	Ministry of Higher Education and Scientific Research - Iraq Al-Mansour University College Department of Communication Engineering	

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Applied Mathematics I**		**Module Delivery**		
Module Type	Core				
Module Code	**COM 23102**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level	UGII		**Semester of Delivery**	1	
Administering Department	BSc - COMM		**College**	Al-Mansour University College	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	2024/9/1		**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. Help students appreciate the use of mathematics as a form of communication; 2. Help students acquire a range of mathematical techniques and skills and to foster and maintain the awareness of the importance of accuracy; 3. Make Mathematics relevant to the interests and experiences of students by helping them to recognize Applied Mathematics in their environment; 4. Help students to develop positive attitudes, such as open-mindedness, self-reliance, persistence and a spirit of enquiry; 5. Prepare students for the use of Mathematics in further studies; 6. Help students to develop an appreciation of the wide application of Mathematics and its influence in the development and advancement of civilization; 7. Help students become increasingly aware of the unifying structure of Mathematics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon successful completion of this course, a student will be able to: 1. Enabling student to know the coordinate systems and its types and properties. 2. Enabling student to know how to perform basic vector operations such as addition, scalar multiplication, dot and cross product of vectors, and understand subspaces and basis in the vector space Rn, orthogonal complement and projection. 3. Enabling student to know the concepts of partial derivative and how can deal with the high order of derivatives. 4. Enabling student to know the introduction of differential equations 5. Enabling student to know how to use Laplace transform to convert the domain from time to S-domain. 6. Enabling student to know how to use Z transform to convert the domain from time to Z-domain in the signal processing
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: 1. Coordinate systems (9 hrs) 2. Vector geometry (9 hrs)

	3. Partial derivatives (6 hrs) 4. Laplace transform and its inverse (6 hrs) 5. Z-transform and its inverse (6 hrs)
Description	Coordinates systems: Cartesian Coordinates, Cylindrical coordinates, Polar Coordinates; Graphing in Polar Coordinates; Polar Equations of Lines, Circles, and Cardioids. Conic Sections and Quadratic Equations: circles, parabola, ellipse, and hyperbola. Three-Dimensional Coordinate Systems. Vectors and the Geometry of Space: addition, subtraction, and scalar multiplication; Dot Product: orthogonal vectors, and vector projection; Properties of product. Cross Product: area of parallelogram, test of parallelism, triple product; Equations of Lines and Planes in Space; Distance between a Point and a Line; Distance between a point and a Plane; Angle between Planes and Lines of Intersection of Planes; Product of three or more vectors. Partial derivatives: Function of two or more variables, The Chain Rule, Directional derivative, Gradient, divergence and Curl, Tangent plane and normal line and Maxima, minima & saddle point. Laplace transform and inverse Laplace transform: definitions, properties and applications, Z-Transform and inverse Z-transform: Introduction, Properties of Z-Transform, Z- transform of elementary functions, Linearity properties, Some standard in Z-Transform, Inverse Z-Transform, Method for finding Inverse Z-Transform, Application of Z-Transform to difference equations

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• The module will be delivered using a combination of lectures, tutorials, and directed and independent learning. • The learning and teaching approach will include the introduction of theoretical basis in the lecture form and the application aspects will be further studied throughout the tutorial sessions, including problem solving. In direct learning, you will be instructed to prepare for the lectures including reading the notes, finding and analyzing relevant information in advance. • Working group (2-3 students per group) will be formed to encourage you to engage critical discussion in class. • Case studies will be used to demonstrate and reinforce the lectures and labs. • Solving examples, problems will give experience to understand the complex cases in communication field.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	**48**	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	**3.2**
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	**27**	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	**1.8**
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**75**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
	Quizzes	**2**	**5% (10)**	**6 and 12**	**LO #1 to #3 and #4 to #6**
	Assignments	**2**	**5% (10)**	**2 and 13**	**LO #3 to #6**
	Projects / Lab.				
	Homework	**2**	**10% (20)**	**13**	**LO #3, #4 and #6**
	Midterm Exam	**1hr**	**10% (10)**	**10**	**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	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	
Week 9	
Week 10	
Week 11	Mid Exam
Week 12	
Week 13	
Week 14	
Week 15	**Preparatory week before the final exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• Text Book Peter V. O'Neil, "Advanced Engineering Mathematics", Cengage Learning, 2012	Yes

Recommended Texts	Supplementary Books • W.E. Boyce, "Elementary differential equations and boundary value problems", Wiley, 2010. • Erwin Kreyszig, "Advanced Engineering Mathematics," 10th edition, Wiley, 2011. • D.G. Zill, "Advanced Engineering Mathematics," 5th ed., Jones & Bartlett Learning, 2014. • Gilbert Strang, "Differential Equations and Linear Algebra," Wellesley-Cambridge Press	Yes
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
	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
	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.