MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Wireless Sensor Networks**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOMU0302066**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	6	
Administering Department	الأنظمة الطبية الذكية		**College**	العلوم	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Lecturer assistant		**Module Leader's Qualification**	M.Sc.	
Module Tutor			**e-mail**		
Peer Reviewer Name	ا.د مهدي عبادي مانع		**e-mail**	mahdi.ebadi@uomus.edu.iq	
Scientific Committee Approval Date	1/10/2024		**Version Number**	2.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	**UOMU0302056**	**Semester**	5
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To develop problem solving skills and understanding of wireless networks. 2. To understand wireless networks application and types. 3. This course deals with the basic concept of sensing and sensors and its classification. 4. This is the basic subject for all electrical and electronic circuits. 5. To understand how WSN work. 6. To learn the typical M-Health system architecture and make knowledge of biophysical signals and sensors.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Describe the wireless network. 2. Explain the IEEE standards for wireless networks. 3. Explain the wireless networks applications. 4. Discuss the types of wireless networks. 5. Discuss the benefits of wireless networks.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – wireless network</u> Introduction about wireless networks, IEEE standards for wireless networks. wireless networks applications, types of wireless networks, benefits of wireless LANs, disadvantage of wireless LANs, wireless MANs, benefits of wireless networks. [15 hrs] Sensors – Introduction about wireless networks, sensing and sensors, sensors classifications, how WSN works, WSN node structure, advantage and disadvantage of WSNs. [15 hrs] Body sensors networks background, types of biosensors. [10 hrs] Typical m-Health system architecture, hardware architecture of sensing node, communication medium. [15 hrs] Revision problem classes [6 hrs] <u>Part B – BSN and practical work</u> BSN power consumption consideration, BSN network topologies (star, mesh, clustered), biophysical signals and sensors, BSN application domain. [15 hrs]

	Description of the Arduino device, learn to work on the Arduino device. [7 hrs] A practical application to connect and operate a medical system that contains a sensor and a transducer. [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The major approach used to offer this module will be to promote student engagement in the exercises while also enhancing and broadening their critical thinking abilities. This will be accomplished through lectures, interactive tutorials, and the use of straightforward experiments with engaging tasks for the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10

Summative assessment	**Midterm Exam**	3 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction about wireless networks, IEEE standards for wireless networks
Week 2	wireless networks applications, types of wireless networks
Week 3	benefits of wireless LANs, disadvantage of wireless LANs
Week 4	wireless MANs, benefits of wireless networks
Week 5	Introduction about wireless networks, sensing and sensors
Week 6	sensors classifications, how WSN works, WSN node structure
Week 7	**Mid-term Exam**
Week 8	advantage and disadvantage of WSNs, Body sensors networks background
Week 9	types of biosensors, Typical m-Health system architecture
Week 10	hardware architecture of sensing node, communication medium
Week 11	BSN power consumption consideration
Week 12	BSN network topologies (star, mesh, clustered)
Week 13	biophysical signals and sensors, BSN application domain
Week 14	Description of the Arduino device
Week 15	learn to work on the Arduino device and sensors connections

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-2	Introduction to ADC convertor
Week 3-4	types of signals
Week 5-6	signal conditioning
Week 7-8	sampling and quantization and encoding
Week 9-10	Arduino uno device

Week 11-12	Arduino environment and codes
Week 12-13	connecting Arduino uno with transducer

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Energy-Efficient Algorithms and Protocols for Wireless Body Sensor Networks. Copyright Year: 2020	Yes
Recommended Texts	Wearable Technologies and Wireless Body Sensor Networks for Healthcare (Healthcare Technologies) by Fernando Jose Veles, Ferdin Derogarian Miyandoab	No
Websites	https://www.emotiv.com/	

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.