Department: Mathematics and Computer Sciences
Division: Computer Sciences
Level and Major: Undergraduate

Course Title: Calculus 2
Number of Credits: 3
Prerequisite: Calculus 1
Lecturer:

Course Description:

Course Topics:

- Part 1 - Analytic Differential geometry: in 2 and 3 dimensional spaces Smooth curves, curves parameterization. Arc length, parameterization according to arc length, vector and calculus vector functions, flat curvature, curvature and torsion formulas. The fundamental theorem of curves. Curvature and torsion formula in terms of a parameter t.
- Part 2: Multivariate Functions, Set Alignment, Limit, Continuity, and Derivative of Multivariate Functions. Drawing Procedures Introducing polar, spherical and cylindrical coordinates.
- Part 3 - Derivative: Partial Derivative - directional Derivative - Derivative - Derivative Calculation - Gradient Field - Higher Order Partial Derivatives - Chain Rule - Taylor Polynomial - Critical Points - Hessian Matrix - First and Second Derivative Tests - Implicit Functions - Implicit Function Theorem - Inverse Function Theorem - Optimization - Lagrange Theorem - Solving Practical Examples of Lagrangian Theorem with more than one condition (7 sessions) It will be given in detail during t
- Part 4 - Multiple Integrals - Calculating Multiple Integrals - Fobini Theorem - Change of Variable in Multiple Integrals (3 sessions)
- Part 5 - Integral on curves and Surface: Smooth surfaces - Integral on curves - Integral on Surface - Center of Mass - Center of Gravity (2 sessions)
- Part 6 - Vector Analysis: Gradient, Curl, Divergence, Greens Theorem, Stokes and Divergence (2 sessions)
- Part 7- Linear Algebra: Introducing the real space and examples (1) for each n, defining the scalar addition and multiplication and expressing their algebraic properties. The expression and justification of the next concept, the basic definition, the definition of internal multiplication and its algebraic properties. (Definition of cloud in next n space) Define linear transformations and show that they are under space. The form of the proposition that states that if the vector spaces are finite d

Reading Resources:

- Robert Adams, Christopher Essex, Calculus: A Complete Course, (7th Edition), Pearson Education Canada, 2009.

Evaluation: