MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	**Probability and Statistics**		**Module Delivery**
Module Type	Support		• ☒ Theory • ☒ Lecture • ☒ Lab • ☒ Tutorial • ☐ Practical • ☐ Seminar
Module Code	**CRPROSTA**		
ECTS Credits	**4**		
SWL (hr/sem)	**33**		
Module Level	2	**Semester of Delivery**	1
Administering Department	Mathematics and computer Applications	**College**	Science
Module Leader	Zeyad Mohammed Abed	**e-mail**	zeyad.mohammed@nahrainuniv.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	**Module Leader's Qualification**	Master degree
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	1/2/2026	**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 Aims **أهداف المادة الدراسية**	This course is designed to provide an introduction to a range of statistical tools of relevance to scientists. Specific topics include an overview of statistical distributions, significance testing, uncertainty determination, linear regression and experimental design. The application of statistics for quality control and practical experience in the application of statistical features in the widely used Minitab and Microsoft Excel is particularly emphasized. The teaching methods used will be a combination of lectures, self-study, labs, tutorials, and any combination of discussion, case study, problem-solving exercises and computer-based learning.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Describe basic statistical terms which are of relevance to the area of analytical science. 2. Graphically display and numerically summarise data using appropriate tables, graphs and measures of centre, spread and position. 3. Explain and apply concepts of basic probability including, conditional probability, Bayes' theorem, independent events and counting formulae. 4. Make interferences about population parameters using sample statistics using confidence interval estimates and tests of statistical hypotheses. 5. Describe the application of statistics to sampling, quality control, analytical method validation and experimental design. 6. Use an appropriate method for analysing relationships between variables in a dataset
Indicative Contents **المحتويات الإرشادية**	1. Describe basic statistical terms which are of relevance to the area of analytical science • Introduction to Statistical Terms • Populations and Samples • Data Types • Introduction to Sampling Methods 2. Graphically display and numerically summarise data using appropriate tables, graphs and measures of centre, spread and position. • Graphical Representation of data including frequency tables and charts • Measures of Central Tendency, Position and Dispersion.

	3. Explain and apply concepts of basic probability including, conditional probability, Bayes' theorem, independent events and counting formulae; • Probability Experiments • Probability Trees • Classical Probability • Experimental Probability • Addition and Multiplication Rules of Probability • Counting Rules • Bayes Theorem • Discrete Probability Distributions • Binomial Distribution • Poisson Distribution • The Normal Distribution • Applications of the standard Normal Distribution • Assessing Normality • The Central Limit Theorem 4. Make interferences about population parameters using sample statistics using confidence interval estimates and tests of statistical hypotheses • Introduction to Hypothesis Testing • Writing hypotheses for statistical tests • One Sample, Independent Samples and Paired Samples t-tests • z-tests for proportion size 6. Use an appropriate method for analysing relationships between variables in a dataset • Relationship Modelling • Pearson's Correlation Co-efficient • Significance of the correlation co-efficient • Simple Linear Regression • Chi Square test for association • Chi Square test of goodness of fit During the Practical element of the course, students will use the Data Analysis ToolPak in Microsoft Excel and also Minitab to carry out the various types of analysis listed in the syllabus above.

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	The teaching methods used will be a combination of online-lectures, self-study, online practical workshops, and any combination of discussion, case study, problem-solving exercises and computer-based learning. The practical element of the course will be delivered separately to students in their various class groups (Biomedical Science/Medical Biotechnology, Forensic Science, Pharmaceutical Science) so that the examples used in the practical application of statistics can be tailored to their field of study.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	33	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	2.2
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	67	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	4.466
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	100		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, and 3
	Assignments	2	10% (10)	7, 12	LO # 4 and 6
	Projects / Lab.	1	10% (10)	continuous	
	Report	1	10% (10)	14	LO # 5 and 7
Summative assessment	**Midterm Exam**	2 hr	10% (10)	8	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	• Introduction to Statistical Terms • Populations and Samples
Week 2	• Statistical Description of Data
Week 3	• Graphical Representation of data including frequency tables and charts
Week 4	• Measures of Central Tendency , Arithmetic Mean, The Geometric Mean
Week 5	• The Median, The Mode
Week 6	• Measures of Dispersion , Variance and Standard Deviation
Week 7	• Introduction of Probability Theory • General Rule of Probability
Week 8	• Counting Rule

Week 9	• Bayes Theorem
Week 10	• The Normal Distribution • Applications of the standard Normal Distribution
Week 11	• Binomial Distribution • Poisson Distribution
Week 12	• Relationship Modelling • Pearson's Correlation
Week 13	• Simple Linear Regression
Week 14	• Introduction to Hypothesis Testing • Writing hypotheses for statistical tests
Week 15	• Chi Square Distribution • Chi Square test of goodness of fit
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
	Material Covered
Week 1	Lab 1:
Week 2	Lab 2:
Week 3	Lab 3:
Week 4	Lab 4:
Week 5	Lab 5:
Week 6	Lab 6:
Week 7	Lab 7:

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts	Practical Statistics for the Analytical Scientist	Yes
Recommended Texts	Essential Mathematics and Statistics for Science	No
Websites	www.mathhandbook.com	

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.