MODULE DESCRIPTION FORM

Module Information					
Module Title	**Mathematics III**			**Module Delivery**	
Module Type	**Basic learning**			☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	ENG201				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	2		**Semester of Delivery**	**3**	
Administering Department			**College**	**Engineering College**	
Module Leader	**Dr.Saad Mahmood Sarhan** **Assist. Lect. Ahmad**		**e-mail**	saad.mah@uowa.edu.iq	
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	1/6/2023		**Version Number**	1.0	

Relation with other Modules			
Prerequisite module	Mathematics II	**Semester**	2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	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	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	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 in various fields of study.

Learning and Teaching Strategies	
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)			
Structured SWL (h/sem)	78	**Structured SWL (h/w)**	6
Unstructured SWL (h/sem)	72	**Unstructured SWL (h/w)**	4
Total SWL (h/sem)	150		

Module Evaluation					
		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
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1 **Week 2** **Week 3**	**Ordinary differential Equations:** First order (variables separable, homogeneous, linear, Bernoulli and exact). Second order (Homogeneous and non-homogeneous). Higher order differential equations

Week 4	
Week 5 **Week 6** **Week 7**	**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 8 **Week 9** **Week 10**	**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 11 **Week 12**	**Sequences and series:** Sequences, convergence, Series, geometric series, n^{th} partial sum, test of convergence, alternating series, Power and Taylor's series.
Week 13 **Week 14** **Week 15**	**Fourier Series:** Periodic functions, Fourier series, Even and odd functions, Half – Range expansions, Complex notation for Fourier series.
Week 16	Preparatory week before the final Exam

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

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