



Forman Christian College, Lahore
(A Chartered University)
Department of Mathematics
Spring 2022

Instructor Information:

Dr. Ashar Ghulam
Ph.D (Applied Mathematics) Louisiana State University U.S.A.
M.S (Mathematics) Louisiana State University U.S.A.
M.Phil. (Mathematics) NCBA & E Lahore, Pakistan
M.Sc. (Mathematics) Dept. of Mathematics University of Punjab, Lahore, Pakistan
Assistant Professor
Office: S-114 (Armacost Science Building)
**Office Hours: Mon., Wed., Fri. 04:00 pm –04:40 pm, Tue, Thur. : 11:00 am- 11:40 am Or
by appointment**
Email: asharghulam@fccollege.edu.pk
Cell# 0332-4049602 (8:00 pm- 9:00 pm)

Course Information:

Course Title: Calculus-II
Course Code: MAT201
Credit hours: 3
Prerequisite: MATH 102
Room # S-410
Section: A
Timing: Mon., Wed. Fri. : 02:00 pm -- 02:50 pm
Mode of teaching: On campus

Resources:

Notes and recorded lectures will be provided on Moodle.

Recommended Text:

Calculus Early Transcendentals, James Stewart, 7th edition, Thomson Learning Inc. U.S.A.

Calculus Early Transcendentals, Anton, Biven, Davis, 10th edition, John Wiley & Sons Inc. U.S.A.

Reference Text:

Calculus and Analytic Geometry, Thomson and Finney, Addison-Wesley publishing Company. U.S.A.

Course Contents:

It is a core course for four years Baccalaureate degree in Mathematics. This course deals with Applications of derivative: increasing and decreasing functions, maxima and minima of a function, concavity, inflection points of a function, Rolle's Theorem, the mean value theorem, Taylor's

theorem, applications of integration: area and arc length, volume and surface of revolution, introduction to improper integrals, infinite series, power series, introduction to conic section

Course Objectives

The objectives of this course for students are to know infinite series, the applications of the derivatives and integrals of Calculus of one variable. It will introduce students to the basic concepts of convergence and divergence of infinite series and applications of derivative and integrals. It will improve their ability to independently increase their own understanding of the above said concepts. It will provide students with an opportunity to appreciate the wide range use of single-variable Calculus. Students successfully completing this course should be reasonably proficient in solving the problems involving applications of derivatives, integrals and infinite series. This course will also help to prepare the students for the other applied mathematics and core courses in Mathematics.

Course Expectations

- ❑ Students must arrive at class on time, should remain in class for the entire class period and mobile phones should be switched off. All students whose attendance is less than 70% (on campus attendance) won't be allowed to take the final exam. Note that there are **05 marks for attendance and in 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. Habitual late comers will not be allowed to enter the class after 10 minutes. In case a late comer with **genuine reason** is not allowed to enter the class, he or she can see the professor in office hours for briefing about the lecture.
- ❑ Course assessment will be through quizzes, midterm, assignments, attendance & in class participation and final exam. **If needed, students may be asked to explain the submitted work**. All assignments are to be completed by the date mentioned on the assignment paper. **Late submission of assignment will result in deduction of points for the assignment**. There is no make up for missed quizzes. 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 makeup examination, there will be a 0-20% deduction in marks depending upon case to case. Medical certificate will be acceptable if it is verified by the medical officer of FCCU.
- ❑ **Academic dishonesty or cheating** will result in zero points (grade F) and will be referred to AIC (Academic Integrity Committee) at FCCU for necessary action. (Page number 20 of 4-year Baccalaureate degree Program Catalog 2018-2019)
- ❑ **Note: All the quizzes and midterm will be conducted in class while all the assignments will be conducted through Moodle.**

Learning Outcomes

Students will be able to:

- develop and strengthen skills in dealing with infinite series and related properties.
- find extrema of a function of one variable.
- find arc length of a plane curve , and area bounded between two curves and volume of a solid.

- analyze, model and interpret problems involving infinite series, applications of derivatives and integrals.
- Understand proper and improper integrals and related properties.

Course Evaluation

Grading will be based on following criteria:

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| Attendance & in class performance including behavior | 05 % |
| Assignments (2) | 10 % |
| Quizzes (3 out of 4) | 15 % |
| Mid Term | 30 % |
| Final Exam | 40 % |

| <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 | Fair |
| 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 | Assessments |
|---------------------------------------|---|---------------------|
| 1 Mar.07,09,11 | Discussion of course Plan: Course introduction, Policies, Requirements and grading criteria. Review of Calculus- I, Extrema of function of one variable, The extreme value theorem | |
| 2 Mar.14,16,18 | The Rolle's theorem, the mean value theorem and its applications | |
| 3 Mar.21,25 | Increasing and decreasing functions, first derivative test for local maximum and minimum values of a function f and its applications | Quiz-1 |
| 4 Mar. 28,30, Apr. 1 | Second derivative test, concave up and concave down functions, inflection point | Assignment-1 |
| 5 April 04,06,08 | Review of definite integral, Areas between the curves | |
| 6 April 11,13 | Continue area between two curves | |
| 7 Apr.20, 22 | Volumes of solids of revolution | Quiz-2 |

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|---------------------------------------|--|---|
| 8 April 25,27,29 | Volumes by cylindrical shell method | |
| 9 May 09,11, 13 | Arc length of a plane curve | Mid-Term 11th May |
| 10 May 16,18,20 | Introduction to improper integrals. | |
| 11 May 23,25, 27 | Type I and type II improper integrals | |
| 12 May 30, June 1, 3 | Sequences, Monotone sequences | Quiz-3 |
| 13 June 06,08, 10 | Infinite series, convergence and divergence of an infinite series, Alternating series | |
| 14 June 13, 15, 17 | The absolute convergence and ratio test, | Assignment-2 |
| 15 June 20, 22,24 | Power series, Conic section | Quiz-4 |
| | Final examination period is from 27th June 2022 - 06th July 2022. | |