	Ministry of Higher Education and Scientific Research - Iraq University of Diyala College of Engineering Department of Communication Engineering	

الملحق 4: وصف المادة الدراسية

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Signals and Systems**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐**Lecture** ☒**Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**COE 201**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UGII	**Semester of Delivery**		1
Administering Department		BSc - COMM	**College**	College of Engineering	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		2024/9/1	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understanding the connectivity between mathematical operations and real-life operations. 2. Understanding the basics of signals in real-life. 3. Understanding the basics of signals in real life. 4. To grow problematic resolution skills through utilization of signals and systems basic mathematical skills. 5. To understand the power and energy of signals. 6. To represent signals using different domains (Time/Frequency). 7. Understanding the system's behavior through different excitations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding the main signal components. 2. Show how to recognize the different signal types. 3. Show how to distinguish between the different system types. 4. List the basic signal functions. 5. Understanding Signals operations. 6. Show the interaction between signals and systems. 7. Understanding the convolution and correlation operations. 8. Understanding the reaction between signals themselves. 9. Understanding the representation of the signals and systems in time/frequency-domains.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following.** • Definitions (**2 hrs**). • Signals Classification (**8 hrs**). • Systems Classifications (**6 hrs**). • Operations on Signals (**8 hrs**). • Convolution and Correlation (**4 hrs**). • Fourier Series (**7 hrs**). • Fourier Transform (**10 hrs**).
Description	**Introduction and Definitions. Classification of signals**: Continuous time (CT), discrete time (DT), periodic/aperiodic, random signals, Energy/Power Signals. **Basics Signal Types**: step, Ramp, Pulse, Impulse, and Exponential. **Main Operations on Signals**: amplitude/time/frequency scale, time shift, phase shift, time reversal, and signals multiplication. **Classification of systems**: CT and DT systems, basic properties of systems-Linear time invariant/variant system and properties, memory/memoryless, causal/not-causal, bunded/unbounded, and stable/unstable systems. **Analysis of Continuous Time Signals**: Fourier series analysis, spectrum of CT signals, Fourier Transform and its Inverse. Fourier Transform properties. **Sampling theory**: Sampling of CT signals and aliasing, signal reconstruction from sampled signals.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The primary approach for administering this module is expected to motivate students to participate in the exercises while simultaneously improving and developing their capacity for critical thought. This will be accomplished via lessons, collaborative tutorials, and the consideration of straightforward trials including selecting tasks that are appealing to students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	**78**	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	**5**
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	**72**	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	**4.8**
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	**2**	**5% (10)**	**2 and 6**	**LO #1 to #5 and #7 to #9**
	Assignments	**2**	**5% (10)**	**3 and 13**	**LO #3 to #9**
	Projects / Lab.	**2**	**5% (10)**	**Continuous**	**All**
	Report	**1**	**10% (10)**	**12**	**LO #3, #4**
Summative assessment	**Midterm Exam**	**1hr**	**10% (10)**	**7**	**LO #1 - #5**
	Final Exam	**3hr**	**50% (50)**	**16**	**All**
Total assessment			**100% (100 Marks)**		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction and Definitions.
Week 2	**Classification of signals**: Continuous time (CT), discrete time (DT).
Week 3	**Classification of Signals**: Periodic/aperiodic, random signals.
Week 4	**Classification of Signals**: Energy/Power Signals.
Week 5	**Basics Signal Types**: step, Ramp, Pulse, Impulse, and Exponential.
Week 6	**Main Operations on Signals**: amplitude/time/frequency scale, phase shift, time reversal, and signals multiplication.
Week 7	**Sampling Theory**: Sampling of CT signals and aliasing, signal reconstruction from sampled signals.
Week 8	**Sampling Theory**: Reconstruction of signals from sampled signals.
Week 9	**Classification of systems**: CT and DT systems, basic properties of systems-Linear time invariant/variant system and properties.
Week 10	**Classification of Systems**: Memory/memoryless, causal/not-causal, bunded/unbounded, and stable/unstable systems.
Week 11	**Analysis of Continuous Time Signals**: Trigonometric Fourier series.
Week 12	**Analysis of Continuous Time Signals**: Exponential Fourier series, spectrum of CT signals.
Week 13	**Analysis of Continuous Time Signals**: Foreword Fourier Transform.
Week 14	**Analysis of Continuous Time Signals**: Inverse Fourier Transform.
Week 15	**Analysis of Continuous Time Signals**: Fourier Transform properties.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introducing laboratory apparatus and their basic operation.
Week 2	Variant Signals generation using function generator.
Week 3	Signals operations using RLC circuits – Part 1 (Summation).
Week 4	Signals operations using RLC circuits – Part 2 (Phase shift).
Week 5	Signals operations using RLC circuits – Part 3 (Integration).
Week 6	Signals operations using RLC circuits – Part 4 (Differentiation).
Week 7	Sampling of Signals – Part 1 (Based on Signal Generators).
Week 8	Sampling of Signals – Part 2 (Based on Transistor).
Week 9	Signals Reconstruction from Sampled Version – Part 1 (Using passive filter).
Week 10	Signals Reconstruction from Sampled Version – Part 2 (Using active filter).

Week 11	Fourier Series Verification – Part 1 (Based on Signal Generator and passive filter).
Week 12	Fourier Series Verification – Part 2 (Based on Signal Generator and active filter).
Week 13	Fourier Series Verification – Part 3 (Based on 555 timer and passive filter).
Week 14	Fourier Series Verification – Part 4 (Based on 555 timer and active filter – first week)
Week 15	Fourier Series Verification – Part 4 (Based on 555 timer and active filter – second week)

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• B.P. Lathi and R.A. Green, Linear systems and signals, Third Edition, Oxford University Press, 2018, ISBN: 9780190200176. • Alan V. Oppenheim, Ronald W. Schafer, Discrete-Time Signal Processing, Third Edition, Pearson, 2010, ISBN: 9780131988422.	Yes
Recommended Texts	Luis F. Chaparro, Signals and Systems Using MATLAB, Second Edition, Elsevier, 2015, ISBN: 9780123948120	No
Websites	N/A	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.