Course Description Form

1. Course Name: **Mathematics III**

2. Course Code: **CE2102**

3. Semester / Year: 1st Semester

4. Description Preparation Date: 18.3.2024

5. Available Attendance Forms: classroom

6. Number of Credit Hours (Total) / Number of Units (Total)

Units (4)

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

Name: Dr. Haider Abdulelah Abdulkarim
Email: haider.a.abdulkarim@uotechnology.edu.iq

8. Course Objectives

Course Objectives	1. This module aims to ensure that students would have the mathematical skills and knowledge to cope with the mathematical content of their degree course. 2. Through its first part, the students learn the principles of Fourier Series of continuous time signals. 3. They also learn the concept of Fourier Transform, as well as the transformation kernel calculation 4. In addition, the students will learn the basic and advanced differential equations, such as partial, second and higher order differential equations. As a result, they will be able to find a general solution to differential equations.

9. Teaching and Learning Strategies

Strategy	This module adopts the main strategy of encouraging students' participation in the exercis while at the same time refining and expanding their critical thinking skills. This will be achie through classes, within-class problem solving and quizzes.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1~4	[16hrs]	Periodic functions, Fourier series – Euler formulas, even and odd functions. (Half – Range expansions), applications in electrical engineering. Complex exponential form, Fourier Integral, Fourier transforms and inverse, Properties, convolution theorem.	Functions Fourier Series and Fourier Transform	Lectures (attendance)	Mid Exam
5~8	[16hrs]	Function of two or more variables Partial derivatives Directional derivative. Gradient, divergence and curl. Tangent plane and normal line. Maxima, minima & saddle point.	Partial Differential Equations	Lectures (attendance)	Mid Exam
9~12	[16hrs]	First order (variables separable, homogeneou linear – Bernoulli and exact). Second order (Homogeneous and non homogeneous). Higher order differential equations.	Ordinary Differential Equatio	Lectures (attendance)	Mid Exam

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation home works, monthly, and mid-term written exams .

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Thomas Calculus 12th edition
Main references (sources)	Advanced Engineering Mathematics 12th editio
Recommended books and references (scientific journals, reports…)	Calculus Anton, Bivens and Davis
Electronic References, Websites	Calculus I (lamar.edu)

Course Description Form

13.Course Name:
Electromagnetic Fields I
14.Course Code:
CE2105
15.Semester / Year:
1 / 2023-2024
16.Description Preparation Date:
19/3/2024
17.Available Attendance Forms:
18.Number of Credit Hours (Total) / Number of Units (Total)
٤٥ hours / 30 units
19.Course administrator's name (mention all, if more than one name)
Name: Haydar Malik Abdulhadi Email: haydar.m.abdulhadi@uotechnology.edu.iq

20.Course Objectives	
Course Objectives	• Study the fundamental principles of electric fields. • Gives the students the knowledge in basic theory and analysis of electric fields. • Drive Maxwell equations for electric field that is need in several objects courses in third and fourth years such as propagation, antenna and microwave engineering.
21.Teaching and Learning Strategies	
Strategy	• Lectures • Tutorials • Electric education

22. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Vector algebra, the Cartesian coordinate system	Vector Analysis	Lectures, Tutorials	Quiz + Exam + HW
2	3	Vector components and unit vectors, vector field, dot product, cross product	Vector Analysis	Lectures, Tutorials	Quiz + Exam + HW
3	3	Circular cylindrical coordinate system, spherical coordinate system	Vector Analysis	Lectures, Tutorials	Quiz + Exam + HW
4	3	Coulomb’s law, electric field intensity, field of n point charges	Coulombs Law and Electric Field Intensity	Lectures, Tutorials	Quiz + Exam + HW

5	3	Field due to a continuous volume charge distribution, field of a line charge	Coulombs Law and Electric Field Intensity	Lectures, Tutorials	Quiz + Exam + HW
6	3	Field of a sheet of charge, streamlines and sketches of fields	Coulombs Law and Electric Field Intensity	Lectures, Tutorials	Quiz + Exam + HW
7	3	Electric flux density, Gauss's law	Electric Flux Density, Gauss's Law, and Divergence	Lectures, Tutorials	Quiz + Exam + HW
8	3	Applications of Gauss's law, differential volume element divergence	Electric Flux Density, Gauss's Law, and Divergence	Lectures, Tutorials	Quiz + Exam + HW
9	3	Maxwell' first equation, and the divergence theorem	Electric Flux Density, Gauss's Law, and Divergence	Lectures, Tutorials	Quiz + Exam + HW
10	3	Energy expended in moving a point charge, definition of potential difference and potential	Energy and Potential	Lectures, Tutorials	Quiz + Exam + HW
11	3	The potential field of a point charge, the potential field of a system of charges	Energy and Potential	Lectures, Tutorials	Quiz + Exam + HW
12	3	Potential gradient, the dipole, energy density in electrostatic field	Energy and Potential	Lectures, Tutorials	Quiz + Exam + HW
13	3	Current and current density, continuity of current	Conductors, Dielectrics	Lectures, Tutorials	Quiz + Exam + HW
14	3	Conductor properties and boundary conditions	Conductors, Dielectrics	Lectures, Tutorials	Quiz + Exam + HW
15	3	Method of images, dielectric materials and boundary conditions	Conductors, Dielectrics	Lectures, Tutorials	Quiz + Exam + HW

23.Course Evaluation

Term Exam	Quizzes + HW	Final Exam
As(30%)	As(10%)	As(60%)

24.Learning and Teaching Resources

Required textbooks (curricular books, if any)	1- William H. Hayt and Joun A. Buck, "Engineering Electromagnetic".
Main references (sources)	2- Sadiku, "Elements of Electromagnetic". 3- Joseph A. Edminister, "Electromagnetics
Recommended books and references (scientific journals, reports...)	N/A
Electronic References, Websites	N/A

Course Description Form

1. Course Name:
Communication Systems I
2. Course Code:
CEM 2106
3. Semester / Year:
1 / 2023-2024
4. Description Preparation Date:
19/3/2024
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total)
٤٥ hours / 30 units
7. Course administrator's name (mention all, if more than one name)
Name: Atheer Alaa Sabri Email: atheer.a.sabri@uotechnology.edu.iq
8. Course Objectives

Course Objectives	• To provide the student with knowledge related to various components of communication systems. • To provide the student with knowledge related to the types of signals and systems in communication systems. • To have knowledge regarding Amplitude Modulation systems Quadrature Amplitude Modulation and Frequency Division Multiplexing.
9. Teaching and Learning Strategies	
Strategy	1. Lectures 2. Tutorials 3. Homeworks

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Introduction to Communication Systems	Elements of communication system and its fundamental limitations. Need of modulation, Analog or Digital communications, Why analog design remains important.	Lectures, Tutorials	Quiz + Exam + HW
2	3	Identify the types of Signals in time domain	Classification and representation of continuous time and discrete time signals, Signal operations, Continuous time and discrete time systems- classification & properties	Lectures, Tutorials	Quiz + Exam + HW
3	3	Dealing with systems	Differential equation representation of continuous time systems, Frequency domain representation of continuous time signals.	Lectures, Tutorials	Quiz + Exam + HW

4	3	Converting Signals to Frequency Domain	Fourier series & Fourier transform, properties.	Lectures, Tutorials	Quiz + Exam + HW
5	3	Understanding the basics of Modulation	Frequency translation, Method of frequency translation	Lectures, Tutorials	Quiz + Exam + HW
6	3	Understanding DSB-SC Modulation	DSB-SC Signal and its Spectrum, Balanced modulator, Synchronous detectors	Lectures, Tutorials	Quiz + Exam + HW
7	3	Understanding DSB-LC Modulation	Amplitude modulation, Modulation index. Spectrum of AM signal. Modulators and Demodulators (Diode detector)	Lectures, Tutorials	Quiz + Exam + HW
8	3	Understanding SSB and VSB Modulations	SSB Signal, SSB generation methods, Vestigial Sideband (VSB) Modulation	Lectures, Tutorials	Quiz + Exam + HW
9	3	Identify QAM and power calculation in Amplitude Modulation	Quadrature Amplitude Modulation. Power calculations in AM systems	Lectures, Tutorials	Quiz + Exam + HW
10	3	Application of AM Systems	Concept synthesis for AM. Application of AM Systems	Lectures, Tutorials	Quiz + Exam + HW
11	3	Understanding how to share channel in frequency domain	FDM system (transmitter & receiver)	Lectures, Tutorials	Quiz + Exam + HW
12	3	Understanding how to share channel in frequency domain	Practical implementation of FDM system	Lectures, Tutorials	Quiz + Exam + HW
13	3	Types of Noise in Communication Systems	Sources of Noise, Resistor Noise, Shot Noise, Calculation of Noise in a Linear System, Noise in AM Systems	Lectures, Tutorials	Quiz + Exam + HW
14	3	Practical AM Communication Systems	AM transmitter, Radio telegraph and telephone transmitters, SSB transmitters.	Lectures, Tutorials	Quiz + Exam + HW
15	3	Practical AM Communication Systems	AM receivers: RF section, Frequency changing and tracking	Lectures, Tutorials	Quiz + Exam + HW

11.Course Evaluation

Term Exam	Quizzes + HW	Final Exam
As(30%)	As(10%)	As(60%)

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Communication Systems, S. Haykin, John Willy & Sons.
Main references (sources)	Modem Analog & Digital Communication Systems, B.P. Lathi, Oxford Univ.
Recommended books and references (scientific journals, reports...)	Analog Communication Systems, Pchakrabarti Dhanpat Rai
Electronic References, Websites	N/A

25.	Course Name:
	Electronics II
26.	Course Code:
	CE2103
27.	Semester / Year:
	1/2023-2024
28.	Description Preparation Date:
	23/3/2024
29.	Available Attendance Forms:
	Full Time
30.	Number of Credit Hours (Total) / Number of Units (Total):
	45/30

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

Name: Assist Prof. Dr. Ali Owda Abid Noor
Email: ali.o.abidnoor@uotechnology.edu.iq

32. Course Objectives

Course Objectives	1.To provide the students the essential knowledge related to various amplifier and oscillator circuits used in communication engineering. 2. To provide the student with adequate skills to analyze these circuits and determining the required components for particular frequency bands operation. 3. To teach the students how to determine the power and efficiency of power amplifier circu

33. Teaching and Learning Strategies

Strategy	1. Class Lectures 2. Tutorials

34. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2,3	9	1-Understanding purpose of amplifier circuits 2- Determining the frequency response 3- Determining components values ٤- Discuss ideas and share Knowledge	Multistage Amplifiers	1- Class Lecture 2 -Tutorial	1 - Quiz 2 - Exam
4,5	6	1-study theory of feedback circuits	Feedback	1- Class Lecture	**1** Quiz

		2- Determining the frequency response 3- Determining components values 4- construct the circuit to wor at certain frequency 5- Discuss ideas and share knowledge	Amplifiers	2 -Tutorial	2 Exam
6,7,8	9	1-Understanding theory of oscillator circuits 2- Determining the resonant frequency 3- Determining components values 4- construct the circuit to work at certain frequency 5- Discuss ideas and share knowledge	Sinusoidal oscillators	1- Class Lecture 2 -Tutorial	1 Quiz 2 Exam
9, 10,11	6	1-Understanding theory of operational amplifier 2- Study characteristics of Operational amplifiers 3- Determining components Values for certain gain 4- Construct the circuit to wor for applications 5- Discuss ideas and share knowledge	Operational Amplifiers	1- Class Lecture 2 -Tutorial	1 Quiz 2 Exam
12,13	9	2-Understanding theory of power amplifier circuits 2- Determining the The power 3- Determining the efficiency 4- construct the circuit to wor at certain efficiency 5- Discuss ideas and share knowledge	Power Amplifiers	1- Class Lecture 2 -Tutorial	1 Quiz 2 Exam
14, 15	6	1-Understanding purpose of tuned amplifier circuits 2- Determining the frequency response 3- Determining components values 4- construct the circuit to wor at certain frequency 5- Discuss ideas and share knowledge	Tuned Voltage Amplifiers	1- Class Lecture 2 -Tutorial	1 Quiz 2 Exam
11.Course Evaluation					

1. Quizzes 10% 2. Mid Exam 30% 3. Final Exam 40%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	-
Main references (sources)	1- T. Floyd," Electronic Devices.12th Edd. 2- Millman and Halkias "Integrated Electronics", 10th Edition 3- Bogart, "Electronic Devices and Circuits". 4- Lecture notes
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-