Analysis 2

1. **Course number and name:** 020AN2CI3 Analysis 2

2. **Credits and contact hours:** 6 ECTS credits, 3x1:15 contact hours

3. **Name(s) of instructor(s) or course coordinator(s):** Nancy Chalhoub

4. **Instructional materials:** Course handouts; slides; in-class problems

5. **Specific course information**
   a. **Catalog description:**
   Normed vector spaces: continuity, uniform continuity and Lipchitz continuity, compactness, linear maps, path connectedness – Generalized 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

   b. **Prerequisites:** 020AA1CI2 Analysis 1

   c. **Required /Selected Elective/Open Elective:** Required

6. **Educational objectives for the course**
   a. **Specific outcomes of instruction:**
   – Identify, construct, manipulate, compare and classify norms.
   – Study and identify topologies over a normed vector space.
   – Identify open, closed, bounded, unbounded, convex, and arc-connected subsets.
   – Characterize differentiable and integrable functions.
   – Manipulate Lebesgue theorems.

   b. **PI addressed by the course:**

PI	1.3	7.1
Covered	x	x
Assessed	x	

7. **Brief list of topics to be covered**
   – Normed vector spaces: Norms, Geometry of normed vector spaces, topology defined by norms, continuity of applications between 2 normed vector spaces, inner products and norms. (18 Lectures)
   – Differential and integral calculus: Derivatives, approximation of function with real variable, integration and differentiation. Taylor formula, Lebesgue convergence theorems, Euler gamma and beta functions. (18 Lectures)