Course Description Form

1. Course Name: Numerical Analysis II

2. Course Code: CE 3201

3. Semester / Year: 2st / 2023-2024

4. Description Preparation Date: 13/3/2024

5. Available Attendance Forms: Attending lectures in the department's classrooms.

6. Number of Credit Hours (Total) / Number of Units (Total): 30Hours/ 2 Units

7. Course administrator's name (mention all, if more than one name)

Name: Assist. Prof. Yousra Abd Mohammed
Email: Yousra.a.mohammed@uotechnology.edu.iq

8. Course Objectives

Course Objectives	• To study the principles of Numerical Analysis and its applications. • Teaching students how to use programming to solve complicated problems. • Gain knowledge about how to solve Ordinary Differential Equations, interpolation, and curve fitting problems by attrition.

9. Teaching and Learning Strategies

Strategy	Theoretical lectures using PPT & PDF, and Video lectures. The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple tutorial involving some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 theoretical	A ,B, and C	Methods for 1st order Ordinary Differential Equations, Euler method	ppt, pdf, & Video lectures	Quiz , Discussion & Exam
2	2 theoretical	A ,B, and C	Improved Euler method, Backward Euler method	ppt, pdf, & Video lectures	Quiz , Discussion & Exam
3	2 theoretical	A ,B, and C	Heun's method: trapezoidal method,	ppt, pdf, & Video lectures	Quiz , Discussion & Exam
4	2 theoretical	A ,B, and C	Runge-Kutta method	ppt, pdf, & Video lectures	Quiz , Discussion & Exam
5	2 theoretical	A ,B, and C	Adams-Bashforth methods, Adams-Moulton methods.	ppt, pdf, & Video lectures	Quiz , Discussion & Exam
6	2 theoretical	A ,B, and C	Linear & Quadratic interpolation	ppt, pdf, & Video lectures	Quiz , Discussion & Exam
7	2 theoretical	A ,B, and C	N- interpolation degree	ppt, pdf, & Video lectures	Quiz , Discussion & Exam
8	2 theoretical	A ,B, and C	interpolation, Interpolation by Newton polynomial	ppt, pdf, & Video lectures	Quiz , Discussion & Exam
9	2 theoretical	A ,B, and C	approximation by Chebyshev polynomial	ppt, pdf, & Video lectures	Quiz , Discussion & Exam
10	2 theoretical	A ,B, and C	interpolation by Cubic spline	ppt, pdf, & Video lectures	Quiz , Discussion & Exam
11	2 theoretical	A ,B, and C	Hermite interpolating polynomial.	ppt, pdf, & Video lectures	Quiz , Discussion & Exam
12	2 theoretical	A ,B, and C	Straight line fit (a polynomial function of first degree),	ppt, pdf, & Video lectures	Quiz , Discussion & Exam
13	2 theoretical	A ,B, and C	Polynomial curve fit(a polynomial function of higher degree),	ppt, pdf, & Video lectures	Quiz , Discussion & Exam
14	2 theoretical	A ,B, and C	Exponential curve fit and other functions. Finite differences	ppt, pdf, & Video lectures	Quiz , Discussion & Exam
15	2 theoretical	A ,B, and C	=.	ppt, pdf, & Video lectures	Quiz , Discussion & Exam

11. Course Evaluation

Term Tests	Quizzes	Final Exam
As(30%)	As(10%)	As(60%)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	-
Main references (sources)	• Applied Numerical methods using MATLAB, W. Y. Yang, a John Wiley and Sons. • Advance Engineering Mathematics. E. Kreyszing, 9th Edition, 2006.
Recommended books and references (scientific journals, reports...)	Advanced Engineering Mathematics By Erwin Kreyszig · 2020
Electronic References, Websites	https://www.sanfoundry.com/best-reference-books-numerical-methods/

Course Description Form

13. Course Name:	
Engineering Analysis	
14. Course Code:	
CE 3202	
15. Semester / Year:	
Semester 2 / 3rd	
16. Description Preparation Date:	
17/3/2024	
17.Available Attendance Forms:	
Attendance	
18.Number of Credit Hours (Total) / Number of Units (Total)	
4 hrs./Week	
19. Course administrator's name (mention all, if more than one name)	
Name: Dr. Mustsfs Sami Ahmed Email: mustafa.sa.ahmed@uotechnology.edu.iq	
20. Course Objectives	
Course Objectives	• **To develop problem solving skills and understanding of , Eign values and E vectors through the application of techniques.** • **To understand the Definition of Z−Transform , Region of convergence a Application of ZT.**
21. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking

	skills. This will be achieved through classes, interactive tutorials and by considering types of sampling activities that are interesting to the students.

22. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1;2;3;4;5	20	1. We start with a basic and thorough introduction to eigenvalue problems in week 2 and explain with several simple matrices. This is followed by a section devoted entirely. We show you these diverse examples to train your skills in modeling and solving eigenvalue problems. Eigenvalue problems for real symmetric, skew-symmetric, and orthogonal matrices are discussed in week 3, and their complex counterparts (which are important in modern physics) in week 3. In week 4 we show how by diagonalizing a matrix, we obtain its eigenvalues. 2. The z-transform, which extends the DTFT to the analysis of discrete-time systems. 3. algebraic methods can solve the linear ODEs with constant coefficients, and their solutions are elementary functions known from calculus. For ODEs with variable	**Complex Variable Theory Function:** of complex variable, complex differentiation, Cauchy-Riemann equations, analytic function and its properties, Elementary complex functions; powers, exponential function, trigonometry and hyperbolic function, logarithm, and general powers. Mapping of elementary complex functions, Cauchy's integral theorem, Cauchy's integral formula, Cauchy integration in the complex plane, derivatives of an analytic functions. Infinite series for functions of complex variable; Taylor series, Laurent series, the residue multiply connected regions.	Attendance	**Quizze** LO #(1&2), (5&6), (9&10) and (12&13)**s**
6;7;8	12		**Partial Differential Equation:** Solution of boundary condition problems, Wave equation, Laplace general solution, solution by separation of variables.	Attendance	**Assignments** LO # 1-13

9	4	coefficients, the situation is more complicated, and their solutions may be nonelementary functions. Legendre's, Bessel's, and the hypergeometric equations are important ODEs of this kind. Since these ODEs and their solutions, the Legendre polynomials, Bessel functions, and hypergeometric functions play an important role in engineering modeling, we shall consider the two standard methods for solving such ODEs. The transition from "real calculus" to "complex calculus" starts with a discussion of complex numbers and their geometric representation in the complex plane. We then progress to analytic functions in week 12. We desire functions to be analytic because these are the "useful functions" in the sense that they are differentiable in some domain and operations of complex analysis can be applied to them. The most important equations are therefore the Cauchy–Riemann equations in week 13 because they allow a test of the analyticity of such functions	**Mid-term Exam**	Attend ance	LO # 1-7
10;11;12	12		**Partial Differentiation :** Function of two or more variables. Partial derivatives. Directional derivative. Gradient, divergence and curl. Tangent plane and normal line. Maxima, minima & saddle point.	Attend ance	
13;14;15	12		**Ordinary differential Equations:** First order: variables separable, homogeneous, linear – Bernoulli and exact. Second order: homogeneous and non-homogeneous. Higher order differential equations.	Attend ance	

23. 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

24. Learning and Teaching Resources

Required textbooks (curricular books, if any)	

Main references (sources)	1- Kellaway, F. W. "Advanced Engineering Mathematics. ByErwin Kreyszig. Pp. xx, 899. 68s.(Wiley.)." The Mathematical Gazette 53.386 (1969): 444-444. 2- Ambardar, Ashok. *Analog and digital signal processing*. BOSTON, MA: PWS, 1995. Chapter (9).
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

25. Course Name:
Digital communication II
26. Course Code:
CE 3204
27. Semester / Year:
2nd / 2023-2024
28. Description Preparation Date:
2024/3/20
29.Available Attendance Forms:
Continuous/quarterly
30.Number of Credit Hours (Total) / Number of Units (Total)
45/6
31. Course administrator's name (mention all, if more than one name)
Name: Assist.Professor Hussain Abdul Karim Hammas Email: hussain.a.hammas@uotechnology.edu.iq
32. Course Objectives

Course Objectives	**a. study the concepts of digital communications.** **b. Study the types of digital modulation.** **c. Study the Spread Spectrum System and the Transmitted &Receive digital signals.** **d. Calculating the error performance of binary system.**

a. Teaching and Learning Strategies	
Strategy	Lectures Exercises Quizzes Homework

b. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	a, b	Introuduction of Digital Pass-band Transmission	in person	Quizzes , Home-works , Discussions , and Examinations.
2	3	a, b	Amplitude Shift Keying,	in person	Quizzes , Home-works , Discussions , and Examinations.
3	3	a, b	Frequency Shift Keying	in person	Quizzes , Home-works , Discussions , and Examinations.
4	3	a, c	Phase Shift Keying PSK, Differential PSK	in person	Quizzes , Home-works , Discussions , and Examinations.
5	3	a, c	Error performance of binary syst QAM	in person	Quizzes , Home-works , Discussions , and Examinations.
6	3	a, c	QPSK, Offset-QPSK, MSK. MFSK	in person	Quizzes , Home-works , Discussions , and Examinations.
7	3	a, d	M-ray QAM, Error performance M-ray Systems.	in person	Quizzes , Home-works , Discussions , and Examinations.
8	3	a, d	Comparison betw performance of dig modulation types. Band wi efficiency	in person	Quizzes , Home-works , Discussions , and Examinations.
9	3	a, d	Direct Sequence (DS) Spread Spectrum,	in person	Quizzes , Home-works , Discussions , and Examinations.
10	3	a, e	Use of Spread Spectrum w Code Division Multi Access (CDMA)	in person	Quizzes , Home-works , Discussions , and Examinations.
11	3	a, e	Ranging using DS Spread Spectr Frequency Hoping (FH) Sp Spectrum	in person	Quizzes , Home-works , Discussions , and Examinations.
12	3	a, e	Generation and Characteristics of Sequences,	in person	Quizzes , Home-works , Discussions , and Examinations.
13	3	a, e	Tracking of FH,DS Signal	in person	Quizzes , Home-works ,

					Discussions , and Examinations.
14	3	a, e	Digital Multiplexing	in person	Quizzes , Home-works , Discussions , and Examinations.
15	3	a, e	Error Control Coding	in person	Quizzes , Home-works , Discussions , and Examinations.

c. Course Evaluation
quarterly exams 30%, Daily exams, homework, discussions 10%.

d. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	1-Analog and digital communication Systems, Martin S. Roden 3rd edition, prentice Hall. 2- Digital communication ,Glover &Grant, prentice Hall.
Main references (sources)	Communication Systems, S. Haykin , John Willy & Sons.
Recommended books and references (scientific journals, reports…)	Modem Analog and digital communication Systems,B.P.Lathi,Ox Univ.Press.
Electronic References, Websites	

Course Description Form

33. Course Name:
Signals &Systems I I
34. Course Code:
CE 3206
35. Semester / Year:
second Semester/ THIRD Year
36. Description Preparation Date:
1/2/2024
37.Available Attendance Forms:
Face-to-face class attendance
38.Number of Credit Hours (Total) / Number of Units (Total)
2/2
39. Course administrator's name (mention all, if more than one name)

Name: Dr. Mohammed Hussein miry
Email: Mohammed.H.Miry@uotechnology.edu.iq

40. Course Objectives

Course Objectives	• Understand the fundamental concepts of Fourier Series and Fourier Transform. • Learn about the properties, characteristics, and analysis of Fourier Series and Fourier Transform.. • Study the principles and techniques used in acquiring and processing signals. in frequency domain. • To gain knowledge about signal processing techniques as applied to signals and systems in frequency domain • To foster critical thinking and problem-solving abilities in analyzing and interpreting signals and systems in frequency domain. •

41. Teaching and Learning Strategies

Strategy	• Lecture presentation • Tutorials • Experimental learning

42. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Understand the basic concepts of signals & systems	Definition, Properties of The Fourier Series	Lectures	Examinations, Homework, and Reports
2	2		Parseval's Theorem,		
3	2		The Frequency Domain CTFS of Common Functions and Using CTFS Tables.		
4	2	Get skills in the analysis methods of signals and systems	Limitations of the Fourier series, Definition of The Fourier Transform, The Frequency Domain, Generalized Fourier Transform, FT of Complex Exponentials,		
5	2		Examples of the Fourier Transform, Properties of The Fourier Transform, Wiener Khintchine Theorem		
6	2		Applications of the Fourier Transform: Frequency Response of the System.		
7	2		Definition of filters		
8	2		Impulse response of the Ideal LPF Filter		
9	2	Gain knowledge about signal processing techniques as	Impulse response of the Ideal High Pass Filter		
10	2		Impulse response of the Ideal Bandpass Filter		
11	2		Practical Filters		
12	2		Bode Diagrams..		

13	**2**	applied to signals and systems.	Definitions		
14	**2**		Spectral Analysis and Filtering with the Wavelet Transform.		
15	**2**		Filtering with the Wavelet Transform		

43. Course Evaluation

1. Classroom activity: 2 Marks 2. Quizzes: 5 Marks 3. Homework: 3 Marks
4. Midterm: 30 Marks 5. Final exam: 60 Marks

44. Learning and Teaching Resources

Required textbooks (curricular books, if any)	-
Main references (sources)	• Signals and Systems. By Simon Haykin, and Barry Van Veen. • SIGNALS SYSTEMS Continuous and Discrete. By Rodger E. Ziemer, William H. Tranter, and D. Ronald Far
Recommended books and references (scientific journals, reports…)	• Digital Signal Processing: Fundamentals and Applicati By Li Tan.
Electronic References, Websites	-