	Ministry of Higher Education and Scientific Research - Iraq Al-Mustaqbal University College of Engineering Department of Prosthetics and Orthotics Engineering	

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية				
Module Title	التحليلات الهندسية		**Module Delivery**	
Module Type	BASIC		☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	UOMU0103057			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level	3	**Semester of Delivery**	5	
Administering Department	UOMU0103	**College**	UOMU01	
Module Leader	Shahad Mahmood Mohammed	**e-mail**	shahad.mahmood.mohammed@uomus.edu.iq	
Module Leader's Acad. Title	Asst. Lect.	**Module Leader's Qualification**	MSc.	
Module Tutor				
Peer Reviewer Name		**e-mail**		
Review Committee Approval		**Version Number**		

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Math I, Math II, MATH III	**Semester**	4
Co-requisites module		**Semester**	
Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			
Module Aims أهداف المادة الدراسية	1. Instructing the mechanical engineering student with the necessary skills to translate real-world situations into mathematical expressions.. 2. Educating the student on the fundamental concepts of equations and the process of constructing them. 3. Establishing the boundary parameters for every operational scenario represented in the equations. 4. Simplifying equations to a certain extent in order to find solutions. 5. Examining and assessing the findings in a practical and scientific manner.		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. All students may construct equations using real-world data. 2. Appropriate solutions to these equations can be found by each student. 3. Each student is able to analyze the results according to work requirements. 4. Developing a fact-based geometric intuition in all learners and having them associate every outcome with a cause can help them understand mathematics better. 5. Understanding how to break complicated equations down into series is one of the other possible options. 6. Solving all linear differential equations by using an appropriate methods. 7. Attempting to convert all semi and quasi linear differential equations to linear ones and thus solving them eventually. Finding a numerical method for non-linear differential equations.		
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Ordinary Differential Equations Review on limits, continuity, differentiation, Cauchy theorem, Trigeometric function ,logarithmic function, exponential function, hyperbolic function [15 hrs] Complex integration, conformal mapping, Gamma function, Beta function, error function. [30 hrs]		

	Laplace transformation, inverse Laplace transformation, ODE and applications, initial value problem. [30 hrs Part B – Partial Differential Equations Fourier series, Euler relation, odd and even function, half rang expansion, complex Fourier, Fourier integration. [25 hrs] Partial differential equations, homogeneity, solution of wave equations, solution of heat equations, solution by Laplace transformation. [25 hrs] Numerical method, finite difference method, solution method ,equations of difference, numerical solution of P.D.E.,. double integration ,Simpson method. [25 hrs]
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	.1Choosing methodological books that are compatible with the academic course and the latest developments in the subject. .2Preparing lectures from these books for the purpose of presentation .3Make the lecture brief and focused on the basics of the subject .4Urging the student to prepare, re-study the lecture, and solve the exercises .5Creating opportunities for the student to contribute and participate effectively in the lecture, etc

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
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)	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	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	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 2	
Week 3	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 4	
Week 5	Euler-Cauchy equations, Applications.
Week 6	Mathematical Modeling
Week 7	Mid-term Exam
Week 8	Review on power series, parodic functions, Fourier series
Week 9	Introduction to the partial differential equations (PDE)
Week 10	The theory of separation of variables and superposition
Week 11	Fourier methods for PDEs.
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	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Advanced Engineering Mathematics by Erwin Kreyszig	Yes
Recommended Texts	Advanced Engineering Mathematics by Dennis G. Zill (z-lib.org)	No
Websites	Pauls Online Math Notes	

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:				

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.

ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي