Course Syllabus

020ANNGS1 Numerical analysis

1. **Course number and name:** 020ANNGS1 Numerical analysis.
2. **Credits and contact hours:** 4 credits, 2x1:35 course hours.
3. **Instructor's or course coordinator's name:** Rafic FADDOUL & Joanna NSEIR
4. **Textbook and other supplemental material:**
   - **a.** Lecture notes
   - **b.** Assignement handouts
   - **c.** Applied Numerical Analysis (6th Edition), Curtis F. Gerald, Patrick O. Wheatley, Published by Addison-Wesley (1998).
   - **d.** Numerical Analysis, Richard L. Burden and J. Douglas Faires, - 9th Edition
   - **e.** Numerical methods for engineers, Steven C. Chapra and Raymond P. Canale. - 6th ed.
5. **Specific course information**
   - **a. Catalog description:** General introduction to numerical methods – Systems of linear equations – Approximation and interpolation – numerical differentiation – numerical integration – nonlinear equations – systems of nonlinear equations – numerical solutions of differential equations – numerical solutions for partial differential equations - numerical solutions for eigenvalues.
   - **b. Prerequisites:** Algebra – Analysis.
   - **c. Required/Elective/Selected Elective:** Required major course for Civil engineering students.
6. **Specific goals for the course**
   - **a. Specific outcomes of instruction:**

     By the end of the course, the student will be able to:
     - carry out mathematical modeling of engineering problems
     - identify the advantages and limitations of the various numerical tools;

   - **b. KPIs addressed by the course:**

KPI	a1	a2	b3	e2	e3	k1	k3
Covered	X	X	X	X	X	X	X
Assessed	X					X	
Give Feedback							

7. **Brief list of topics to be covered and approximate number of lectures:**

Nbr Hours	**Content**
4	Systems of linear equations
4	Interpolation
3	Numrical differentiation
3	Numerical integration
4	Numerical solutions for first order ordinary differential equations
4	Numerical solutions for n^{th} order ordinary differential equations
4	Numerical solutions for partial differential equations
4	Numerical solutions for (systems) nonlinear equations
4	Numerical solutions for eigenvalues