FORMAN CHRISTIAN COLLEGE, LAHORE

(A Chartered University)

Department of Mathematics

Calculus and Analytic Geometry –MATH111 (D)

Fall 2021

Instructor Information:

Dr Farheen Ibraheem

Assistant Professor

On Campus Office Hours: Monday to Friday: 10:00a.m. – 10:50a.m.

Off Campus Office Hours: Monday to Friday: 06:30p.m. – 07:30p.m.

Using

https://us02web.zoom.us/j/6226632909?pwd=MmlQMlFabU5veENSM1VjNHJFWnlaQT09

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Office No. S113

Course Information:

Title: Calculus and Analytic Geometry   **Course Code**: MATH 111

Class Room: S412   **Prerequisite**: Math 101/A-level/ Intermediate math

Class Timings: Tuesday & Thursday @ 12:30p.m.-1:45p.m.

Recommended Books

1. Calculus and analytic geometry by Howard Anton 10th Edition
2. Calculus and Analytic Geometry by Thomas and Finney , 13th Edition

Reference Books

1. Applied Calculus, Hughes Hallett et. al

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 and how it helps in calculation of area and volume.

Course Requirement:

- ➢ Students must arrive at class on time, should remain in class for the entire class period and mobile phones should be switched off or on silent mode. Students whose attendance is less than 70% won't be allowed to take the final exam. Note that there are **05 marks for attendance and class participation.** If a student arrives more than 10 minutes late or leaves class during lecture or uses mobile phone in class, he/she will be marked absent.
- ➢Course assessment will be through quizzes, attendance & class participation, assignments, midterm and final exam. **Absolute grading system** will be followed throughout the course. If needed, students may be asked to explain the submitted work. **Late submission of assignment will result in deduction of points for the assignment**. There is no make up for missed quizzes but **best 3 out of 4** will be counted. In extreme cases average marks for the missed quizzes might be given provided students should submit strong evidence **within 3 days** after missing the quiz. Make up for midterm and final exam is possible only under extremes cases if student provides strong documentary evidence within **3 days after missing the mid/final exam.** In case of make-up examination, there will be a 0-20% deduction in marks depending upon case to case.
- ➢ 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:

Following assessment tools will be used to evaluate students' progress

1. **Attendance and Class Behaviour** (Regularity and Punctuality in completion and submission of home tasks/Assignments/online activities). **5%**
2. **Assignments:** **10%**
3. **Quizzes** **15%**
4. **Midterm Exam** **30%**
5. **Final Exam** **40%**

Grades	Quality Points	Numerical Value	Meaning
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, Modeling Functions, Functions and their graphs.	
(2)	**Limits and Continuity** Limits (An Intuitive Approach) Computing Limits	
(3)	**Limits at Infinity**; End behavior of a Function $\delta - \epsilon$ definition of Limit	**Quiz-1**
(4)	**Continuity**	
(5)	**The Derivative** Limit Definition of Derivative. Evaluating Derivatives by Definition.	
(6)	**Introduction to Techniques of Differentiation.** The Product and Quotient Rule	
(7)	**Derivative of Trigonometry Functions The Chain Rule**	**Quiz-2**
(8)	**Implicit Differentiation Related Rates**	
(9)	**The Derivative in Graphing and Applications** Analysis of Functions, Relative and Absolute Extremum, Graphing Polynomial. **Applied Optimization Problems**	**Mid-Term Exam**

(10)	**Integration** Overview and Area Problem The Indefinite Integral, Integration by Substitution.	
(11)	**The Definition of area as a Limits, Sigma Notation** **The Definite Integral**	**Quiz-3**
(12)	**The Fundamental Theorem of Calculus. Integration by Parts**	
(13)	**Applications of the Definite Integral** Area between Two Curves, Length of a Plane Curve.	
(14)	**Volume by Slicing** Disks and Washers Method	**Quiz-4**
(15)	**Infinite Series and Convergence Tests** **Taylor Series**	
FINAL EXAM WILL BE CONDUCTED FROM WHOLE SYLLABUS		