ERBIL POLYTECHNIC UNIVERSITY

زانکۆی پۆلیتەکنیکی هەولێر

Module (Course Syllabus) Catalogue

2022-2023

College/ Institute	Erbil Technical Engineering College	
Department	Mechanical and Energy Technquies Engineering Department	
Module Name	Mathematics III	
Module Code	MAT405	
Degree	Technical Diploma ☐ Bachler ☑ High Diploma ☐ Master ☐ PhD ☐	
Semester	4th	
Qualification	Master Degree in Mechanical Engineering	
Scientific Title	Assist. Lecturer	
ECTS (Credits)	5	
Module type	Prerequisite ☐ Core ☑ Assist. ☐	
Weekly hours	4 hr	
Weekly hours (Theory)	(4) hr Class	(50) Total hrs Workload
Weekly hours (Practical)	(0) hr Class	(0) Total hrs Workload
Number of Weeks	12 Weeks	
Lecturer (Theory)	Mr. Asaad Razzoky Mekha	
E-Mail & Mobile NO.	asaad.mekha@epu.edu.iq / 0750 743 9415	
Lecturer (Practical)		
E-Mail & Mobile NO.		
Websites		

Course Book

Course Description	Mathematics is the base for different scientific specifications. To explain any natural phenomenon, we translate this phenomenon to a mathematical model which let us deal with the problem easily. Basically, using mathematical explaining to multivariable functions with different physical amounts are applied with (Matrices, Vectors, Partial Derivatives, Multiple Integrals) on mathematical model in (Polar, Cylindrical, and Spherical Coordinates). Analytically, using engineering analysis to simulation model are applied with (Complex Numbers and Complex Functions, Power Series). It is very important to emphasize that this is a problem-oriented class and that only way throughout the material can be mastered with practice solving problems in addition to assignments which include the homework problems, reports, seminars, projects and class activity.
Course objectives	At the end of this course the student will be able: 1. To provide an introduction to fundamentals of advanced mathematics. 2. To learn the applications of mathematics in real life problems and analysing the results. 3. To engineering analysis the natural phenomenon, simulation models and engineering applications by using different analytical engineering methods with different relations of solutions.
Student's obligation	1. Homework will be assigned periodically. However, homework will neither be collected nor graded. 2. Students are responsible to do homework on their own. 3. There will be several quizzes during the academic year, not necessarily announced. The quiz contains the materials covered in previous lectures as well as homework is to be covered that day. 4. There are 120 minutes to midterm exam and 180 minutes to final exam. All tests are in class, closed book and closed notes. 5. Any quiz or test are missed without a supported documents and excused absence will represent a zero. 6. Attendance and participation in the lecture are mandatory and will be considered in the grading as class activity. 7. There will be another several assignments such as reports, seminars and projects, must be done by looking for or in search of the scientific researches.
Required Learning Materials	Lecture hall equipments for the lecture presentation such as data show, white board and overhead projector are used throughout the lecture. Certainly, the lecture notes are sent to the students before the lecture day.

Evaluation		Task	Weight (Marks)	Due Week	Relevant Learning Outcome
		Paper Review			
	Assignment 28 %	Homework	10 %	6 & 8	
		Class Activity	2 %		
		Report	16 %	5,6,7 & 8	
		Seminar		5,6,7 & 8	
		Essay			
		Project			
	Assessment 32 %	Quiz	8 %	3 & 5	
		Lab.			
		Midterm Exam	24 %	9	
		Final Exam	40 %	13 - 15	
		Total 100 %	100 %		

Specific learning outcome:	By the end of the year the student should be able to demonstrate the ability: 1. To explaining the mathematical skills that related to the engineering information knowledge with the basic science related to mathematics. 2. To engineering analysing and engineering simulating of the mathematical models can be used in different mechanical applications. 3. To engineering investigation and engineering approximation of the different relations solutions in mechanical design and manufacturing problems.
Course References:	1. Calculus by Thomas, 11th Edition, 2005 2. Calculus and It's Applications by Marvin L. Bittinger,10th Edition, 2010 3. Schaum's Outline of Calculus 4. Advanced Mathematics by Gryzig, 11th Edition, 2008

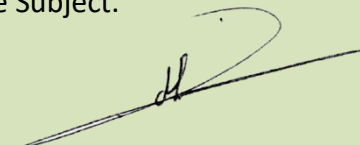| Course topics (Theory)	Week	Learning Outcome
Chapter One: Matrices (Theorems, Determinant, Cramer's Rule)	1st	
Chapter Two: Vectors (Theorem, Equation of Plane with Vectors in Space)	2nd, 3rd	
Chapter Three: Polar, Cylindrical and Spherical Coordinates (Coordinate Conversion Formulas)	4th	
Chapter Four: Multivariable Functions (Partial Derivatives, Total and Exact Differential)	5th, 6th	
Chapter Five: Multiple Integrals (Double Integral (Area), Triple Integral (Volume))	7th, 8th	
Chapter Six: Complex Number and Complex Function (Theorems, Cauchy-Rieman Equations)	9th, 10th	
Chapter Seven: Infinite Series and Power Series (Theorems, Taylor and Maclaurin in Power Series)	11th, 12th	
Practical Topics	Week	Learning Outcome
Not Applicable		

Questions Example Design

1. Find the normal plane at point (2,1,1) of intersection of two planes:
$$3zz + 2xx = 6 + yy \quad , \quad 2yy + 7xx = zz + 15$$

2. Find all roots of complex number: $zz^5 = -3 + 3\sqrt{3}\, ii$

3. Find the expansion of Taylor series generated by $ff(xx) = \ln(1 + xx)\ aaaa\ aa = 0$
   and investigate the series (converges) or (diverges).

Extra notes:

External Evaluator:

I confirm that the (Course Syllabus) and all the required information which are given in this (Module Catalogue) of the (Course Book) satisfy and cover all the requirements of the Mathematics III Module Subject.

Dr. Dlair Obaid Ramadan