MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Digital Communications**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOMU0202055**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	5	
Administering Department	CET		**College**	ETC	
Module Leader	Ahmed Hasan Kadhim		**e-mail**	ahmed.janabi@uomus.edu.iq	
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	29/10/2023		**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 Aims أهداف المادة الدراسية	The aims to students in third stage to defined and understand the -Concepts and terminology used in digital communications -The advantage and disadvantage of each type of digital communication systems -Types of Digital modulation - Send multiple digital signals at the same time and how to retrieve it
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Describe of concepts and terminology used in digital communications 2 -Explain the advantage and disadvantage of each type of digital communications systems 3- Identify types of digital modulation 4- Discuss the comparison between the types of digital systems and its advantages 5- work on digital systems and Describe the most suitable designs 6- Explain how can send more than a signal at the same time and how to retrieve it 7- analog signal into a digital signal converter (PCM) 8- Explain types of digital modulation ask , psk , fsk 9- Explain the modulation and demodulation of quadrature amplitude modulation
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - Introduction to digital communication **&** Sampling theorem **(10 hr)** - Pulse Amplitude Modulation (PAM), Pulse width and Pulse Position **(10 hr)** - Source Coding Techniques Modulation **(24 hr)** - Baseband modulation (Digital Modulation), **(30 hr)**
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	

Strategies	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 experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب موزع على (15) اسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.06
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	4,9	LO #1-4, LO #4- 7
	Assignments	2	10% (10)	3,10	LO #1-4, LO #4- 7
	Projects / Lab.	10	10% (10)	Continuous	LO #1-8
	Report	10	10% (10)	Continuous	LO #1-8
Summative assessment	**Midterm Exam**	2 hr	10% (20)	6	LO # 1-5
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Signal types, General block diagram of digital communication
Week 2	Advantage and disadvantage of digital modulation, digital coding
Week 3	Sampling theorem, Pulse Amplitude Modulation (PAM),
Week 4	Pulse width and Pulse Position Modulation (PWM & PPM),
Week 5	Time Division Multiplexing (TDM) , Pulse Code Modulation PCM),
Week 6	Mid exam
Week 7	Noise Consideration in PCM, Limitation and Modifications of PCM
Week 8	Differential PCM (DPCM), Delta Modulation (DM),
Week 9	Delta-Sigma Modulation
Week 10	Baseband modulation (Digital Modulation), Amplitude Shift Keying (ASK) [Modulation and demodulation].
Week 11	Frequency Shift Keying (FSK) [Modulation and demodulation],
Week 12	Phase Shift Keying (PSK) [Modulation, Coherent and Noncoherent Detection], Differential PSK.
Week 13	Quadrature Phase Shift Keying (QPSK), Offset QPSK
Week 14	Minimum Shift Keying
Week 15	Quadrature Amplitude Modulation (QAM), Multilevel Modulation Techniques M-ary PSK, M-ary QAM

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Fourier series and Fourier Transform , Spectrum analysis of signal
Week 2	Pulse Amplitude Modulation
Week 3	Pulse Position Modulation (PPM)
Week 4	Pulse Code Modulation
Week 5	Digital Time Division Multiplexing (TDM)
Week 6	Delta Modulation (DM)
Week 7	Amplitude shift key (ASK)
Week 8	Phase Shift Key (PSK)
Week 9	Frequency Shift Key (FSK)

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	- Sarkar N., Elements of Digital Communications, first edition, 2003	NO
Recommended Texts	- Haykin S., Introduction to Analog and Digital Communications, second edition, 2007.	No
Websites	https://www.coursera.org	

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.