and surfaces in three dimensional Euclidean space
- To be at convenience using and extending the knowledge of vectors and vector calculus of one variable to 3 or more variables

Course Requirements:

- Students are expected to attend all classes. **University's attendance policy** will be followed and the student whose attendance is less than 70% won't be allowed to take the final exam.
- Students must arrive in the class at time and should remain there for the entire period.
- All electronic devices including **Mobile phones should be switched off** during class, problem solving session, quizzes, midterm and final exam.
- There is no make up for missed quizzes but best 2 out of 3 will be counted. Make up for midterm and final exam is possible only under extremes cases if the student provides strong documentary evidence. In case of makeup exam there will be a 0-20% deduction in marks depending upon case-to-case basis. Medical Certificate will be acceptable if the medical officer of FCC verifies it.
- For other "Expectations" and "Breaches of Academic Integrity" please visit <https://www.fccollege.edu.pk/policy-on-academic-integrity/>

Course Contents:

This is an elective course of Mathematics. Course contents include Moving Trihedron (tangent, normal, binormal), osculating, normal and rectifying planes, curvature and torsion, Serret-Frenet equations, natural equations, evolute and involute, first and second fundamental forms of surfaces and tangent planes.

Course Evaluation:

Course assessment will be done through the following steps:

Attendance, Behavior, Class Participation	5%
Assignments (2)	5%
Quizzes (3)	20%
Midterm	30%
Final Exam	40%

Grading Legend:

The following grading legend will be followed in assigning the final grade:

<u>Grades</u>	<u>Quality Points</u>	<u>Numerical Value</u>	<u>Meaning</u>
A	4.00	93-100	Superior
A-	3.70	90-92	
B+	3.30	87-89	
B	3.00	83-86	Good
B-	2.70	80-82	
C+	2.30	77-79	
C	2.00	73-76	Satisfactory
C-	1.70	70-72	
D+	1.30	67-69	
D	1.00	60-66	Passing
F	0.00	59 or below	Failing

Course Outline:

Wee k	Topics	Assessme nt
1	Course Plan: Course Introduction, Policies, Requirements and Grading Criteria. Moving Trihedron (Tangent, Normal, Binormal)	
2	Moving Trihedron (Continued)	
3	Osculating Planes	Assignment 1
4	Osculating Planes (Continued)	
5	Normal Planes	Quiz-1
6	Rectifying Planes	

7	Curvature	
8	Torsion	Midterm
9	Serret-Frenet Equations	
10	Serret-Frenet Equations (continued)	Assignment 2
11	Natural Equations	
12	Evolute and Involute	Quiz-2
13	First Fundamental Form of Surfaces	
14	Second Fundamental Form of Surfaces	
15	Tangent Planes	Quiz-3
	Final Exam (Midterm course included)	