



FORMAN CHRISTIAN COLLEGE, LAHORE

(A Chartered University)

Course Outline for Spring 2023

Instructor Information:

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Course Information:

Title: Calculus and Analytic Geometry

Code: MATH 111

Section: B

Credits: 3

Class Room: S416

Lectures Time: MWF 10:00am-10:50am

Prerequisite: Math 101/A-level/ Intermediate math

Recommended Books

1. Calculus and analytic geometry by Howard Anton 10th edition
2. *Calculus with Analytic Geometry* by George F Simmons. 2nd ed.
3. Applied Calculus, Hughes Hallett et. al
4. Calculus and Analytic Geometry by Thomas and Finney

Course Description:

This course includes a review of algebra and trigonometry; coordinate systems, analytical geometry, the derivative using the definition, limits, continuity, techniques of differentiation, Applications of differentiation to extreme value problems, curve sketching and related rates problems, the integral and its properties, applications of the integral for finding area under a curve

Course Goals:

Upon successful completion of the course, students should be able to:

- Know basic classes of functions, and be able to talk about their differing characteristics, properties, domain and range.
- Understand the fundamental concept of the derivative, in terms of how it is defined, how it is computed, and how it helps us with optimization, rates of change, and the shape of a graph.

- Understand how to compute higher-order derivatives, and their roles in graphs and problem-solving.
- Compute derivatives of functions using various techniques, including direct, implicit, and chain-rule.
- Students should understand the meaning of the definite integral

Course Policies:

- Basic blended model will be the mode of conduct/ teaching. It will involve face to face class sessions (on-campus) that are accompanied by online lectures (lecture recordings on Moodle) – essentially a “blend” of both on-campus and online learning through recorded lectures.
- Students with odd roll numbers (last digit) will be allowed on campus for the first two weeks of class and those with even roll numbers (last digit) will learn remotely through the recorded lectures. After two weeks, those with even id numbers will come to campus for in-person classes and those with odd id numbers will learn from home through lecture recordings. Every fortnight, the students will switch who is on campus and who is studying remotely.
- Students are expected to watch every video lecture and read the lecture notes uploaded on Moodle. Off-campus students can discuss their queries/ questions in the given online office hours.
- Students are expected to attend every class. Students must arrive at class on time, should remain in class for the entire class period and mobile phone should be switched off or on silence. Note that there is 5 marks for attendance, behavior and class participation. if a student arrives more than 10 minutes late or leave class during lecture or use mobile in class, he/she will be marked absent.
- Course assessment will be through **quizzes; attendance, behavior and class participation; assignments; midterm and final exam.**
- Quizzes, Mid-term exam and final exam will be conducted on campus for both even and odd ID students. Assignments will be conducted on Moodle. There is **no make up** for the missed quizzes and assignments. Make up for quizzes, midterm and final exam is possible only under extremes cases if a student provides strong documentary evidence. In case of make-up exam there will be a 0-20% deduction in marks depending upon case to case basis.
- Academic dishonesty or cheating will result in zero points (grade F) and will be referred to AIC (Academic Integrity Committee) at FCC for necessary action.

Course Evaluation

Midterm Exam	30%
Final Exam	40%
Quizzes(Best 5 out of 6 will be selected)	20%
Class Participation and Attendance	10%

<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

Week #	Topics Covered	Instruments
1	Course Overview and Introduction	
	Review of pre-calculus: Functions and its types	
	Limits and Its Properties: One sided limit, two sided limit. Rules of finding a limit	

2	Infinite Limits. Continuity	
	Introduction to Derivatives Rules of differentiation Application of Derivatives The Derivative as a Rate of Change	
3	Derivatives of Transcendental Functions Differentiation of trigonometric, exponential and transcendental	Quiz 1
	The Chain Rule and Parametric Equations	
4	Implicit Differentiation. Introduction to L'Hopital rule.	
	Application of Derivatives Related Rates	
5	Application of Derivative Increasing and decreasing curves, First Derivative test,	Quiz 2
	Application of Derivatives Maxima and Minima Problems	
6	Application of Derivatives Second Derivative Test	
	Application of Derivatives Concavity and curve sketching	
7	Application of Derivatives	Quiz 3
	Applied optimization problems	
8	Introduction to antiderivative	
9	Introduction to Integration and Riemann Sums	Mid Term
	Properties of Integrals Principal of Integration Evaluation	
10	Definite Integrals	

	Fundamental theorems of Calculus	Quiz 4
11	Application of Integration Integration Techniques , Computation of areas	
	Volume by slicing, Volume of Solids of Revolution(Disk Method And Washer Method)	
12	Conic section: Circle, Ellipse, Parabola and Hyperbola	Quiz 5
	Infinite series , power series,	
13	Taylor's series	
14	Convergence tests	
15	Question and Answer	Quiz 6
16	Final Exam	

***All Quiz ,Mid and Final will be conducted on campus.**

***Assignments will be uploaded on moodle**

*** The lectures may vary week wise depending on the understanding of the students.**