



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Communication Systems/ Elective 1		Module Delivery
Module Type	Elective	✓ Theory Lecture ✓ Lab Tutorial ✓ Practical Seminar	
Module Code	UOMU0205066		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	2
Administering Department	DEPARTMENT OF ELECTRICAL ENGINEERING TECHNIQUES	College	AL-MUSTAQBAL
Module Leader	Ahmed turkey jaiad	e-mail	ahmed.turky.jaiad@uomus.edu.iq
Module Leader's Acad. Title	doctor	Module Leader's Qualification	doctor
Module Tutor	None	e-mail	None
Peer Reviewer Name	None	e-mail	None
Review Committee Approval	/ /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	<ol style="list-style-type: none">1-Understanding and teaching students the principles and foundations of communications engineering, their mathematical relations, and how to deal with them.2- Enable students to obtain knowledge and understand the laws of electronic physics and theories of complex communications engineering and how to use them in the design of modern communication systems and in the analysis of programs related to communication systems.3- To make the student understand the methods of digital signal transmission, its processing, methods of its dissemination in different media, the possibility of transferring data and information from one place to another, as well as enabling students to obtain knowledge and understanding of the practical framework in the field of communications.4-Circuit Simulation and Design: The course may involve introducing students to circuit simulation software. They will learn how to use simulation tools to analyze and design Communication Systems, verify their calculations.5-Problem-Solving Skills: An important objective is to develop students' problem-solving skills in the context of Modulation. They will learn how to analyze transmission line using
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	<p>Smith chart, Crank Diagram, formulate appropriate strategies, and apply their knowledge to solve a variety of lossless and loss line problems efficiently.</p> <p>6- Enabling students to obtain knowledge and understanding of the design of various and advanced communication systems, according to generations of communications.</p> <p>7- Enabling students to obtain knowledge and understanding to understand electric and magnetic fields and the force resulting from them, work, magnetic induction, charge distribution, capacitors and various insulators, as well as knowing and understanding the active electronic parts in communication systems.</p> <p>8-Laboratory Skills: The course includes Matlab program laboratory experiments to provide students with practical experience in building, testing, and troubleshooting communication systems.</p>
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>1-Fundamental Knowledge: Explanation of the topics of the foundations of communication engineering by specialists in the subject, with an emphasis on the use of mathematics as a basis for understanding and learning.</p> <p>2- Provide them with the skills of solving practical problems related to various Communication systems and computer programs related to communication systems.</p> <p>3-Circuit Analysis Skills: Students will develop the ability to analyze Communication networks and the processes of sending and receiving information using various techniques such as applying Smith chart, Crank Diagram. They will gain proficiency in solving complex circuit problems and calculating circuit parameters.</p> <p>4- Communication systems Design and Simulation: Students will be able to design and simulate Communication networks, using appropriate components and considering design constraints. They will learn to use circuit simulation software to verify their designs, analyze circuit performance, and troubleshoot circuit issues.</p> <p>5-Laboratory Skills: Introduction to Matlab Communication Systems design, students will develop practical skills in building, testing, and troubleshooting Communication networks.</p> <p>6-Critical Thinking and Analysis: The course will promote critical thinking and analytical skills among students. They will learn to evaluate different modulation circuit solutions, analyze circuit behavior, and make informed decisions based on their understanding of Communication systems.</p> <p>By the end of the course, students will possess a comprehensive knowledge of DC circuits, enabling them to analyze, design, and troubleshoot a wide range of electrical circuits. Enabling students to imagine the electronic circuit components of digital communication systems. Enabling students to think and analyze topics related to solving practical problems.</p>
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following:</p> <ul style="list-style-type: none"> • <u>Part A – Transmission Lines.</u> Constituent parts of an Communication systems (source, load, communication & control), analyzing the Transmission Lines using Smith chart and Crank Diagram then solving Transmissions lines equations. [8 hrs] • <u>Part B Modulation, Demodulation.</u> AM Modulation, Angle Modulation, Noise in AM Systems, Noise in Angle Modulation Systems [32 hrs] • <u>Part C (Noise and Radio transmitters, receivers)</u> Sources of noise, resistor noise, calculation of noise, Noise in AM Systems, Noise in Angle Modulation Systems. Radio transmitters and receivers. [14 hrs] • Revision problem classes [6 hrs]
<p>Learning and Teaching Strategies</p> <p>استراتيجيات التعلم والتعليم</p>	
<p>Strategies</p>	<p>1-Hands-on Experiments: Engage students in practical experiments to deepen their understanding of circuits.</p> <p>2-Simulation Software: Use circuit simulation software for virtual communication</p>

	<p>circuit design and analysis.</p> <p>3-Problem-solving Exercises: Include various problem-solving exercises to apply circuit analysis techniques.</p> <p>4-Group Projects: Assign collaborative projects for circuit design and construction.</p> <p>5-Real-world Applications: Discuss practical applications of circuits in different devices and systems.</p> <p>5-Interactive Discussions: Encourage student participation and critical thinking through open-ended questions.</p> <p>6-Conceptual Understanding: Focus on intuitive understanding alongside mathematical analysis.</p> <p>7-Assessment Variety: Use diverse assessment methods to gauge student understanding.</p> <p>8-Office Hours and Support: Offer individualized assistance through office hours or online support.</p>
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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.13
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	4	10% (10)	5, 10	LO #1, 2, 4 and 5
	Assignments	8	10% (10)	2, 12	LO # 3, 4, 6
	Projects / Lab. Report	7	10% (10)	Continuous	All
	Summative assessment	Midterm Exam	2 hr	10% (10)	8
	Final Exam	3 hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
1,2	Transmission Lines, Transmissions lines equations
3	Crank diagram
4,5	Smith Chart
6	lossless and lossy lines
7	Amplitude Modulation, Modulation Index, Spectrum of AM Signal
8	Modulators, Demodulators
9	Power Calculations in AM Systems, Application of AM Systems
10	Angle Modulation, Phase and Frequency Modulation, Phase and Frequency Deviation
11	Comparison between AM and FM
12	Parameter variation method, indirect method of frequency modulation (Armstrong method), frequency multiplication
13	Sources of noise, resistor noise, calculation of noise, Noise in AM Systems, Noise in Angle Modulation Systems

14	Radio transmitters, Radio receivers.
15	Final Examination

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
1	Introduction to Matlab Communication Systems design
2	Function Generation
3	Signal Generation, Sampling, and Reconstruction
4	AM Modulation
5	AM Demodulation
6	FM Modulation
7	FM Demodulation
8	MID-TERM EXAM
9	Phase Modulation
10	Phase Demodulation
11	Noise
12	Sound In MATLAB And Add Noise For Signal
13	Signals Generation and add Noise
14	A/D Converter
15	Review

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	كتاب أساسيات الاتصالات تأليف: سامي محمد طاهر, خليل حسن سيد مرعي, بايز خورشيد. دار الكتب للطباعة والنشر-الموصل 1989.	Yes
Recommended Texts	<i>B.P. Lathi & Zhi Ding: "Modern Digital And Analog Communication Systems". Oxford University Press. 2018.</i>	No
Websites	Communication Systems https://www.tutorialspoint.com/principles_of_communication/principles_of_communication_introduction.htm	

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.