



University of Central Punjab

Faculty of Information Technology

**PROGRAM (S) TO BE
EVALUATED**

BSCS

A. Course Description

Course Code	CSSS2763			
Course Title	Differential Equations			
Credit Hours	3(3-0)			
Prerequisites by Course(s) and Topics	Multivariable Calculus			
Assessment Instruments with Weights (homework, quizzes, midterms, final.)	Quiz 15% Assignment 10% Class Participation 10% Midterm 20% Final 45%			
Semester	5 th			
Course Instructor	Adnan Rafiq Siddiqui			
Course Instructor Email	rafiq.siddiqui@ucp.edu.pk			
Course Coordinator	Rohsha Tahir			
Office Hours	Displayed before Room			
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 main objectives of this course include showing the students how differential equations appear in real life and physical phenomena, and teach them the techniques to solve various types of differential equation analytically. By the end of the course, the students should be able to make mathematical models involving differential equations for problems encountered in engineering, social and physical sciences. They should therefore be prepared to successfully continue their studies towards more advanced and specialized courses in their field.			
Textbook	A First Course in Differential Equations with Modeling Applications by Dennis G. Zill			
Reference Material	Elementary Differential Equations by William E. Boyce and Richard C. DiPrima, 9 th Edition Differential Equations by “Sheply L. Ross” 3 rd Edition Differential Equations by N. P. Bali			
Course Goals	Most advanced algorithms are based on advanced maths and maths is important in understanding a lot of the fundamentals that go into things like schedulers, optimizations, sorting, protocol management, and a number of other aspects of computers. Differential equations have practical and theoretical applications in a wide range of computer science. Numerical methods to solve differential equations are directly based on computer programming like Matlab.			
Class Time Spent on (in credit hours)	Theory	Problem Analysis	Solution Design	Social and Ethical Issues
	.5	1.5	0.5	0.5

CLO#	Course Learning Outcome (CLO)	Taxonomy Level	Mapping to PLO
CLO 1	Students will be able to apply an appropriate technique to solve first order and higher order differential equations	C3	PLO-03
CLO 2	Students will be able to analyze the structure of real-life problems using differential equations.	C4	PLO-04

Week	Topics Covered	CLO Achieved	Evaluation Instrument Used
1	What is differential equation? Introduction and importance of the differential equation, formulation of differential equations for a given scenario. Continuation of formulation of differential equations for a given scenario, classification of differential equations, order and degree of differential equation.		
2	Existence of the solution, general and particular solutions, boundary value problems, Initial value problems (IVPs), geometric interpretation of IVPs. Physical interpretation of $y' = f(x, y)$ and direction fields.		Class Assignment
3	Solving Separable ODEs/IVPs Solving Linear ODEs/IVPs	1	Class Assignment
4	Mathematical Modeling: Growth and Decay Models Mathematical Modeling: Growth and Decay Models	2	Quiz 1 Assignment 1
5	Mathematical Modeling: Newton's Law of Cooling/ Warming Models.	2	
6	Exact ODEs Exact IVPs	1	Assignment 2 Quiz 2
7	Making non-exact equations exact	1	Quiz 3
8	REVISION		Class Assignment
MID TERM EXAM			

9	Paper Review, Intro to Higher order ODEs/IVPs	3	
10	Homogeneous Linear ODEs with constant coefficients	3	Class Assignment
11	Non-homogenous Linear ODEs/IVPs, Method of undetermined coefficients	3	Quiz 4 Assignment 3
12	Glitch in the Method of undetermined coefficients Reduction of Order	3	Class Assignment
13	Variation of Parameters	3	Quiz 5 Assignment 4
14	Power series solution of ODEs/IVPs	3	
15	Laplace Transform Inverse Laplace Transform Solution of IVPs using Laplace Transform	3	Class Assignment
16	REVISION		
FINAL TERM EXAM			