



Course No.: 54453144

Time Division: 3 hr Theoretical and 2 hr Practical

Course Name: Numerical Analysis

Semester & Year: First, 2022 / 202

Course Website:

Course Description:

The primary objective of the course is to develop the basic understanding of numerical algorithms and to implement algorithms to solve mathematical problem on computer. Introduction to numerical method with emphasis on algorithm construction, analysis and implementation. Solutions of equations in one variable, polynomial approximation, direct solves for linear systems, indirect solves for linear systems.

Course Intended Outcomes:

The aim of this course is to study and discuss the numerical method to solve the one variable equation (non-linear equation), linear and nonlinear system direct and indirect methods, Interpolation and Polynomial Approximate, Numerical Differentiation.

Course Outline:

Week	Description depends on the Timing table (Theoretical & Practical)
1	Source of error, Classification of error, Number Representation, Absolute & Relative error
2	Non-linear Equation (One Variable Equation), Locating Root, 1. Bisection Method
3	2. Fixed-point Iteration Method, Fixed-point Theorem
4	3. Newton-Raphson Iteration Method, 4. Secant Method
5	5. False-Position Method
6	Linear system, Direct Method, First Exam
7	1. Gauss elimination method, 2. LU Decomposition
8	Indirect Method 1. Gauss Jacobi Iterative Method 2. Gauss-Seidel Method
9	Non-linear System of Equations, Use Newton-Raphson Method for solving nonlinear system, Second Exam
10	Interpolation and Polynomials Approximate, 1. Lagrange Interpolation Polynomials
11	2. Newton's Divided Difference Formulae
12	Newton interpolation formulae, Third Exam
13	3. Newton's Forward Difference Interpolation polynomials
14	4. Newton's Backward Difference Interpolation polynomials
15	Numerical Differentiation, 1. Newton's Forward Difference Formulae, 2. Newton's Backward Difference Formulae, Four Exam

Textbooks:

- [1]: Numerical Analysis by Richard L. Burden , 7th Edition (2011).
[2]: An Introduction to Numerical Methods and Analysis by James F. Epperson (2013).

Suggested references:

- [1]:
[2]:

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
3	3	1	1	8

Assignment/ Project	Description	Due Date	Marking
Home work	Some important exercise	13-11-2022	3
Home work	Some important exercise	5-12-2022	3

Instructor(s) information [معلومات الأستاذ]

Section: (Mathematics) ; Lecture Room:[A 204] ; Office No.: (11)

Instructor's Name: Dr. Lamyaa Hussein Ali

E-Mail: lamya_h2@yahoo.com

Office Hours : Sun.: [10: 10 – 11 : 50]

NOTES:

- Office Hour: Other office hours are available by appointment.
- The content of this syllabus not be changed during the current semester.



Lecturer Signature

د. م. د. طيار، حسيب علي



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