	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al_Anbiyaa.... civil Department	

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	MATHEMATICS III		**Module Delivery**
Module Type	CORE		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	ENG023		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	**Semester of Delivery**	3
Administering Department		**College**	Engineering College
Module Leader	Asst. lect. Noorulhuda Kadhim	**e-mail**	nooralhuda@uowa.edu.iq
Module Leader's Acad. Title		**Module Leader's Qualification**	
Module Tutor		**e-mail**	E-mail
Peer Reviewer Name		**e-mail**	E-mail
Review Committee Approval	1/6/2023	**Version Number**	1.0

Relation With Other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Mathematics II	**Semester**	2

Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The module aims to provide students with a solid understanding of the fundamental concepts and techniques of linear algebra. This includes the study of linear equations. Students will also learn how to apply these concepts to solve real-world problems in various fields such as engineering, physics, economics, and computer science. By the end of the module, students should be able to manipulate and analyze mathematical models using linear algebraic tools and communicate their findings effectively.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On completion of this module, students are expected to be able to: 1. Differentiate functions using the chain rule, product rule, quotient rule, and differentiation formula. 2. Formulate and solve first, second and higher order differential equations by algebraic methods. 3. Apply Fourier series to solving ordinary differential equations. 4. Test a given series for convergence, Determine whether a given sequence converges or not. 5. Differential Equations: Ordinary differential equations (ODEs) and partial differential equations (PDEs) are extensively used to describe dynamic systems and phenomena in engineering. They play a crucial role in fields such as fluid mechanics, heat transfer, structural analysis, and electrical circuits. 6. Apply methods of general and particular solutions to ordinary differential equations. 7. Formulation of a mathematical problem, mathematical formulation and use of mathematical methods in solving. 8. Find the Laplace transform of a function from the definition of a Laplace transform. 9. Find the Laplace transform of derivatives and integrals.
Indicative Contents المحتويات الإرشادية	The Indicative Contents of a Mathematics module will depend on the level and scope of the course. However, some common topics that may be covered in a mathematics module include: 1. Arithmetic: Basic mathematical operations such as addition, subtraction, multiplication, and division. 2. Algebra: The study of mathematical symbols and the rules for

	manipulating these symbols to solve equations and represent real-world situations. 3. Geometry: The study of shapes, sizes, positions, and measurements of objects in space. 4. Calculus: The study of mathematical concepts such as limits, derivatives, and integrals. 5. Number theory: The study of properties of numbers and their relationships with each other. Overall, the Indicative Contents of a Mathematics module aims to provide students with a comprehensive understanding of mathematical concepts and their applications 3 in various fields of study.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

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, 10 and 11
	Assignments	2	10% (10)	2 ,12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
	Midterm Exam	2hr	10% (10)	7	LO # 1-7

Summative assessment	**Final Exam**	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Ordinary differential Equations: First order (variables separable, homogeneous, linear, Bernoulli and exact). Second order (Homogeneous and non-homogeneous). Higher order differential equations
Week 2	
Week 3	
Week 4	
Week 5	Partial Differentiation: Function of two or more variables, Partial derivatives, Directional derivative, Gradient, divergence, curl, Tangent plane and normal line, Maxima, minima & saddle point.
Week 6	
Week 7	
Week 8	**Laplace Transform: Unit step function, Gamma function, Definition of L.T. and Properties, Inverse Laplace Transform, partial fractions, solution of differential equations using Laplace transform.**
Week 9	
Week 10	
Week 11	Sequences and series: Sequences, convergence, Series, geometric series, nth partial sum, test of convergence, alternating series, Power and Taylor's series.
Week 12	
Week 13	**Fourier Series: Periodic functions, Fourier series, Even and odd functions, Half – Range expansions, Complex notation for Fourier series.**
Week 14	
Week 15	
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	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Erwin Kreyszig, “Advanced Engineering Mathematics”, 10th Ed.	YES
Recommended Texts	1. George B. Thomas Jr., "CALCULUS", 14th Ed 2. Schaum's Outline of College Mathematics, Fourth Edition 3. Mary Attenborough, "Mathematics for Electrical Engineering and Computing", 1st Ed.	NO
Websites	Topics in a Calculus -Wolfram Mathworld	

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				

NB 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.