الملحق 4: وصف المادة الدراسية

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية				
Module Title	**Digital Signal Processing**		**Module Delivery**	
Module Type	**Core**		☒Theory ☐Lecture ☒Lab ☒ Tutorial ☐Practical ☐Seminar	
Module Code	**COM 35101**			
ECTS Credits	**5**			
SWL (hr/sem)	**125**			
Module Level	UGIII	**Semester of Delivery**	1	
Administering Department	BSc - COMM	College	Al-Mansour University College	
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	13-9-2025	**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	9. The student's ability to understanding signals and systems Introduce the basics of signals (continuous-time and discrete-time) and systems (linear time-invariant systems), including concepts like convolution and frequency domain representation. 10. Explain the process of converting continuous signals into discrete signals through sampling and the effects of quantization. 11. Being able to **analysis the time and frequency Domain** and Develop skills in analyzing signals and systems in both time domain (using difference equations, impulse response, etc) and frequency domain (Fourier series, Fourier transform, Z-transform). 12. And also the student's ability to know **digital signal processing algorithms** and study common algorithms used in DSP such as the Fast Fourier Transform (FFT). 13. Being able to design and Analysis Filter: cover the design and analysis of digital filters including FIR (Finite Impulse Response) filter and IIR (Infinite Impulse Response) filters, using techniques like windowing and bilinear method. 14. Building and preparing the student psychologically to play his role as a reliable engineer in this field. 15. Building students capable of competing with other engineers for job opportunities and obtaining the required seats to complete postgraduate studies. 16. Ability to submit to external tests by local, regional or international bodies for the purpose of completing studies or appointment. 17. Providing students with scientific, practical and personal skills that enable them to solve practical problems and deal with them using scientific concepts.
Module Learning Outcomes	1. Understanding and teaching the student the types of signs 2. Enabling the student to know the types of systems. 3. The student will understand the types of filters in communications systems.

مخرجات التعلم للمادة الدراسية	4. Enabling students to know how to process a signal. 5. The student will understand the types of communications networks through which information is exchanged. 6. Enabling the student to visualize project management and solve the problems he encounters in the factory.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following.** • Course introduction (4 hrs) • Working with Power point (15 hrs) • Theoretical lectures (30 hrs) • Lap (30hrs)
Description	**Introduce the basics of signals (continuous-time and discrete-time) and systems (linear time-invariant systems),** including concepts like convolution and frequency domain representation. **Analog to Digital (A/D) and Digital to Analog (D/A) Conversion.** **Discrete Fourier Transform:** Discrete Fourier Transform (DFT), Inverse discrete Fourier transform (IDFT), Relationship between Fourier transform and Fourier series. Fast Fourier Transform (FFT): Definition, Applications, Decimation in time FFT (DIF-FFT), Decimation in Frequency FFT (DIF-FFT). **Z-transform:** Introduction to the Z-transform, Inverse Z-transforms, Properties of Z-transforms, Transfer Functions. **Digital Filter Design:** Discrete Time Filters, Design by using numerical solution, bilinear transformation, Design IIR filter using bilinear method, Analog Design using digital filter, Digital Design using digital to digital transformation, Design of finite impulse response filter (FIR), Design of FIR using windows methods, FIR design computer techniques. Realization of Digital Filters. Introduction to Statistical Signal Processing: Signal Models: types and properties of statistical models for signals. **Analog Filter Design**: Butterworth filter and Chebyshev filter.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	In this course, students are guided by: • Using different examples. • Using different styles of discussion that aim to connect the theoretical and practical sides. • Asking questions and giving exercises that require analysis and conclusions related to lectures. • Encourage students to participate in discussions and do the practical work. • Encourage students to work in groups.

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	**47**	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	**3.1**
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% (5)	6 and 12	LO #1 to #3 and #4 to #6
	Assignments	2	10% (5)	2 and 13	LO #3 to #6
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #3, #4 and #6
Summative assessment	Midterm Exam	2hr	10% (10)	9	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	Introduce the basics of signals (continuous-time and discrete-time) and systems (linear time-invariant systems)
Week 2	Convolution and frequency domain representation.
Week 3	Sampling and A/D conversion
Week 4	Introduction to the Z-transform and Properties of Z-transforms
Week 5	Inverse Z-transforms Properties of Z-transforms
Week 6	Inverse Discrete Fourier Transform (IDFT) and Discrete Fourier Transform (DFT)
Week 7	Fast Fourier Transform (FFT): Definition, Applications, Decimation in Frequency FFT (DIF-FFT).
Week 8	Decimation in time FFT (DIF-FFT)
Week 9	Digital Filter Design: Discrete Time Filters, Design by using numerical solution, bilinear transformation

Week 10	Digital Design using digital to digital transformation, Design of finite impulse response filter (FIR)
Week 11	Design of FIR using windows methods
Week 12	Realization of Digital Filters.
Week 13	Analog filter design.
Week 14	Butterworth and Chebyshev filter
Week 15	PowerPoint: Prepare to deliver your presentation
Week 16	Preparatory week before the final exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to the lab and get started with use of tools which uses in the experiments.
Week 2	Introduction to the MATLAB program and how to use it.
Week 3	An overview of the experiments that will be carried out in the laboratory and using some of the available programs.
Week 4	Unit impulse signal: programming the generation of this signal in the laboratory
Week 5	Unit step signal: programming the generation of this signal in the laboratory
Week 6	Unit ramp signal: programming the generation of this signal in the laboratory
Week 7	Exponential growing signal: programming the generation of this signal in the laboratory
Week 8	Exponential decaying signal: programming the generation of this signal in the laboratory
Week 9	Sine signa: programming the generation of this signal in the laboratory
Week 10	Cosine signal: programming the generation of this signal in the laboratory
Week 11	Sum of sinusoidal signals: programming the generation of this signal in the laboratory

Week 12	Sampling and Quantization: programming the process of sampling and quantization in the laboratory
Week 13	Programming DFT and IDFT
Week 14	Review and discussion
Week 15	Preparatory week before the final exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• John G. Prokais, digital signal processing	Yes
Recommended Texts	• Digital Signal Processing, Li Tan 2008	No
Websites	None	

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.