	Ministry of Higher Education and Scientific Research - Iraq **Al-Naji University** **College of Engineering** **AI Engineering Department**	

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Mathematics**			**Module Delivery**	
Module Type	B			☒ **Theory** ☒ **Lecture** ☒ **Tutorial**	
Module Code	CEA2301				
ECTS Credits	**5**				
SWL (hr/sem)	125				
Module Level	2		**Semester of Delivery**	3	
Administering Department	AI Engineering		**College**	College of Engineering	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name	Name		**e-mail**	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 Objectives أهداف المادة الدراسية	1. Broadening students' understanding of integration towards more advanced integration techniques such as integration by parts. 2. Develop the ability to analyze and solve problems involving multiple integrals. 3. Introduce series expansions as tools for approximating and analyzing engineering functions. 4. Provide fundamental knowledge of differential equations as a basis for modeling engineering systems. 5. Enhance students' problem-solving skills and their ability to apply mathematics in practical engineering contexts.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Apply integration methods such as substitution, integration by parts, and partial fractions. 2. Evaluate double and triple integrals in engineering applications. 3. Use power and Tylor series for function approximation and problem-solving. 4. Formulate and solve ordinary differential equations in engineering contexts. 5. Demonstrate analytical and independent problem-solving abilities through coursework and examination.
Indicative Contents المحتويات الإرشادية	Weeks 1-2: integration overview, substitution, integration by parts. Weeks 3-4: integration using partial fractions. Weeks 5-6: Double integrals and applications. Weeks 7: Midterms Examination. Weeks 8-9: Triple integrals and applications. Weeks 10-11: Power series and Tylor series expansions. Weeks 12-14: differential equations (first- and higher-order, applications in engineering). Weeks 15: Final Examinations

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module will be delivered through **lectures, tutorials, and applied problem-solving sessions**. Lectures will introduce theoretical concepts supported by engineering applications, while tutorials will provide practice in applying methods to structured problems. Students will be encouraged to engage in active learning through problem sheets and homework exercises. Computer-based demonstrations shall be used to show how mathematical concepts are applied in engineering simulations. Independent study will be promoted through guided reading and

	assignments, and formative feedback will support students in building confidence and mastery of mathematical techniques. Assessment will combine examinations and coursework to test both theoretical understanding and practical application.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
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**	5	10% (10)	3, 6 and 10	**Example** LO #3, #6 and #10
	Lab	NA	NA	NA	NA
	Projects	10	10% (10)	Continuous	All
	HomeWork	5	10% (10)	Continuous	
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	
	Final Exam	3hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	integration overview, substitution, integration by parts.
Week 2	integration overview, substitution, integration by parts.
Week 3	integration using partial fractions.
Week 4	integration using partial fractions.

Week 5	Double integrals and applications.
Week 6	Double integrals and applications.
Week 7	Midterms Examination.
Week 8	Triple integrals and applications.
Week 9	Triple integrals and applications.
Week 10	Power series and Tylor series expansions.
Week 11	Power series and Tylor series expansions.
Week 12	differential equations (first- and higher-order, applications in engineering).
Week 13	differential equations (first- and higher-order, applications in engineering).
Week 14	differential equations (first- and higher-order, applications in engineering).
Week 15	Final Examinations
Week 16	

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	

Week 15	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		
Recommended Texts		
Websites		

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.