



د. محمد مصطفى نزيه  
2023/05/06

# MODULE DESCRIPTION FORM



نموذج وصف المادة الدراسية



Module Information			
معلومات المادة الدراسية			
Module Title	<b>Probability &amp; Statistics</b>	Module Delivery	
Module Type	<b>Basic learning activities</b>	<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	<b>IT2105</b>		
ECTS Credits	<b>4</b>		
SWL (hr/sem)	<b>100</b>		
Module Level	2		
Administering Department	Information Technology	College	College of Science
Module Leader	Ahmed Yahya Awad	e-mail	ahmed.ya@uowa.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date		Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CSIT101	Semester	1
Co-requisites module		Semester	

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b> أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> <li>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.</li> <li>2- Also, this module will provide students a foundation for further modules in statistics and applied probability.</li> <li>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.</li> <li>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.</li> </ol>
<p><b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية</p>	<p>On successful completion of this module, a student will be able to:</p> <ol style="list-style-type: none"> <li>1- Model simple experiments using probability theory.</li> <li>2- Perform standard probability calculations.</li> <li>3- Work with independent and correlated random variables.</li> <li>4- Correctly apply simple formal statistical techniques and interpret the results.</li> <li>5- Assess, analyses and interpret basic statistical problems.</li> <li>6- Discern when statistics are being misused.</li> <li>7- Present results of basic statistical analyses (both descriptive and inferential).</li> <li>8- Apply simple probabilistic and statistical concepts.</li> <li>9- Construct and apply mathematical descriptions of probability distributions.</li> </ol>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<ol style="list-style-type: none"> <li>1. Introduction to Probability Theory <ul style="list-style-type: none"> <li>○ Basic concepts of probability: sample spaces, events, and probability axioms.</li> <li>○ Combinatorial principles and counting techniques.</li> <li>○ Conditional probability and independence.</li> <li>○ Discrete and continuous probability distributions.</li> <li>○ Expected value, variance, and moment-generating functions.</li> </ul> </li> <li>2. Statistical Data Representation <ul style="list-style-type: none"> <li>○ Data types: qualitative and quantitative.</li> <li>○ Graphical representation of data: histograms, bar charts, and pie charts.</li> <li>○ Measures of central tendency: mean, median, and mode.</li> <li>○ Measures of dispersion: range, variance, and standard deviation.</li> <li>○ Exploratory data analysis techniques.</li> </ul> </li> <li>3. Statistical Inference <ul style="list-style-type: none"> <li>○ Sampling techniques and sampling distributions.</li> <li>○ Point estimation: methods for estimating population parameters.</li> <li>○ Interval estimation: construction of confidence intervals.</li> <li>○ Hypothesis testing: formulation of null and alternative hypotheses, test statistics, and p-values.</li> <li>○ Type I and Type II errors, significance level, and power of tests.</li> </ul> </li> </ol>

	<p>4. Probability Distributions</p> <ul style="list-style-type: none"> <li>○ Binomial, Poisson, and normal distributions: properties and applications.</li> <li>○ Central Limit Theorem and its significance.</li> <li>○ Transformations of random variables.</li> <li>○ Joint probability distributions and independence.</li> <li>○ Multivariate distributions: covariance, correlation, and regression.</li> </ul> <p>5. Statistical Methods and Techniques</p> <ul style="list-style-type: none"> <li>○ Regression analysis: simple linear regression and multiple regression.</li> <li>○ Analysis of variance (ANOVA): one-way and two-way ANOVA.</li> <li>○ Nonparametric methods: rank tests and chi-square tests.</li> <li>○ Experimental design and sampling strategies.</li> <li>○ Data collection, validation, and interpretation.</li> </ul> <p>6. Foundations for Further Study in Statistics and Applied Probability</p> <ul style="list-style-type: none"> <li>○ Bridging concepts and techniques for more advanced statistical modules.</li> <li>○ Connecting probability theory and statistical inference to real-world applications.</li> <li>○ Understanding the importance of statistical methods in decision-making and research.</li> </ul>
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<b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم	
<b>Strategies</b>	<ol style="list-style-type: none"> <li>1- Giving weekly lecture/tutorial sessions.</li> <li>2- Printed notes will be given for each part of the course.</li> <li>3- Concepts and underlying theories will be explored in the lecture period.</li> <li>4- Students will learn through a formative process of tackling the exercises at the end of each section, with feedback and extension in tutorials.</li> <li>5- Scientific discussions and dialogues and asking questions.</li> </ol>



  
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<b>Student Workload (SWL)</b> الحمل الدراسي للطلاب محسوب لـ ١٥ أسبوعا			
<b>Structured SWL (h/sem)</b>	50	<b>Structured SWL (h/w)</b>	4
الحمل التدريسي المنتظم للطلاب خلال الفصل		الحمل الدراسي المنتظم للطلاب أسبوعيا	

<b>Unstructured SWL (h/sem)</b> الحمل الدرايس غري المنتظم للطالب خلال الفصل	25	<b>Unstructured SWL (h/w)</b> الحمل الدرايس غري المنتظم للطالب أسبوعيا	2
<b>Total SWL (h/sem)</b> الحمل الدرايس الكيل للطالب خلال الفصل	75		

<b>Module Evaluation</b> تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	<b>Quizzes</b>	3	10% (10)	3,6,9	
	<b>Assignments</b>	2	10%(105)	4,12	
	<b>H.W</b>	5	10% (10)	2,4,6,8,10	
	<b>Attendance</b>	1	10% (10)	Continues	
<b>Summative assessment</b>	<b>Midterm Exam</b>	2hr	10% (10)	5,11	
	<b>Final Exam</b>	3hr	50% (50)	16	
<b>Total assessment</b>			100% (100 Marks)		

<b>Delivery Plan (Weekly Syllabus)</b> المنهاج الأسبوعي النظري	
	<b>Material Covered</b>
<b>Week 1</b>	Probability (Sample Space, Events, Probability of an Event)
<b>Week 2</b>	Probability (Additive Rules, Independence, Product Rule)
<b>Week 3</b>	Conditional Probability
<b>Week 4</b>	Total Probability Rule.
<b>Week 5</b>	Bayes' Rule.
<b>Week 6</b>	Discrete and Continuous Random Variable.
<b>Week 7</b>	Probability Density Functions.
<b>Week 8</b>	Joint Probability Distributions.
<b>Week 9</b>	Probability Mass Functions.
<b>Week 10</b>	Cumulative Distribution Functions.
<b>Week 11</b>	Statistics Basics
<b>Week 12</b>	Frequency Distributions
<b>Week 13</b>	Measures of Central Tendency

<b>Week 14</b>	Discrete Uniform Distribution.
<b>Week 15</b>	Measures of Dispersion

### Learning and Teaching Resources

مصادر التعلم والتدريس

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

### Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
<b>Success Group (50 - 100)</b>	<b>A - Excellent</b>	امتياز	90 - 100	Outstanding Performance
	<b>B - Very Good</b>	جيد جدا	80 - 89	Above average with some errors
	<b>C - Good</b>	جيد	70 - 79	Sound work with notable errors
	<b>D - Satisfactory</b>	متوسط	60 - 69	Fair but with major shortcomings
	<b>E - Sufficient</b>	مقبول	50 - 59	Work meets minimum criteria
<b>Fail Group (0 - 49)</b>	<b>FX – Fail</b>	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	<b>F – Fail</b>	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.



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2022/2023