MODULE DESCRIPTION FORM

Module Information				
Module Title	**Probability & Statistics**		**Module Delivery**	
Module Type	**Basic**		☒Lecture	
Module Code	**IT2105**			
ECTS Credits	**4**			
SWL (hr/sem)	**100**			
Module Level	UG2	**Semester of Delivery**	1	
Administering Department	Information Technology	**College**	College of Science	
Module Leader	Elaf Ali Sfooq	**e-mail**	elaf.safooq@uowa.edu.iq	
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	MSc	
Module Tutor	Elaf Ali Sfooq	**e-mail**	elaf.safooq@uowa.edu.iq	
Peer Reviewer Name	Dr.Maky H.Abdulraheem	**e-mail**	maky.h@uowa.edu.iq	
Scientific Committee Approval Date	2025-09-1	**Version Number**	V1.0	

Relation with other Modules			
Prerequisite module	None	Semester	None
Co-requisites module	None	Semester	None

Department Head Approval **Dean of the College Approval**

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	1- This module will provide students with a basic knowledge of mathematical probability theory and the techniques of statistical inference that are used for analyzing data. 2- Also, this module will provide students a foundation for further modules in statistics and applied probability. 3- Understanding the most important principles of statistics and statistical methods for representing data, as well as knowing the types of coefficients statistics, their importance and methods of calculation. 4- Understanding the most important principles of probability and the most important operations that take place on the aggregates and knowing what most important properties of probability.
Module Learning Outcomes	On successful completion of this module, a student will be able to: 1- Model simple experiments using probability theory. 2- Perform standard probability calculations. 3- Work with independent and correlated random variables. 4- Correctly apply simple formal statistical techniques and interpret the results. 5- Assess, analyses and interpret basic statistical problems. 6- Discern when statistics are being misused. 7- Present results of basic statistical analyses (both descriptive and inferential). 8- Apply simple probabilistic and statistical concepts. 9- Construct and apply mathematical descriptions of probability distributions.
Indicative Contents	1. Introduction to Probability Theory ○ Basic concepts of probability: sample spaces, events, and probability axioms. ○ Combinatorial principles and counting techniques. ○ Conditional probability and independence. ○ Discrete and continuous probability distributions. ○ Expected value, variance, and moment-generating functions. 2. Statistical Data Representation ○ Data types: qualitative and quantitative. ○ Graphical representation of data: histograms, bar charts, and pie charts. ○ Measures of central tendency: mean, median, and mode. ○ Measures of dispersion: range, variance, and standard deviation. ○ Exploratory data analysis techniques. 3. Statistical Inference ○ Sampling techniques and sampling distributions. ○ Point estimation: methods for estimating population parameters. ○ Interval estimation: construction of confidence intervals. ○ Hypothesis testing: formulation of null and alternative hypotheses, test statistics, and p-values. ○ Type I and Type II errors, significance level, and power of tests.

	4. Probability Distributions ○ Binomial, Poisson, and normal distributions: properties and applications. ○ Central Limit Theorem and its significance. ○ Transformations of random variables. ○ Joint probability distributions and independence. ○ Multivariate distributions: covariance, correlation, and regression. 5. Statistical Methods and Techniques ○ Regression analysis: simple linear regression and multiple regression. ○ Analysis of variance (ANOVA): one-way and two-way ANOVA. ○ Nonparametric methods: rank tests and chi-square tests. ○ Experimental design and sampling strategies. ○ Data collection, validation, and interpretation. 6. Foundations for Further Study in Statistics and Applied Probability ○ Bridging concepts and techniques for more advanced statistical modules. ○ Connecting probability theory and statistical inference to real-world applications. ○ Understanding the importance of statistical methods in decision-making and research.

Learning and Teaching Strategies	
Strategies	1- Giving weekly lecture/tutorial sessions. 2- Printed notes will be given for each part of the course. 3- Concepts and underlying theories will be explored in the lecture period. 4- Students will learn through a formative process of tackling the exercises at the end of each section, with feedback and extension in tutorials. 5- Scientific discussions and dialogues and asking questions.

Student Workload (SWL)			
Structured SWL (h/sem)	45	**Structured SWL (h/w)**	3
Unstructured SWL (h/sem)	52	**Unstructured SWL (h/w)**	3.5
Total SWL (h/sem)	97 + 3 final = 100		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	5	10% (10)	3,6,9	1,2,3,4
	Onsite Assignments	5	10% (10)	2,4,6,10,12	All
	H.W	5	10% (10)	2,4,6,8,10	All
	Report	1	10% (10)	12	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	5,11	
	Final Exam	3hr	50% (50)	16	
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Probability (Sample Space, Events, Probability of an Event)
Week 2	Probability (Additive Rules, Independence, Product Rule)
Week 3	Conditional Probability
Week 4	Total Probability Rule.
Week 5	Bayes' Rule.
Week 6	Discrete and Continuous Random Variable.
Week 7	Probability Density Functions.
Week 8	Joint Probability Distributions.
Week 9	Probability Mass Functions.
Week 10	Cumulative Distribution Functions.
Week 11	Statistics Basics
Week 12	Frequency Distributions
Week 13	Measures of Central Tendency
Week 14	Discrete Uniform Distribution.
Week 15	Measures of Dispersion

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	1. An introduction to probability and statistics. (R1) 2. Introduction to Statistics. (R2)	

Grading Scheme

Group	Grade	Mark	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	Excellent	90 - 100	Outstanding Performance
	B - Very Good	Very Good	80 - 89	Above average with some errors
	C - Good	Good	70 - 79	Sound work with notable errors
	D - Satisfactory	Fair / Average	60 - 69	Fair but with major shortcomings
	E - Sufficient	Pass / Acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	Fail (Pending)	(45-49)	More work required but credit awarded
	F – Fail	Fail	(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.