

## Course Syllabus

1. Course number and name: 020CDINI3 Differential Calculus and Integrals.
2. Credits and contact hours : 8 ECTS credits, 4x1:15 course hours
3. Instructor's or course coordinator's name : Salim Salem.
4. Text book : X. OUDOT, Maths PC, Vuibert
  - a. other supplemental materials :
5. Specific course information
  - i. Catalog description: Normed vector spaces: continuity, uniform continuity and Lipschitz continuity, compactness, linear maps, path connectedness - Improper integrals: tests of convergence, dominated convergence - Functions of several variables: directional and partial derivatives, differentiability, gradient, extrema of functions of several variables, differential forms, multiple integrals, line integrals.
  - ii. Prerequisites: General analysis (020ANGNI1)
  - iii. Required : Yes
6. Specific goals for the course
  - a. Specific outcomes of instruction
    - Identify, construct, manipulate, compare and classify norms
    - Characterize open and closed sets
    - Study and manipulate vector valued functions
    - Classify improper integrals, and study their nature
    - Manipulate functions of several real variables, and identify their extrema.
    - Compute multiple integrals
    - Compute line integrals, and apply the Green-Riemann theorem
  - b. KPIs addressed by the course.

RAP (KPI)	a1
Covered	x
Assessed	x
Give Feedback	x

7. Topics and approximate lecture hours :

- Normed vector spaces, metric spaces, equivalent norms (5 Lectures)
- Convergence and continuity in normed vector spaces (8 Lectures)
- Topology of normed vector spaces (7 Lectures)
- Improper integrals and tests of convergence (9 Lectures)
- Some classical improper integrals, special functions (6 Lectures)
- Continuity, differentiability of functions of several variables (4 Lectures)
- Extrema of functions of several variables, Lagrange multipliers (4 Lectures)
- Multiple integrals (9 Lectures)
- Line integrals, Green-Riemann theorem (4 Lecture)