Course Description Form

1. Course Name:
Engineering and Numerical Analysis

2. Course Code:
MPAC300

3. Semester / Year:
2024-2025

4. Description Preparation Date:
23/09/4202

5. Available Attendance Forms:
presence

6. Number of Credit Hours (Total) / Number of Units (Total) :
116 H

7. Course administrator's name (mention all, if more than one name)
Name: Ali Muselm Abdul AL Mohsen Email: ali.muslim@uowa.edu.iq

8. Course Objectives

Course Objectives	This course aims to provide a good knowledge the students about the Engineering numerical analysis with understand the basis solutions and their application in differ branches of engineering / mechanical, mater Civil and power

9. Teaching and Learning Strategies

Strategy	1. Understand the methods of solutions for first, second and high orders differential equations and their engineering applications. 2. Understand the types and method of solution for Fourier Series and their engineering applications. 3. Understand the methods of solution by Laplace transformation and their applications. 4. Understand the methods of solution for partial differential equation and their engineering application. 106 5. Understand the numerical methods for solving linear and non-linear equations and their engineering applications. 6. Understand the numerical methods for solving the differential equations and their engineering applications.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1st week	4	The student understands subject	First order differen equations, Special cases first order D.E and t engineering	Theoretical	Assignment and c
2nd week	4	The student understands subject	applications.	Theoretical	Assignment and c
3rd week	4	The student understands subject	Second order linear equa with constant coefficients their engineering applicatio	Theoretical	Assignment and c
4th week	4	The student understands subject	High order linear differer equations , Integral opera and their enginee applications.	Theoretical	Assignment and c
5th week	4	The student understands subject	Fourier series, even and functions and their enginee applications.	Theoretical	Assignment and c
6th week	4	The student understands subject	Laplace transformat Inverse Lap transformation, Lap transformation to solution	Theoretical	Assignment and c
7th week	4	The student understands subject	differential equations and t engineering applications.	Theoretical	Assignment and c
8th week	4	The student understands subject	Partial differential equati solution by separation met and their enginee applications.	Theoretical	Assignment and c
9th week	4	The student understands subject	Nonlinear equations solut Simple Iteration, New Raphson, finite differe methods.	Theoretical	Assignment and c
10th week	4	The student understands subject	Solution of simultane linear equations, Direct Indirect methods	Theoretical	Assignment and c
11th week	4	The student understands subject	10 Interpolation by Lagran and Newton methods.	Theoretical	Assignment and c
12th week	4	The student understands subject	Curves fitting analysis Newton method.	Theoretical	Assignment and c
13th week	4	The student understands subject	Numerical integrat complex numerical integra and their applications.	Theoretical	Assignment and c
14th week	4	The student understands subject	Numerical method to s partial differential equat by separation method.	Theoretical	Assignment and c
15th week	4	The student understands subject	Numerical method to s differential equations by R Kotta and Power series.	Theoretical	Assignment and c
16th week	4	The student understands subject	Newton-Raphson method	Theoretical	Assignment and c
17th week	4	The student understands subject	finite difference method	Theoretical	Assignment and c
18th week	4	The student understands subject	Interpolation	Theoretical	Assignment and c
19th week	4	The student understands subject	Lagrangian method	Theoretical	Assignment and c
20th week	4	The student understands subject	Solution of simultane linear equations.	Theoretical	Assignment and c

21st week	**4**	The student understands subject	Direct methods. Indi methods	Theoretical	Assignment and c
22nd wee	**4**	The student understands subject	Numerical integrat Complex nume integration, applications	Theoretical	Assignment and c
23rd wee	**4**	The student understands subject	Curves fitting analysis	Theoretical	Assignment and c
24th weel	**4**	The student understands subject	Newton method	Theoretical	Assignment and c
25th weel	**4**	The student understands subject	Numerical method to s differential equations	Theoretical	Assignment and c
26th week	**4**	The student understands subject	Rang-Kotta method	Theoretical	Assignment and c
27th week	**4**	The student understands subject	Power series method	Theoretical	Assignment and c
28th week	**4**	The student understands subject	Exponential equations	Theoretical	Assignment and c
29th week	**4**	The student understands subject	Frobinous method	Theoretical	Assignment and c
30th week	**4**	The student understands subject	Preparatory week before final Exam	Theoretical	Assignment and c

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1- Advanced Engineering Mathematics, Erwin Kreysz John Wiley & Sons, Inc. - 2- Advanced Engineering Mathematics, Peter V. O'N Thomson Brooks/Cole – 3- Advanced Engineering Mathematics, A.B. Mathur & Jaggi, Khanna Publishers – 4- Advanced Engineering Mathematics, Wyle Barrett /l edition.
Main references (sources)	1- Numerical Methods for Scientists and Engine R.w. Hamming knowledge. – 2- 2- Numerical Analysis, Richard L. Burden & Douglas Faires.
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	