

Republic of Iraq

College: Shatt Al-Arab

Ministry of Higher

Education and Scientific Research

Department of Civil Engineering

Stage: 2nd stage

Supervision and Scientific

Evaluation Apparatus

Lecturer name: Academic t



University: Shatt Al-Arab University

College: Engineering College

Department: Civil Engineering

Stage: 2nd stage

Course Weekly Outline

Week No.	Theoretical	Experimental
1	Definition of Polar Coordinates, Polar Equations and Graphs, Relating Polar and Cartesian Coordinates, Graphing Polar Coordinate Equations	
2	Areas and Lengths in Polar Coordinates	
3	Vectors and the Geometry of Space, Component Form and Vector Algebra Operations	
4	Unit Vectors, Midpoint of a Line Segment, Navigation, forces action on a single object	
5	The Dot Product, Angle Between Vectors, orthogonal Vectors, work and Vector Projections	
6	The Cross Product, Calculating the Cross Product as a determinant, Area of a Parallelogram and Torque, Lines and Planes in Space	
7	Infinite Sequences and Series, Infinite Series, Taylor and Maclaurin Series,	
8	Power Series, The Binomial Series and Applications of Taylor Series	
9	Partial Derivatives, Limits and Continuity in Higher Dimensions, Partial Derivatives of a Function of Two and Three Variables Second-Order and higher Partial Derivatives.	
10	The Chain Rule, Directional Derivatives and Gradient Vectors, Tangent Planes and Differentials, Estimating Change in a Specific Direction	
11	Extreme Values and Saddle Points, optimization	
12	Double Integrals in Cartesian and Polar Form, Area by	

	Double Integration	
13	Triple Integrals, Area, volume, centroid and moment of inertia	
14	Triple Integrals in Cylindrical and Spherical Coordinates	
15	Preparatory week before the final Exam	