

Course Syllabus

1. Course number and name: 020AN2NI4 Analysis 2.
2. Credits and contact hours : 6 ECTS credits, 3x1:15 course hours
3. Instructor's or course coordinator's name : Fares Maalouf
4. Text book : : X. OUDOT, Maths PC, Vuibert
 - a. other supplemental materials :
5. Specific course information
 - i. Catalog description: Series and summable families, sequences and series of functions, integration and derivation of a series of functions, power series, 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. First and second order differential equations.
 - ii. Prerequisites: Analysis 1 (020AN1NI2) or Analysis 1 (020AN1CI2)
 - iii. Required : Yes
6. Specific goals for the course
 - a. Specific outcomes of instruction
 - Apply convergence criteria in order to determine the nature of a series.
 - Identify sequences or series of functions, which are pointwise or uniformly convergent.
 - Evaluate the radius of convergence of a power series.
 - Represent a function as a sum of a power series.
 - Solve a linear differential equation or system with constant coefficients.
 - Solve certain linear differential equations or systems, with non-constant coefficients.
 - Identify the probability distributions of discrete random variables.
 - b. KPIs addressed by the course.

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

7. Topics and approximate lecture hours :

- Series: introduction and examples (3 Lectures)
- Convergence tests: ratio test, root test, alternating series test (3 Lectures)
- Sequences of functions, pointwise and uniform convergence (5 Lectures)
- Series of functions, normal convergence, term by term integration or differentiation (5 Lectures)
- Power series (6 Lectures)
- Differential equations and systems, Cauchy-Lipschitz theorem (2 Lectures)
- Linear differential equations with constant coefficients, method of variation of parameters (3 Lectures)
- Linear differential systems with constant coefficients, method of variation of parameters (3 Lectures)
- Some ordinary differential equations with non-constant coefficients, Lagrange method (2 Lecture)
- Probability on a countable universe (6 Lectures)
- Discrete random variables, generating functions, usual probability distributions (4 Lectures)