Analysis 3

1. **Course number and name:** 020AN3CI4 Analysis 3

2. **Credits and contact hours:** 4 ECTS credits, 2x1:15 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:**
      Series and summable families, sequences and series of functions, integration and derivation of a series of functions, power aeries, probability and discrete random variables, linear differential equation and systems of the form X'=A(t)X+B(t), method of the constant variation, Lagrange's method.

   b. **Prerequisites:** 020AN2CI3 Analysis 2

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

6. **Educational objectives for the course**
   a. **Specific outcomes of instruction:**
      - Identify, construct, manipulate, compare and classify numerical series, function series and summable families.
      - Study and identify linear differential equations.
      - Study of multi-variables functions and differential forms.
      - Study of probability and random variables over a countable space.

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

PI	1.3
Covered	x
Assessed	x

7. **Brief list of topics to be covered**
   - Numerical series and summable families: convergence criteria of convergence of a positive term series, alternating series and summable families. (4 lectures)
   - Sequences and series of functions: simple, uniform and normal convergence. (4 lectures)
   - Power series: radius of convergence, relation to Taylor series. (4 lectures)
   - Differential Equations: equation and systems of the form X'=A(t)X+B(t). (4 lectures)
   - Multi-variable functions: partial derivatives, gradient, closed and exact differential forms. Curve-integral. (4 lectures)

- Probability and Random variables over a countable space: Independence, discrete random variables, couple of random variables, mean, variance special random variables (Poisson, geometric,…). (4 lectures)