Analysis 1

1. **Course number and name:** 020AA1CI2 Analysis 1

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:**
      Asymptotic analysis: Taylor series- Integration on a segment: integration and derivation- Riemann's sum- Real and complex series, series with positive terms, convergence and absolute convergence- Combinatorics: Cartesian product, arrangements, combinations, finite sets cardinality, probability on a finite space, Bayes formula, independence, finite random variables.

   b. **Prerequisites:** None

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

6. **Educational objectives for the course**
   a. **Specific outcomes of instruction:**
      - Identify, construct, manipulate, compare and classify functions.
      - Study a function locally and near infinity
      - Manipulate Riemann integrals of piecewise continuous functions
      - Characterize and manipulate numerical series
      - Study and manipulate finite probability spaces.

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

PI	1.3
Covered	x
Assessed	x

7. **Brief list of topics to be covered**
   - Asymptotic analysis: Comparison of real functions near a given point, Taylor series and their applications (4 lectures)
   - Riemann Integral of step and piecewise continuous functions: fundamental theorem of calculus, Taylor- Lagrange theorem, approximation of integral the Riemann's sums (4 lectures)
   - Numerical Series: convergence, absolute convergence, comparison of series and operations on series (4 lectures)

- Combinatorics: finite sets, cardinal of a set, number of bijective maps, of combinations (4 lectures)
- Probability on finite spaces: general properties, Bayes formula, independent events (4 lectures)
- Finite random variables: definition, mean, variance, standard deviation, Bernoulli and binomial variables, Bienaymé-Tchebychev inequality (4 lectures)