

MODULE DESCRIPTION

Module Information						
Module Title	Engineering Analysis I			Module Delivery		
Module Type	Core			☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	PE313					
ECTS Credits	5					
SWL (hr/sem)	125 H/Sem.					
Module Level	3	Semester of Delivery				5
Administering Department		Petroleum Engineering	College	College of Engineering		
Module Leader		Hussam Waheed Mktooff		e-mail	h564127@gmail.com	
Module Leader's Acad. Title		Assistant lecture		Module Leader's Qualification		M.sc
Module Tutor		Hussam Waheed Mktooff		e-mail	h564127@gmail.com	
Peer Reviewer Name		Hasnaa M.EL-Arwash		e-mail	Hasnaa.Mohammed@alayen.edu.iq	
Scientific Committee Approval Date		20205/10/5		Version Number		1.0

Relation with other Modules			
Prerequisite module	mathematics IV (PE223)	Semester	4
Co-requisites module	Applied Mathematics and Geostatistics (PE323)	Semester	6

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	Introduction to Ordinary Differential Equations: Review of Fundamental Concepts 1ST Order Linear Differential Equations: Types and Solutions, Application of 1st Order Linear Differential Equations, nth order of LDE using Undetermined Coefficients, Nth order of LDE using Variation of Parameters, Solution of Linear Differential Equations with Variable Coefficients/ Cauchy-Euler Method 2nd Order DE with variable coefficients using Power-Series Method , 2nd Order DE with variable coefficients using Tayler-Series Method, 2nd Order DE with variable coefficients using Frobenius Method/ Three Cases.



Module Learning Outcomes	Knowledge	A2	A2.1 Understand the fundamentals of differential equations. A2.2 Classify the differential equations based on its type, order, and degree. This will help to identify the best method for solving the differential equations. A2.3 Solve the 1st order of DE using different methods including separable, exact, homogenous, linear, Bernoulli, and Ricatti's methods. A2.4 Analyzing complex engineering problems in petroleum engineering and contributing to their solution.	
		Skills	B1	B1.1 Function efficiently as an individual B1.2 Function as a member of multidisciplinary and multicultural teams
	B2		B2.1 Communicate effectively – graphically with a range of audiences using contemporary tools. B2.2 Communicate verbally and in writing with a range of audiences using contemporary tools.	
	Ethics	C2	C2.1 Recognize professional and ethical responsibility. C2.2 Adhere and respect diversity.	
Indicative Contents	Indicative content includes the following. <u>Unit 1:</u> to Ordinary Differential Equations: Review of Fundamental Concepts[2 hours] <u>Unit 2:</u> 1ST Order Linear Differential Equations: Types and Solutions, Application of 1st Order Linear Differential Equations[8 hours] <u>Unit 3:</u> Solution of nth order of LDE using Undetermined Coefficients, Solution of Nth order of LDE using Variation of Parameters[8 hours] <u>Unit4:</u> Solution of Linear Differential Equations with Variable Coefficients/ Cauchy-Euler Method[2 hours] <u>Unit5:</u> Solution of 2nd Order DE with variable coefficients using Power-Series Method, Solution of 2nd Order DE with variable coefficients using Tayler-Series Method, Solution of 2nd Order DE with variable coefficients using Frobenius Method/ Three Cases[10hours]			
Learning and Teaching Strategies				
Strategies	• Report • Interactive learning • Discussions • Brainstorming • Group Solving Problems • Problem-Based Learning • Self-learning			
Student Workload (SWL) for 15 weeks				
Structured SWL (h/sem)	63	Structured SWL (h/w)	4.2	
Unstructured SWL (h/sem)	62	Unstructured SWL (h/w)	4.13	

Total SWL (h/sem)	125
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Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	A2
	Interaction within the class	All	10% (10)	All	A2, B1, B2 ,C2
	Assignments	2	10% (10)	2, 4,6,8,10,12 and 14	A2
	Projects / Lab.				
	Report	1	10% (10)	13	A2
Summative assessment	Midterm Exam	1hr	10% (10)	12	A2
	Final Exam	3hr	50% (50)	15	A2
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري		
	Material Covered	LOs
Week 1	Introduction to Ordinary Differential Equations: Review of Fundamental Concepts	
Week 2,3	1ST Order Linear Differential Equations: Types and Solutions	A2, B1, B2, C2
Week 4,5	Application of 1st Order Linear Differential Equations	A2, B1, B2, C1
Week 6,7	Solution of nth order of LDE using Undetermined Coefficients	A2, B1, B2, C1
Week 8	Solution of Nth order of LDE using Variation of Parameters	A2, B1, B2, C1
Week 9	Solution of Linear Differential Equations with Variable Coefficients/ Cauchy-Euler Method	A2, B1, B2, C1
Week 10,11	Solution of 2nd Order DE with variable coefficients using Power-Series Method	A2, B1, B2, C1
Week 12	Solution of 2nd Order DE with variable coefficients using Tayler-Series Method	A2, B1, B2, C1
Week 13,14	Solution of 2 nd Order DE with variable coefficients using Frobenius Method/ Three Cases	A2, B1, B2, C1

Week 15	Preparation and Help Session for the Final Exam	A2
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Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	•Curriculum and textbook	Yes
Recommended Texts	• Engineering Mathematics", by John Bird, 5th edition, Elsevier Ltd., 2007 •Advanced Engineering Mathematics", by Peter V. O'Neil, 7th Edition, Cengage Learning, 2012	Yes
Websites	https://eng.alayen.edu.iq//colleges/e/42	

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.				