University of Central Punjab
Faculty of Information Technology

PROGRAM (S) TO BE EVALUATED

A. Course Description   BSCS

(Fill out the following table for each course in your computer science curriculum. A filled-out form should not be more than 2-3 pages.)

Course Code	**CSSS2733**
Course Title	**Multivariate Calculus**
Credit Hours	3(3-0)
Prerequisites by Course(s) and Topics	**Calculus and Analytical Geometry**
Assessment Instruments with Weights (homework, quizzes, midterms, final)	Quizzes (15%) + Assignments (10%) +Class participation(10%) + Mid Term (20%) + Final Term (45%)
Semester	Spring 2022
Course Instructor	Tahir Rasheed
Course Coordinator	M. Rayees
Office Hours	TBD
Plagiarism Policy	All the parties involved will be awarded Zero in first instance. Repeat of the same offense will result in (F) grade.
Course Description	The course will focus on functions of two and three variables. Using calculus to analyze the geometry of curves and surfaces in three dimensional spaces. Differentiation and integration of functions of several variables and vector geometry of lines, planes and surfaces in space will be discussed in detail.
Textbook	• Thomas' Calculus by G B Thomas, 11thEdition. • Applied Calculus by Hughes-Hallett et al., 4th edition.
Reference Material	• Calculus Single and Multivariable by Hughes-Hallett et al., 6th edition. • James Stewart, "Multivariable Calculus" 7th Ed.
Course Goals	*Upon successful completion of the course, students would be able to* understand the concepts of vectors in two- and three-dimensional spaces. Develop a working knowledge of two-variable functions including partial derivatives, chain rule, and extrema of these functions. Develop a solid understanding of multiple integrals and its applications.

Class Time Spent on (in credit hours)	**Theory**	**Problem Analysis**	**Solution Design**	**Social and Ethical Issues**
	.5	1.5	1	0

Week	Topics	Section (from Textbook)	Evaluation
1	Introduction to vectors, Dot product, Cross product, projection	12.2, 12.3, 12.4	
2	Vector equation of Line in 3-D, Distance from a Point to a Line in 3-D	12.5	
3	Vector equation of plane in 3-D, Distance from a Point to a Plane in 3-D	12.5	Assignment 1
4	Calculus of vector valued functions.	13.1,13.2	Quiz1
5	Arc length, Speed Velocity and Acceleration	13.3,13.4	Quiz 2 Assignment 2
6	Functions of several variables, Limit and continuity	14.1,14.2	Quiz 3
7	Derivatives of Functions several variables	14.3,14.4	
8	Revision		
9	**Mid-Term Exam**		
10	Linear approximation, Application of several variables, Chain rule	14.5	
11	Gradient vector, Directional derivative.	14.6	Quiz 4 Assignment 3
12	Optimization in several variables.	14.7	
13	Multiple integrals, Integrals over triangles and more general regions	15.2,15.3	Quiz 5 Assignment 4
14	Applications of multiple integrals.	15.6	
15	Polar and Cylindrical coordinates,	15.4	
16	Integrals in polar and cylindrical coordinates	15.4	
17	Revision		
	FinalTermExam		