

## Module (Course Syllabus) Catalogue

2022-2023

College/ Institute	Erbil Technology College	
Department	Department of ICTE	
Module Name	Engineering Mathematics I	
Module Code	ENM104	
Degree	Technical Diploma <input checked="" type="checkbox"/> Bachler <input checked="" type="checkbox"/> High Diploma <input type="checkbox"/> Master <input type="checkbox"/> PhD <input type="checkbox"/>	
Semester	First semester	
Qualification	M.SC	
Scientific Title	Assistant Lecturer	
ECTS (Credits)	5	
Module type	Prerequisite <input type="checkbox"/> Core <input checked="" type="checkbox"/> Assist <input type="checkbox"/>	
Weekly hours	8 Hours	
Weekly hours (Theory)	(4)hr Class	(175 for whole semester )hr Workload
Weekly hours (Practical)		
Number of Weeks	12	
Lecturer (Theory)	Salar A. Raheem MSc	
E-Mail & Mobile NO.	<a href="mailto:salar.raheem.@epu.edu.krd-">salar.raheem.@epu.edu.krd-</a>	
Lecturer (Practical)		
E-Mail & Mobile NO.		
Websites		

# Course Book

<b>Course Description</b>	<p>Now a day, most of the equipment use Mathematics, therefore it's very important to recognize the main parts of these systems which include:</p> <ul style="list-style-type: none"> <li>• Main parts solution of linear equation.</li> <li>• How to apply the derivative.</li> <li>• Complex number, Operation of complex number and Complex numbers in polar and Exponential Forms.</li> <li>• General methods of integration.</li> <li>• Find the rotating volume and length of curves.</li> </ul>				
<b>Course objectives</b>	<p>Applying mathematical operations to find solution of the systems of linear equation by using Cramer's rules.            Solving electrical circuit equations using Cramer's rule.            Develop inequalities to represent real world situations and use them to solve problems.            Solve problems in a range of mathematical applications using the derivative            Solving some electrical application circuit using integration such as (find the charge inside capacitor)</p>				
<b>Student's obligation</b>	<ul style="list-style-type: none"> <li>• Attendance &amp; following the lectures</li> <li>• Missed classes will not be compensated including the quizzes and the scheduled assignments. The students will lose marks on unattended classes with quizzes unless a legal document or authorized leave is presented which should explain the excuse of the absence. However, the absent student should take the responsibility for making up the missed lecture Submit homework</li> </ul>				
<b>Required Learning Materials</b>	<p>By the end of the course, students should be able to:</p> <ul style="list-style-type: none"> <li>• Solution of linear equation.</li> <li>• Solving electrical circuit equation.</li> <li>• How to prove trigonometric lows.</li> <li>• Solving some electrical application circuit</li> <li>• applications of derivative</li> <li>• Find Area by integration</li> </ul> <p>Find Domain and range</p>				
<b>Evaluation</b>	<b>Task</b>	<b>Weight (Marks)</b>	<b>Due Week</b>	<b>Relevant Learning Outcome</b>	
	Paper Review	-	-	-	
	<b>Assignments</b>	Homework	10%		
		Class Activity	2%		
		Report	8%		
Seminar		8%			

	Essay			
	Project	-		
	Quiz	8%	All	All
	Midterm Exam	24%		
	Final Exam	40%		
	Total	100%		
<b>Specific learning outcome:</b>	1- sketch the graph of the derivative from the given graph of a function 2- obtain expressions for higher order derivatives of a function using the rules of differentiation 3- Use substitution to find the anti-derivative of a composite function. 4-use crammer rule to find linear equation 5-Use logarithmic to find value in equation 6-Use complex number			
<b>Course References:</b>	<ul style="list-style-type: none"> <li>• Calculus , Robert A. Adams</li> <li>• Thomas Calculus, George B. Thomas, Maurice D. Weir, Joel R. Hass</li> <li>• Internet</li> </ul>			
<b>Course topic</b>				
<b>Course topics (Theory)</b>		<b>Week</b>	<b>Learning Outcome</b>	
1-Determinant of matrix, Matrix operations and Transpose of a matrix and inverse a matrix:		1	Compute with and recognize properties of particular matrices	
2-Applying mathematics operation to determinant to find solution of systems of linear equation by Grammar roles:		2	Learning how to use Cramer's Rule to solve a linear system.	
3- Function (logarithm function), solving electrical examples:		3	<i>Logarithms</i> can help you solve <i>exponential</i> functions.	
4- Complex number, Operation of complex number :		4	Know methods of finding the $n^{\text{th}}$ roots of complex numbers and the solutions of simple polynomial equations.	

5- Function; Domain and range:	5	
6- Complex numbers in polar and Exponential Forms:	6	
7- Trigonometric function:	7	Use degrees and radians to measure angles
8- Application of derivative:	8	Solve problems in a range of mathematical applications using the derivative
9- Rule satisfied by defines integral:	9	Solve integration problems involving products and powers
10- Integral trigonometric function:	10	
11- Rule satisfied by definite integral:	11	
12- Application of definite integration:	12	Students will be able to Calculate a definite integral and Volumes. Calculate the area between a curve and the x-axis over a given interval

## Questions Example Design

### 19. Examinations:

*Q1. Ex: Find the domain and the range of each function.*

1.  $f(x) = 1 + x^2$

**Solution:**

**Domain** =  $(-\infty, \infty)$ , **range** =  $[1, \infty)$

2.  $f(x) = 1 - \sqrt{x}$

**Solution:**

**domain** =  $[0, \infty)$ , **range** =  $(-\infty, 1]$

3.  $F(t) = \frac{1}{\sqrt{t}}$

**Solution:**

**Domain** =  $(0, \infty)$ ,

$y = \frac{1}{\sqrt{t}}$        $y^2 = \frac{1}{t}$       and  $y > 0$        $y$  can be any positive real number

**range** =  $(0, \infty)$

4.  $F(t) = \frac{1}{1+\sqrt{t}}$

**Solution:**

**Domain** =  $[0, \infty)$ , **Range** =  $(0, 1]$

5.  $g(z) = \sqrt{4 - z^2}$

**Solution:**

**Domain** =  $[-2, 2]$ , **Range** =  $[0, 2]$

$$6. g(z) = \frac{1}{\sqrt{4-z^2}}$$

**Solution:**

$$\text{Domain} = (-2, 2), \text{Range} = \left[\frac{1}{2}, \infty\right)$$

**Q2: If Two numbers sum of them equal (20) and multiplication of them are large value , Find of them**

**Solution :-**

Let 1 number =X and 2 number =Y

$$X+Y =20$$

$$Y=20-X \text{ -----(1)}$$

$$XY=L\text{-----(2)}$$

Application equation (1) in equation (2) to get value (X)

$$(20-X)X=L$$

$$20X-X^2 =L$$

$$\frac{dL}{dX} = 20 - 2X$$

$$20-2X=0$$

$$2X=20$$

$$X=10$$

X=10 Application value (X) in equation (1) to get value (y)

$$10+Y=20$$

$$Y=10$$

**Q3. Chose the correct answer for the following statements:**

1-A matrix with only one column are called

(a) Row matrix (b) Column matrix (c) Square matrix

2- Non-zero element in principal diagonal and zero in all other positions are called.

(a)Diagonal matrix (b) Scalar matrix (c) Identity matrix

3- we usually use i, j and k to represent the unit vectors in the x, y and z directions, if  $i=\langle 1, 0, 0 \rangle$  are called

(a)points along the positive x-axis (b) points along the positive y-axis

(c) points along the positive z-axis

**Q4. True or false type of exams:**

1. To find a determinant you must have a (*SQUARE MATRIX*) .(**True**)
- 2-A Rectangular matrix is number of rows is equal the number of columns (**False**)
- 3-Identity matrix is Diagonal matrix having each diagonal element equal to one (**True**)
- 4-Let A, B and C be *matrices of the same size*, and let p and q be scalars.  
 $p(A + B) \neq pA + pB$  (**False**)
- 5-The complex numbers  $a + bi$  and  $a - bi$  are called conjugates. (**True**)

Extra notes:

I don't have any notes about all topics

External Evaluator

The course book is covered most of the tasks in the Matlab program and joint most topic in commincation and electronic department .