

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Engineering Numerical Methods		Module Delivery
Module Type	Basic		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	ENG011		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIV	Semester of Delivery	6
Administering Department	CV101	College	Civil Engineering College
Module Leader	Dr. Jalil Eyada Kwad	e-mail	j.j.kwad@uoanabr.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Atheer Al Anbaki	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CE2202 Calculus 4	Semester	4
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. Familiarize the student with the mathematical background of the different numerical methods.2. Develop an understanding of the different numerical methods for solving algebraic equations.3. Familiarize the student for create MATLAB functions to solve numerical geometry problems.4. Perform basic analyses to use the functions built into MATLAB and EXCEL.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. Be aware of the mathematical background for the different numerical methods introduced in the course.2. Understand the different numerical methods to solve the algebraic equations and to solve system of linear and nonlinear equations.3. Understand the different numerical methods for interpolation, differentiation, integration and solving set of ordinary differential equations.4. Understand how numerical methods afford a mean to generate solutions in a manner that can be implemented on digital computers.5. Use and create functions in MATLAB and EXCEL for solving numerical engineering problems.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Chapter one</u> The numerical methods include error analysis, roots of nonlinear algebraic equations, solution of linear and transcendental simultaneous equations, matrix and vector manipulation [20 hrs]</p> <p><u>Chapter Two</u> Curve fitting and interpolation [10 hrs]</p> <p><u>Chapter Three</u> Numerical integration and differentiation, solution of ordinary and partial differential equations [15 hrs]</p>

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Engineering Numerical courses require effective learning and teaching strategies to ensure students develop a strong understanding of complex concepts and their practical applications. The range of strategies that can enhance the learning experience for students in Engineering Numerical courses. These strategies include lecture-based teaching, practical applications, problem-solving assignments, group work and discussions, technology integration, assessments and feedback, continuous learning, and encouraging self-directed learning. By incorporating these strategies, educators can create an engaging and comprehensive learning environment that equips students with the knowledge, skills, and critical thinking abilities necessary for success in the field of foundation engineering.

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 أسبوعياً	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	5% (5)	3, 6,10,14	LO #1,2 and3
	Assignments	2	5% (5)	2, 12	LO # 2
	Projects / Lab.	1	5% (5)		LO # 2 and 4
	Report	1	5% (5)	13	LO # 2,4 and 5
Summative assessment	Midterm Exam	2 hr	20% (20)	7	LO # 1-5
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered

Week 1	Introduction, General concepts of numerical method, General definition of the types of numerical error
Week 2	General definition of the types of numerical error, Roots
Week 3	Roots
Week 4	Roots
Week 5	Roots, Matrix
Week 6	Solving system of linear equations
Week 7	Solving system of linear equations
Week 8	Solving system of linear equations
Week 9	Curve Fitting, Polynomial Interpolation
Week 10	Curve Fitting, Polynomial Interpolation
Week 11	Polynomial Interpolation
Week 12	Polynomial Interpolation, Integration
Week 13	Integration and differentiation
Week 14	Differentiation and Ordinary differential equation
Week 15	Ordinary differential equation
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to the MATLAB interface
Week 2	Lab 2: Introduction to MATLAB programming language
Week 3	Lab 3: Drawing using MATLAB
Week 4	Lab 4: Solve the equation of falling under the influence of gravity
Week 5	Lab 5: Finding the square root of a given number
Week 6	Lab 6: Sort specific numbers according to a specific condition
Week 7	Lab 7: Solve linear algebraic equations
Week 8	Lab 8: Solving differential equations

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Numerical Methods for Engineers, 6th edition 2010, S. C. Chapra and R. P Canale, McGraw-Hill	Yes
Recommended Texts	Essential MATLAB for Engineers and Scientists Seventh Edition, Brian D. Hahn, Daniel T. Valentine Elsevier Ltd 2019	Yes
Websites	https://www.uoanbar.edu.iq/Bank-Section.php	

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.