Department of Science Education
Institute of Education & Research
University of the Punjab, Lahore
Course Outline

Programme	BS Science Education	Course Code	BSScEd-707	Credit Hours	04
Course Title	Mathematics B-III [Calculus (II)]				

Course Introduction
Mathematics B-III (Calculus-II) is a continuation of Calculus-I. In this course, students study more advanced topics of integration and learn new concepts like sequences, series, and functions of more than one variable. This course helps students understand how calculus is used to solve practical problems in science, engineering, economics, and other fields. It improves students' problem-solving skills and logical thinking. By the end of the course, students will have a stronger understanding of advanced calculus concepts and their applications.

Learning Outcomes
On the completion of the course, the students will:
1. Use different methods of integration such as integration by parts and substitution.
2. Solve definite and improper integrals.
3. Understand sequences and series and check whether they converge or diverge.
4. Expand functions using Taylor and Maclaurin series.
5. Find partial derivatives of functions with two or more variables.
6. Solve practical problems related to area, volume, and applications of integration.
7. Show clear and logical steps while solving mathematical problems.

Course Content		
Week 1	**Unit -1: Sequence and Series**	
	1.1	Sequences, Infinite series, Convergence of sequence and series
Week 2	1.2	The integral test, Comparison tests, Ratio test, Root test
Week 3	1.3	Alternative series, Absolute and conditional convergence
Week 4	1.4	Power series, Interval and radius of convergence
Week 5	**Unit-2: Functions of Several Variables**	
	2.1	Functions of two variables, Graphs of functions of two variables
Week 6	2.2	Contour diagrams, Linear functions, Functions of three variables
	2.3	Limit and continuity of a function of two variables
Week 7	2.4	The partial derivative, Computing partial derivatives algebraically
Week 8	2.5	The second-order partial derivative, Local linearity and the differential
Week 9	**MID- TERM EXAM**	
Week 10	**PRESENTATIONS**	
Week 11	2.6	Tangent planes and normal lines

	2.7	Optimization, Maxima and minima of a function of two variables
Week 12	2.8	Lagrange multipliers
	2.9	Various methods for finding area and volume surface of revolution
Week 13		**QUIZZ**
		Unit-3: Multiple Integrals
Week 14	3.1	Double integral in rectangular and polar form
	3.2	Triple integral in rectangular, Cylindrical and spherical coordinates
Week 15	3.3	Substitutions in multiple integrals
	3.4	Moments and centre of mass
Week 16		**FINAL- TERM EXAM**

Textbooks and Reading Material

1. Thomas, Calculus, 11th Edition. Addison Wesley Publishing Company, 2005
2. H.Anton, I. Bevens, S. Davis, Calculus, 8th Edition, John Wiley & Sons, In.2005
3. Hughes-Hallet, Gleason, McCalum, et al, Calculus Single and Multivarible, 3rd Edition John Wiley & Sons, Inc 2002
4. Frank A. Jr, Elliott Mendelson, Calculus, Schaum's Outline Series, 4th Edition 1999
5. C.H. Edward and E.D Penney, Calculus and Analytical Geometry Prentice Hall, Inc. 1988
6. E.W.Swokoski, Calculus and Analytical Geometry PWS Publishers, Boston, 19

Teaching Learning Strategies

- Lecture Method
- Collaborative Method
- Problem-Solving Approaches
- Demonstration Method
- Project Method
- Connecting mathematics to real world context
- Discussion

Assignments: Types and Number with Calendar

- Class presentation, Quizzes.
- Ist assignment before mid-term exam.
- 2nd assignment after mid-term exam