

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Probability and Statistics		Module Delivery
Module Type	Basic		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	ATU11502		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	UGIII	Semester of Delivery	1
Administering Department		College	NETC
Module Leader	Asaad. S. Daghal	e-mail	ad466kent@atu.edu.iq
Module Leader's Acad. Title	Assist. Prof.	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	
Peer Reviewer Name	Nasir Hussein Selman	e-mail	Coj.nas@atu.edu.iq
Scientific Committee Approval Date	01/05/2025	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	1. Understand Basic Probability: Learn the foundational concepts of probability, including sample spaces, events, and probability axioms. 2. Apply Probability Distributions: Use common distributions (e.g., binomial, normal) and key theorems like Bayes' and the central limit theorem. 3. Analyze Random Variables: Calculate expected values, variances, and apply these concepts to model stochastic processes.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Basic Probability Concepts: Students will be able to define and calculate probabilities for simple and compound events, applying the axioms of probability. 2. Probability Distributions and Theorems: Students will be able to apply probability distributions and key theorems to solve problems and make predictions. 3. Random Variables and Expectation: Students will be able to analyze random variables, calculate expected values and variances, and model real-world stochastic processes.
Indicative Contents المحتويات الإرشادية	1. Overview of set theory. 2. Random variables and probability density functions. 3. Joint, Marginal and conditional distributions. 4. Characteristic functions.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. State the need for Mathematics with Engineering Studies and Provide real-life examples. 2. Support and guide the students for self-study. 3. Assigning homework, grading assignments, quizzes, and documenting students'

	progress. 4. Encourage the students to group learning to improve their creative and analytical skills. 5. Show short related video lectures.
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Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	100		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects /Siminar	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Overview of set theory and essential mathematical concepts; Random experiments and probability axioms;
Week 2	Conditional probability and Bayes' rule;
Week 3	Counting methods
Week 4	Discrete random variables and probability mass functions;
Week 5	functions of Discrete random variables
Week 6	Continuous random variables and probability density functions;
Week 7	Functions of Continuous random variables
Week 8	Cumulative distribution functions; Expectation, variance, and higher-order moments
Week 9	Joint distributions of discrete and continuous variables; Marginal and conditional distributions;
Week 10	Mid -Term Exam
Week 11	Covariance and correlation; Functions of multiple random variables
Week 12	Definition and properties of moment-generating functions;
Week 13	Characteristic functions and their applications;
Week 14	Inequalities in probability (e.g., Markov's and Chebyshev's inequalities)
Week 15	Revision of whole materials
Week 16	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	<i>A First Course in Probability</i> by Sheldon Ross	Yes
Recommended Texts	<i>Probability and Statistics for Engineering and the Sciences</i> by Jay L. Devore	No
Websites	Khan Academy - Probability and Statistics	

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.				