



CIHAN UNIVERSITY-SULAIMANIYA

Course Outline

2023-2024

**Address: Chwarchra-Opposite to Family Mall
Sulaymaniyah City
Kurdistan Region-Iraq
Tel: 07714695656,
email: presidency@sulicihan.edu.krd**

MODULE DESCRIPTION FORM

Module Information			
Module Title	Calculus		
Module Type	Theoretical	<input type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar <input type="checkbox"/> Report <input type="checkbox"/> Extra activity	
Module Code	CUE68001		
Language	English		
ECTS Credits 5 Credits			
Module Level		Semester of Delivery	1 st Semester
Administering Department	Department of Architectural Engineering	College	College of Engineering
Lecturer	Salah Raza Saeed		
Academic Title	Assistant Professor	Qualification	
Module Tutor	Salah Raza Saeed	e-mail	Salah.raza @sulicihan.edu.krd
Peer Reviewer Name		e-mail	Salah.raza @sulicihan.edu.krd
Scientific Committee Approval Date		Version Number	
Cycle of Study	Bachelor	Form of Education	Full time

Relation with other Modules			
Prerequisite module	yes	Semester	2
Co-requisites module	no	Semester	1

Department: Architectural

Discipline:

Stage: 1



Total Contact Hours:	23
Total Self Study Hours:	38
Total No. Hours:	61
ECTS:	2

No. of Weeks	Contact Hours					Self-Study					
	Theoretical	Practical	Lab	Project	Visit	Quiz	Reading	Assignment	Report	Midterm Exam.	Final Exam.
1 st Week (Registration)	1				-	-	0	-	-	-	
2 nd Week	2						2			4	5
3 rd Week	2						2	1			
4 th Week	2					1	2				
5 th Week	2						2	1			
6 th Week	2						2				
7 th Week	holiday								
8 th Week	2						2				
9 th Week	2						2				
10 th Week	holiday								
11 th Week	2						2	1			
12 th Week	2					1	2	1			
13 th Week	2						2				
14 th Week	2						2				
15 th Week (Final Exam.)											
16 th Week (Final Exam.)											
TOTAL	23					2	23	4		4	5

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Course outline
Week 2,3,4	<p>6. Matrices Addition, multiplication, Identity , Transpose , Determinants, Cofactor Expansion .Inverse .Two by Two Matrices .Partitioned Matrix, Cofactors Matrix, Matrix Manipulation, Systems of Equations Eigenvalues and Eigenvectors .Trace Symmetric Matrices .Diagonal Matrices .Example Questions</p>
Week 4	<p>7. Vectors AND CURVILINEAR COORDINATES</p> <ul style="list-style-type: none"> ➤ Vector Notation ➤ Addition and Scalar Multiplication ➤ Length ➤ Cartesian Unit Vectors ➤ Dot Product ➤ Cross Product ➤ Linear Independence ➤ Example Questions . ➤ Cylindrical coordinates ➤ Spherical coordinates
Week 5	POWER SERIES AND POLYNOMIALS
Week 6	Mid-Term Exam
Week 7	<p>Complex Numbers</p> <ul style="list-style-type: none"> ➤ Definition ➤ Addition and Multiplication ➤ Complex Conjugate .. ➤ Euler's Equation - - - - ➤ De Moivre's Theorem. ➤ Example Questions . .
Week 8,9,10	<p>Differential Equations</p> <p>First Order Differential Equations, Integrable - - - - - Separable - - - - - Integrating Factor - - - - -</p> <p>Second Order Differential Equations Homogeneous . Inhomogeneous . Example Questions . . .</p>
Week 11,12,13	<p>Multivariable Calculus</p> <ul style="list-style-type: none"> ➤ Partial Differentiation ➤ Grad, Div and Curl ➤ Double Integrals . . ➤ Example Questions
Week 14	Review
Week 15	Preparatory Week

Week 16	Final Exam
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Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	<p>The course aims to provide sufficient knowledge of complex numbers, and to give an understanding differentiation, integration, matrices and vectors. The student will, also, understand the concept of series expansion, the polar coordinates and how to transform Cartesian coordinates into polar coordinates and vice versa.</p> <p>By the end of the course, students should be able to:</p> <ol style="list-style-type: none"> 1. Understand the meaning of a complex number. 2. Be able to do arithmetic operations on complex numbers and to represent these numbers on the Argand diagram. 3. Understand the coordinate systems . 4. Be able to solve matrices, Eigen value and Eigen functions 5. Understand the concept of limit of sequence. 6. Compute limits, where they exist, of sequences which involve products and quotients and perhaps some elementary functions. 7. Solve differential equation and its applications 8. Compute the limits, if they exist, of some simple infinite series. 9. Solve the partial differential equations 10. Understanding the concept of Gradient, divergence and curl 11. Determining 2nd and 3rd integrations <p>Find the Taylor and Maclaurin series of the functions $e(x)$; $\sin(x)$; $\cos(x)$; $\log(x)$; .Sum series using standard Maclaurin.</p>
Module Learning Outcomes	Provide students with the foundation of Mathematics and prepare students for numerical analysis and advance mathematics mostly used in varied applications in computer science.

Learning and Teaching Strategies	
Strategies	The course aims to provide sufficient knowledge of complex numbers, and to give an understanding concept of different functions, derivatives and integration rules and application, on length, area and volumes, and provide a good knowledge on series expansion, matrices and vectors .sequences and series, in particular the infinite and power series. The convergence and divergence of sequences and series are to be appreciated. The student will, also, understand the polar coordinates and how to transform Cartesian coordinates into polar coordinates and vice versa.

Module Evaluation					
Assessment Types		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
	Quizzes		10		

Summative assessment	Assignments		10		
	Attendance		5		
Formative assessment	Midterm Exam	1.5hr	30		
	Final Exam	2hr	50		
Total assessment			100% (100 Marks)		

Learning and Teaching Resources		
	Text	Available in the Library?
Required Texts	<ul style="list-style-type: none"> Thomas Calculus, 12th edition (2004), George B. Thomas, Jr. Maurice D. Weir Joel Hass ISBN-13: 978-0-321-58799-2 	
Recommended Texts	<ul style="list-style-type: none"> Advanced Engineering Mathematics, Erwin Kreyzigl. Barry, Steven Ian. Essential mathematical skills for engineering, science and applied mathematics. Includes index. ISBN 0 86840 565 5. 	
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
<p>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.</p>				

Approved by Head of the Branch / Department

Signature

Date

Name

Approved by Curriculum Development Committee and Bologna Process Committee

Signature

Date

Name