Ministry of Higher Education and
Scientific Research - Iraq

University of Warith Al_Anbiyaa
College of Engineering
Civil Engineering Department

MODULE DESCRIPTOR FORM

Module Information

Module Title	MATHEMATICS II	Module Delivery
Module Type	BASIC	☒ **Theory**
Module Code	ENG023	☒ **Lecture** **Lab**
ECTS Credits	6	☒ **Tutorial** **Practical**
SWL (hr/sem)	150	**Seminar**

Module Level	1	Semester of Delivery	2
Administering Department	Civil Engineering	College	Engineering
Module Leader	Zahraa Khalil Hussein	e-mail	Zahraa.khaleel@uowa.edu.iq
Module Leader's Acad. Title	Assist.prof	Module Leader's Qualification	PhD
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Review Committee Approval	2024/9/26	Version Number	1

Relation With Other Modules

Prerequisite module	MATHEMATICS I	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	The aims of a mathematics module are to provide students with an understanding of mathematical concepts, skills, and techniques that can be applied to a range of real-world problems. This includes topics such as An introductory class in the theory and techniques of differentiation and integration ofalgebraic and trigonometric functions. Additionally, the module aims to prepare students for future academic and professional pursuits that require mathematical proficiency
Module Learning Outcomes	On successful completion of this module, students will be able to: 1. Find the domain and range of a function and graphs. 2. Evaluate limits, and determine continuity and differentiability offunctions. 3. Apply rules of calculus to solve engineering problems including differentialequations. 4. Differential calculus, these concepts are used to analyze rates of change,optimization problems, and the behavior of functions in engineering applications. 5. Integration: Table of integrals, Rules of integration, Definite integrals,Area bounded by curves, Integration by parts, Integration by substitution and using partial fractions. 6. Student should use more than one method to solve the integration. 7. Express and evaluate a double and triple integral in terms of the Cartesian. 8. Calculate area, volume, and surface area of integral. 9. Application of Integration: Centres of mass, Moments of inertia.
Indicative Contents	The Indicative Contents of a Mathematics module will depend on the level andscope of the course. However, some common topics that may be covered in a mathematics module include: 1- Arithmetic: Basic mathematical operations such as addition, subtraction,multiplication, and division. 2- Algebra: The study of mathematical symbols and the rules for manipulatingthese symbols to solve equations and represent real-world situations. 3- Geometry: The study of shapes, sizes, positions, and measurements of objectsin space. 4- Calculus: The study of mathematical concepts such as limits, derivatives, andintegrals. Overall, the Indicative Contents of a Mathematics module aims to provide students with a comprehensive understanding of mathematical concepts and their applications in various fields of study.

Learning and Teaching Strategies

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achievedthrough classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)

Structured SWL (h/sem)	87	Structured SWL (h/w)	6
Unstructured SWL (h/sem)	80	Unstructured SWL (h/w)	2
Total SWL (h/sem)	105		

Module Evaluation

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO # 1, 201, and 00
	Assignments	2	10% (10)	2, 12	LO # 3,4; 6, and 7
	Projects / **Lab.**	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100%(100)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	**Functions:** Domain and Range, Functions and their graphs, Trigonometric Functions.
Week 2 **Week 3**	**Limits and Continuity:** Limit of a Function and Limit Laws, One-Sided LimitsContinuity, Limits Involving Infinity, Asymptotes of Graphs.

Week 4 Week 5 Week 6	**Derivatives**: Tangent Lines and the Derivative at a Point, The Derivative as a Function,Differentiation Rules, Derivatives of Trigonometric Functions, The Chain Rule, ImplicitDifferentiation, Linearization and Differentials.
Week 7 Week 8 Week 9	**Applications of Derivatives:** Extreme Values of Functions, The Mean Value Theorem, Monotonic Functions and the First Derivative Test, Concavity and Curve Sketching, AppliedOptimization, Antiderivatives
Week 10 Week 11 Week 12	**Integrals:** The Definite Integral, The Fundamental Theorem of Calculus, Indefinite Integralsand the Substitution Method, Definite Integral Substitutions and the Area Between Curves.
Week 13 Week 14 Week 15	**Applications of Definite Integrals:** Volumes using Cross-Sections, Volumes using Washerand Cylindrical Shells methods, Arc Length, Areas of Surfaces of Revolution, Work and Fluid Forces, Moments and Centers of Mass.
Week 16	Preparatory week before the final Exam

	Learning and Teaching Resources

	Text	**Available in the Library?**
Required Texts	George B. Thomas Jr., "CALCULUS", 14th Ed	Yes
Recommended Texts	1. Erwin Kreyszig, "Advanced EngineeringMathematics", 10th Ed. 2. Schaum's Outline of College Mathematics, FourthEdition. Mary Attenborough, "Mathematics for Electrical Engineering and Computing", 1st Ed.	No
Websites	Topics in Calculus -Wolfram Mathworld.	

APPENDIX:

GRADING SCHEME				
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:				

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.