Calculus and Analytical Geometry

BSCS/BSSE

Course Code	**CSSS1713/ SESS1713**
Credit Hours	3
Assessments	• **Quiz 15%** • **Assignment 10%** • **Class Participation 10%** • **Mid Exam 20%** • **Final Exam 45%**
Course Instructor	**Dr. Abdul Rauf Nizami** Email: arnizami@ucp.edu.pk Cell: 0336-7778271 Office Address: Building A, F304, Cabin 4 Office Hours: Displayed on the office door
Textbook	CALCULUS by Howard Anton 10th Edition
Reference Material	• CALCULUS by Thomas • APPLIED CALCULUS by Hughes Hallett
Course Goals	Upon successful completion of the course, the students should be able to: • Understand functions and their graphs. • Understand the concepts of limits and continuity. • Understand geometrical and physical meanings of derivative. • Use derivative to find extreme values. • Understand the concept of indefinite integral. • Compute indefinite integrals by parts and by partial fractions. • Understand the concept of definite integral. • Find areas between curves as applications of definite integrals. • Understand the conic sections and their applications

Lecture	Contents	Practice Exercises
Lecture 1	Intervals	See my lecture notes on Intervals and Inequalities.
Lecture 2	Inequalities	See my lecture notes on Intervals and Inequalities.
Lecture 3	Graph of an Equation	See my lecture notes on Graph of an Equation.
Lecture 4	Functions: independent variable, dependent variable, domain and range of a function, vertical line test, horizontal line test for one-to-one and onto functions	**Quick Exercises 0.1 (Pg. 11)** Problems: 1 and 3 **Exercise Set 0.1 (Pg. 13)** Problems: 7, 10 (a), and 10(b)
Lecture 5	Limit	**Exercise Set 1.2 (Pg. 87)** Problems: 2,3,4, and 9
Lecture 6	Continuity	**Exercise Set 1.5 (Pg. 118)** Problems: 1,4, and 29
Lecture 7	Secant and tangent lines	**Exercise Set 2.2 (Pg. 152)** Problems: 9,10, and 11
Lecture 8	Average rate, Instantaneous rate, The derivative	**Exercise Set 2.1 (Pg. 140)** Problems: 11 and 12
Lecture 9	Techniques of differentiation	**Exercise Set 2.3 (Pg. 161)** Problems: 1,3,7,9, and 10
Lecture 10	Techniques of differentiation	**Exercise Set 2.4 (Pg. 168)** Problems: 1,3,11, and 13
Lecture 11	Applications of the Derivative: Intervals of increase and decrease, Concavity (optional)	**Exercise Set 2.5 (Pg. 172)** Problems: 1,3,5,7, and 25 **Exercise Set 4.1 (Pg. 242)** Problems: 15,17, and 19

Lecture 12	Applications of the Derivative: Critical points, Second derivative test, Extreme values	**Exercise Set 4.2 (Pg. 252)** Problems: 3,7, and 8
Lecture 13	Applications of the Derivative: Maximize profit and revenue, Minimize cost	**Exercise Set 4.5 (Pg. 285)** Problems: 42,43, and 44
Lecture 14	Rolle's Theorem, Mean-Value Theorem	**Exercise Set 4.8 (Pg. 308)** Problems: 1,2,5, and 6
Lecture 15	Revision for mid-term exam	
Lecture 16	Revision for mid-term exam	
Mid-Term Exam		
Lecture	**Contents**	**Practice Exercises**
Lecture 17	The indefinite integral of algebraic functions	**Exercise Set 5.2 (Pg. 330)** Problem: 9,10,11,14,17, and 19
Lecture 18	The indefinite integral of exponential, logarithmic, and trigonometric functions	**Exercise Set 5.2 (Pg. 330)** Problems: 21,23,25, and 30
Lecture 19	Integration by parts	**Exercise Set 7.2 (Pg. 498)** Problems: 1,3, and 5
Lecture 20	Integration by parts	**Exercise Set 7.2 (Pg. 498)** Problems: 7,9,21, and 23
Lecture 21	Integration by partial fractions	**Exercise Set 7.5 (Pg. 514)** Problems: 1,9,10, and 12
Lecture 22	Integration by partial fractions	**Exercise Set 7.5 (Pg. 514)** Problems: 17,19, and 23
Lecture 23	The definite integral	**Exercise Set 5.4 (Pg. 350)** Problems: 36,37, and 39
Lecture 24	Properties of the definite integral	**Exercise Set 5.5 (Pg. 360)** Problems: 13,21, and 25

Lecture 25	Applications of the definite integral: area under a curve	**Exercise Set 5.6 (Pg. 373)** Problems: 5,7,35,37, and 39
Lecture 26	Applications of the definite integral: area between two curves	**Exercise Set 6.1 (Pg. 419)** Problems: 5,7,8, and 15
Lecture 27	Parabola	**Exercise Set 10.4 (Pg. 744)** Problems: 3,4, and 15
Lecture 28	Parabola	**Exercise Set 10.4 (Pg. 744)** Problems: 5 and 6
Lecture 29	Ellipse	**Exercise Set 10.4 (Pg. 744)** Problems: 7,8,9, and 10
Lecture 30	Hyperbola	**Exercise Set 10.4 (Pg. 744)** Problems: 11,12,13, and 14
Lecture 31	Revision for Final-Term Exam	
Lecture 32	Revision for Final-Term Exam	