MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Engineering Analysis			**Module Delivery**	
Module Type	S			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	UOMU0206056				
ECTS Credits	5				
SWL (hr/sem)	150				
Module Level	UGIII		**Semester of Delivery**	Five	
Administering Department	**Fuel and Energy Techniques Engineering Department**		**College**	**Engineering Technical College**	
Module Leader	**Firas Thair Almaliky**		**e-mail**	firas.thair.almaliky@uomus.edu.iq	
Module Leader's Acad. Title	**Assistant Professor Dr.**		**Module Leader's Qualification**	**Ph.Dr. Prosthetic and Orthopedic Engineering**	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**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	1- To define the types of the first order ordinary differential equations and explain the most important standard methods for solving such equations in the engineering applications. 2- To define the types of the second and high orders ordinary differential equations, and explain the methods for solving such equations in the engineering applications. 3- To define the Fourier series, odd and even periodic functions and explain the methods for solving such series during the engineering applications. 4- To define the Gamma Function and explain the methods for solving integrals using gamma function in the engineering applications. 5- To define the Laplace Transforms and Inverse transforms and explain the methods for solving Differential equations by Laplace Transforms during the engineering applications. 6- To describe the methods for solving the Partial Differential Equations connected with various physical and geometrical applications.
Module Learning Outcomes	Upon completion of the course, students should be able to: 1. Understand the methods of solutions for first order differential equations and their engineering applications. 2. Understand the methods of solutions for second and high orders differential equations and their engineering applications. 3. Understand the method of solution for Fourier Series and their engineering applications. 4. Understand the methods for solving integrals using gamma function with their applications. 5. Understand the methods of solution by Laplace transformation and their applications. 6. Understand the methods of solution for partial differential equation and their engineering application.
Indicative Contents	Indicative content includes the following. 1. Differential equations classification, first order methods of solutions, engineering applications of first order differential equations. [6 hrs]

	2. Introduction of the linear differential equation of the second and nth orders, Homogeneous and Non-Homogeneous Linear ODEs with constant Coefficients, methods of solutions, engineering applications) [6 hrs] 3. Fourier series, Even and Odd Functions, Applications of the Fourier series in the engineering field. [6 hrs] 4. Gamma function definition, evaluation of Gamma Function, extension of definition of Gamma Function, Applications of Gamma Function. [6 hrs] 5. The Laplace transformation definition, Laplace Transforms of Some Simple Functions, Application of Hyperbolic Functions, Inverse Laplace Transform, Solution of Differential Equations using Laplace transforms, Solution of System of ODEs. [6 hrs] 6. The partial derivatives definition, Basic Concepts of PDEs, Formation of Partial Differential Equations, Engineering Applications. [6 hrs]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	Assessment is based on hand-in assignments, written exam, Case study, Quizzes, seminars, Practical testing and Online testing.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem)	59	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	91	**Unstructured SWL (h/w)**	6
Total SWL (h/sem)	150		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	20% (20)	3,5,6,10	LO #1,2,…..10
	Assignments	2	10% (10)	7, 8	LO # 8
	Seminar	1	10% (10)	11	LO # 11
	Midterm Exam	2 hr	10% (10)	12	LO # 1-12

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري محتوى كل اسبوع يجب ان يغطي الوقت المحدد	
	Material Covered
Week 1	First order differential equations, Special cases of first order D.E.
Week 2	First order differential equations engineering applications.
Week 3	Second order linear equation with constant coefficients.
Week 4	Second order linear equation engineering applications.
Week 5	High order linear differential equations , Integral operators.
Week 6	High order linear differential equations engineering applications.
Week 7	Fourier series, even and odd functions .
Week 8	Fourier series engineering applications.
Week 9	Gamma Function and integral solution.
Week 10	Gamma Function applications
Week 11	Laplace transformation, Inverse Laplace transformation, Laplace transformation to solution for differential equations.
Week 12	Laplace transformation engineering applications.
Week 13	Partial differential equations, solution by separation method.
Week 14	Partial differential equations solution of their engineering applications.
Week 15	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Recommended Texts	1. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, Inc. 2. Advanced Engineering Mathematics, Peter V. O'Neil, Thomson Brooks/Cole. 3. Advanced Engineering Mathematics, A.B. Mathur & V.P. Jaggi, Khanna Publishers. 4. Advanced Engineering Mathematics, Wyle Barrett /fifth edition.	No

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.