	Ministry of Higher Education and Scientific Research - Iraq University of Diyala College of Engineering Department of Engineering	

الملحق 4: وصف المادة الدراسية

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	**Applied Mathematic II**	**Module Delivery**	
Module Type	Core	☒Theory ☐Lecture ☐Lab ☒Tutorial ☐Practical ☐Seminar	
Module Code	**COE 208**		
ECTS Credits	**4**		
SWL (hr/sem)	100		
Module Level	UGII	**Semester of Delivery**	2
Administering Department	BSc - COMM	**College**	College of Engineering
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	COE 202: Applied Mathematics I	**Semester**	1
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. Solve linear, exact and homogeneous first-order ODEs and their initial value problems and, homogeneous or non-homogeneous second-order ODEs and their initial value problems with appropriate methods. 2. 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. Perform basic matrix operations, elementary row operations and row reduced echelon form, bases for row, column or null spaces, and solve homogeneous and nonhomogeneous systems. 4. Calculate sequences and series if the signals mathematically 5. Using of Laplace transform to convert the domain from time to S-domain. 6. Using of 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. Fourier series and Fourier transform (9 hrs) 2. Sequence and series (9 hrs) 3. Multiple integrals (12 hrs) 4. Ordinary DE (6 hrs) 5. Partial DE (6 hrs)
Description	Fourier series, Fourier transform and invers Fourier transform: definitions, properties and applications. Multiple Integrals: Area by Double Integration. Double Integrals in Polar Form. Double and Triple Integrals in Rectangular Coordinates, Cylindrical and Spherical Coordinates. Sequences and Series: Sequence: convergence, tests and properties, types of sequences. Series: geometric series, nth partial sum. Test

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	of convergence, alternating series and Taylor's series, Power series. Ordinary Differential Equations: First order (variables separable, homogeneous), First order (linear – Bernoulli and exact), Second order (Homogeneous and non-homogeneous) and Higher order differential equations. Partial Differential Equations: formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order Lagrange's linear equation and non-linear equations, Charpit's method, Method of separation of variables for second order 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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.5
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)	6 and 12	LO #1 to #3 and #4 to #6
	Assignments	2	10% (10)	2 and 13	LO #3 to #6
	Projects / Lab.				
	Report	2	10% (20)	13	LO #3, #4 and #6
Summative assessment	**Midterm Exam**	1hr	10% (10)	9	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	Fourier series, Fourier transform and invers Fourier transform: definitions, properties and applications.
Week 2	
Week 3	Multiple Integrals: Area by Double Integration. Double Integrals in Polar Form. Double and Triple Integrals in Rectangular Coordinates, Cylindrical and Spherical Coordinates.
Week 4	
Week 5	
Week 6	Sequences and Series: Sequence: convergence, tests and properties, types of sequences. Series: geometric series, nth partial sum. Test of convergence, alternating series and Taylor's series, Power series.
Week 7	
Week 8	
Week 9	Mid exam
Week 10	Ordinary Differential Equations: First order (variables separable, homogeneous), First order (linear – Bernoulli and exact), Second order (Homogeneous and non-homogeneous) and Higher order differential equations.
Week 11	
Week 12	
Week 13	Partial Differential Equations: formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order Lagrange's linear equation and non-linear equations, Charpit's method, Method of separation of variables for second order equations.
Week 14	
Week 15	

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Week 16	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	No

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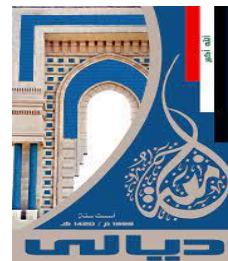
Websites	

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.