

## 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:**

<b>PI</b>	1.3	7.1
<b>Covered</b>	x	x
<b>Assessed</b>	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)