

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	معالجة الإشارات الطبية		Module Delivery	
Module Type	اساسي		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	MIET4104			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level	UG IV	Semester of Delivery		7
Administering Department	MIET	College	Faculty of Engineering Techniques	
Module Leader	Dr. Prof Hussain F. Hamdan		e-mail	Hussain1956@gmail.com
Module Leader's Acad. Title	professor	Module Leader's Qualification	Ph.D.	
Module Tutor	Dr. Prof Hussain F. Hamdan		e-mail	Hussain1956@gmail.com
Peer Reviewer Name	Dr. Prof Hussain F. Hamdan		e-mail	Hussain1956@gmail.com
Scientific Committee Approval Date	15/3/2026	Version Number	1.0	

Relation with other Modules				
العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	Signals and systems _ MIET3104		Semester	UG III-S5
Co-requisites module	None		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	✓ Provide knowledge on the characteristics of medical data and the analysis of physiological signals. ✓ Equips learners with skills for efficient data management and signal analysis, contributing to improved healthcare delivery and patient outcomes. ✓ Understanding random physiological signals and their analysis as stochastic processes. ✓ Focuses on applying averaging techniques, utilizing the sampling theorem, implementing windowing, efficient computation of discrete Fourier transform, and implementing discrete-time systems. ✓ Understanding and implementing digital filters that involve FIR and IIR filters, analyzing filter characteristics, designing filters, and applying filters for signal processing and noise reduction.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students should be able to: ✓ Demonstrate a systematic knowledge of the complex physical and physiological principles that underpin biomedical signals. ✓ Demonstrate an understanding of the principles of digital signal processing. ✓ Systematically apply methods to extract relevant information from biomedical signal measurements. ✓ Critically assess the appropriateness of biomedical signal processing techniques for various challenges in the field. ✓ Model of random signals and interference noise. ✓ Design noise reduction techniques. ✓ Consider signal sampling and effect of aliasing. ✓ Evaluate the effectiveness of techniques applied to biomedical signals against specific benchmarks. ✓ Consider discrete system implementation techniques. ✓ Knowledge of digital filter (frequency selection system) design.
Indicative Contents المحتويات الإرشادية	✓ Characteristics of medical data, physiological signals analyzer, medical care system, nature of biomedical signals, signal acquisition [7 hrs]. ✓ Random physiological signals, signal as stochastic process, averaging techniques [10 hrs]. ✓ Sampling theorem, windowing, Efficient computation of discrete Fourier transform [11 hrs]. ✓ Implementation of discrete time systems, digital filters (FIR, IIR) [17 hrs].

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The primary method for delivering this module will be to encourage students to participate in the tasks while improving and expanding their critical thinking skills. This will be accomplished through class lectures and seminars and the consideration of basic experiments incorporating various sample activities that are attractive to the students and improve module knowledge.
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Student Workload (SWL)			
الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	74	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	36	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	15%(15)	5 and 10	LO #4 and #9
	Assignments	2	10%(10)	2 and 12	LO #5 and #10
	Projects / Lab.	4	10%(10)	Continuous	All
	Report	1	5%(5)	13	LO #8
Summative assessment	Midterm Exam	2hr	10%(10)	7	LO #1 - #6
	Final Exam	4hr	50%(50)	16	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	✓ CHARACTERISTICS OF MEDICAL DATA ✓ PHYSIOLOGICAL SIGNALS ANALYZER ✓ MEDICAL CARE SYSTEM
Week 2	✓ NATURE OF BIOMEDICAL SIGNALS ✓ SIGNAL ACQUISITION
Week 3	<u>RANDOM PHYSIOLOGICAL SIGNALS</u> ✓ SIGNAL AS STOCHASTIC PROCESS ✓ AVERAGING TECHNIQUES
Week 4	

Week 5	
Week 6	SAMPLING THEOREM
Week 7	Mid Term
Week 8	WINDOWING
Week 9	EFFICIENT COMPUTATION OF DISCRETE FOURIER TRANSFORM
Week 10	
Week 11	IMPLEMENTATION OF DISCRETE TIME SYSTEMS
Week 12	
Week 13	<u>DIGITAL FILTERS</u> ✓ FIR ✓ IIR
Week 14	
Week 15	

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	SIGNAL ACQUISITION
Week 2	
Week 3	AVERAGING TECHNIQUES
Week 4	
Week 5	SAMPLING
Week 6	
Week 7	WINDOWING
Week 8	
Week 9	EFFICIENT COMPUTATION OF DISCRETE FOURIER TRANSFORM
Week 10	
Week 11	IMPLEMENTATION OF DISCRETE TIME SYSTEMS
Week 12	
Week 13	DIGITAL FILTERS
Week 14	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	John G. Proakis & Dimitris G. Manolakis, Digital Signal Processing, Principles, Algorithms and Applications, 2007, 4 th Edition, Pearson Prentice Hall.	621.382 1920
Recommended Texts	Eugene N. Bruce, Biomedical Signal Processing and Signal Modeling, 2000, John Wiley & Sons. A V Oppenheim & R W Schafer, Discrete-time Digital Signal Processing, 2009, Edition: 3rd, Prentice-Hall: Englewood Cliffs, NJ	
Websites		

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.



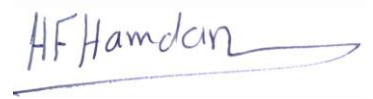
عميد الكلية : أ.د. هارون عبد الكاظم شهد

التاريخ : 2026 / 3 / 15



رئيس القسم : أ.د. محمود شاكر نصر

التاريخ : 2026 / 3 / 15



اسم التدريسي : أ.د. حسين فاضل حمدان

التاريخ : 2026 / 3 / 15