



**Forman Christian College, Lahore  
(A Chartered University)  
Department of Mathematics  
Calculus- I \ MATH 102**

**Fall 2021**

**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.**

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**Course Details:**

**Course Timings: Mon, Wed, Fri 12:00 NOON-12:50 PM**

**Class Room: S- 410**

**Credits: 3hrs**

**Prerequisite: MATH 101 or A Levels or Intermediate  
Mathematics**

**Section: B**

**Recommended Book and Notes:**

- **Calculus with Analytic Geometry, Howard Anton, 8<sup>th</sup> Edition  
(link of the soft copy of book shall be posted on Moodle)**
- **Lecture Notes (available on Moodle)**
- **Links of youtube video lectures posted on Moodle**

**Goals:**

- To be able to place the difference between functions and graphs
- To be able to draw the graphs of functions
- To understand the difference between differential calculus and integral calculus
- To be able to extend the knowledge of methods and tools, used in Calculus, to other branches of science, particularly in Physics
- To understand the reasons that lead to the concepts of limit, derivation and integration of functions and that how these concepts are interrelated
- To be familiar with various derivation and integration techniques
- To relate the idea of functions in Calculus with real world examples (in terms of dependence of one factor onto another)

## **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 a general education course for Mathematics. Course contents include the following: Functions, Graph of functions, Translation, Stretching and compressing graphs. Limit, Continuity and differentiability, Differentiation and its basic rules, Indeterminate forms, L'Hospital's rule, Integration and its techniques, Introduction to definite integral.

## **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%

## Course Outline:

<b>Week</b>	<b>Topics</b>	<b>Assessment</b>
<b>1</b>	<b>Course Plan:</b> Course Introduction, Policies, Requirements and Grading Criteria. Functions, Operations on Functions, Graphs of Functions	
<b>2</b>	Inverse Functions, Limit (Computational techniques)	
<b>3</b>	Limit (Computational techniques) (continued), Limits at infinity	
<b>4</b>	Continuity, Limits and Continuity of Trigonometric Functions	<b>Assignment 1</b>
<b>5</b>	Limits and Continuity of Trigonometric Functions (continued), The Derivative of a Function, Differentiability	<b>Quiz-1</b>
<b>6</b>	Techniques of Differentiation, Derivative of Trigonometric Functions	
<b>7</b>	The Chain Rule, Higher Derivatives	
<b>8</b>	Derivatives of Logarithmic, Exponential and Inverse Trigonometric Functions	<b>Midterm</b>
<b>9</b>	Derivatives of Logarithmic, Exponential and Inverse Trigonometric Functions	
<b>10</b>	Implicit Differentiation, Logarithmic Differentiation	
<b>11</b>	L' Hospital 's Rule, Indeterminate Forms	<b>Quiz-2</b>

<b>12</b>	The Indefinite Integral, Integration Techniques	<b>Assignment 2</b>
<b>13</b>	Integrating Powers and Product of Trigonometric Functions	
<b>14</b>	The Definite Integral, The First Fundamental Theorem of Calculus	
<b>15</b>	Integration by Parts, Integration by Trigonometric Substitution	<b>Quiz-3</b>
<b>16</b>	Integrating Rational Functions by Partial Fractions	
	<b>Final Exam (Midterm course included)</b>	

**Grading Legend:**

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