



Ministry of Higher Education and
Scientific Research - Iraq
Al-Nahrain University
College of Sciences
Department of Mathematics and Computer
Applications



MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Calculus (II)		Module Delivery
Module Type	Core		<ul style="list-style-type: none">• <input type="checkbox"/> Theory• <input checked="" type="checkbox"/> Lecture• <input checked="" type="checkbox"/> Lab• <input checked="" type="checkbox"/> Tutorial• <input type="checkbox"/> Practical• <input type="checkbox"/> Seminar
Module Code	MATH1203		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level		Semester of Delivery	
Administering Department	Mathematics and Computer Applications	College	College of Sciences
Module Leader	Ibtisam Kamil Hanan	e-mail	ibtisam.kamil@nahrainuniv.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	me	e-mail	E-mail
Scientific Committee Approval Date	01/09/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MATH1101	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	<p>The aim of this course is to introduce the concept of integration, study various techniques of integration, test improper integrals for convergence and illustrate some applications of integration. Student will gain proficiency to use integration to solve real world problems such as area and volumes problems.</p>
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<p>After completing the course, students have the ability</p> <ol style="list-style-type: none"> 1. To determine proper integral of one variable functions. 2. To determine integral involving the fundamental theorem of Calculus and method of substitution. 3. To determine the solution of problems involving the integral of one variable function. 4. To compute integral involving transcendental functions. 5. To compute integral with advanced integration techniques. 6. To demonstrate ability to think critically by recognizing patterns and determining and using appropriate techniques for solving a variety of integration problems. 7. To solve indeterminate forms and improper integral problems. 8. To calculate the length of a plane curve and solving area and volume application problems. 9. To sketch the graph of a polar equation and the area problems in the polar coordinate system. 10. To demonstrate an intuitive and computational understanding for integral applications by solving a variety of problems from physics, engineering and mathematics.
Indicative Contents المحتويات الإرشادية	<ol style="list-style-type: none"> 1. Proper integral, Fundamental Theorem of Calculus, basic rules of integration. 2. Methods of integrations, method of substitution, partial integration method, trigonometry integral and integral of rational function with partial fraction. 3. Improper integrals, test for convergence and divergence of improper integrals.

	<p>4. Application of Definite Integrals, Mean value theorem of integration, Area, solid revolution volume and Arc length.</p> <p>5. polar coordinates.</p>
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	<p>The module will be presented to the students through a specified series of lectures, supported by problem solving practice carried out in interactive tutorials. These tutorials will be supported by practice and directed study outside the classroom. Formative assessment takes place throughout the module during tutorials and feedback is given during these tutorials.</p>

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	81	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	3, 8	LO #1, 2, and 4
	Assignments	2	10% (10)	6, 9	LO # 3 and 6
	Projects / Lab.	1	10% (10)	continuous	
	Report	1	10% (10)	12	LO # 5, 7 and 8
Summative assessment	Midterm Exam	2	10% (10)	5,10	LO # 1-7
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Indefinite integrals, Definite integrals, The fundamental theorems of integrals, Basic Integration Formulas.
Week 2	Integration by substitution
Week 3	Integration of certain powers of trigonometric and hyperbolic functions
Week 4	Integrals involving trigonometric substitutions, Integrals involving hyperbolic substitution .
Week 5	Mid-Term Exam + Integrals involving quadratic substitution
Week 6	Integration by parts
Week 7	Integration of Rational Functions
Week 8	Integration of Irrational Functions, Integration of Rational Functions of Trigonometric
Week 9	Improper integrals: Definition of improper integral and examples
Week 10	Mid-Term Exam + Test for convergence and divergence of improper integrals (P-test, Domination test, Limit comparison test)
Week 11	Application of Definite Integrals: Mean value theorem of integration , Area under the curve
Week 12	Area between two curves, Volume of solid of revolution (Disk (washer) and shell) methods
Week 13	Arc length, Area of surface of revolution
Week 14	Area in polar coordinates
Week 15	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Integration in MATLAB
Week 2	Lab 2: Definite Integrals
Week 3	Lab 3: Indefinite integrals
Week 4	Lab 4: Sine and Cosine Integral functions
Week 5	Lab 5: Hyperbolic Sine and Cosine Integral functions
Week 6	Lab 6: Integration by parts in MATLAB
Week 7	Lab 7: Integrating inverse trigonometric Functions
Week 8	Lab 8: Partial Fraction Expansion in MATLAB
Week 9	Lab 9: Solving an improper Integral
Week 10	Lab 10: Area in MATLB

Week 11	Lab 11: Area between two curves in MATLAB
Week 12	Lab 12: Compute Volumes of Revolution
Week 13	Lab 13: Arc length
Week 14	Lab 14: Using Polar Coordinates in MATLAB

اساتذة المختبر

- 1- م.د. ابتسام كامل حنان
 2- م. رنين زيد حمود
 3- م.م. حنين عبد الكريم أمين
 4- م.م. عباس ابراهيم خليف
 5- م.م. شيماء عبد الستار
 6- م.م. فرح لطيف

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Calculus and Analytic Geometry by Thomas	Yes
Recommended Texts	Calculus Labs for MATLAB	No
Websites	www.mathhandbook.com	

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.