



Course Specification

(Bachelor)

Course Title: Mathematical Basis

Course Code: MATH 0111

Program: BSc in Physics and BSc in Physics of Renewable Energy and Environment

Department: Mathematics

College: College of Science

Institution: Majmaah university

Version: 1

Last Revision Date: 15/12/2024



Table of Contents

A. General information about the course:	3
B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods	4
C. Course Content	5
D. Students Assessment Activities	6
E. Learning Resources and Facilities	6
F. Assessment of Course Quality	7
G. Specification Approval	7



A. General information about the course:

1. Course Identification

1. Credit hours: 3 (3,0,0)

2. Course type

A. University College Department Track Others
B. Required Elective

3. Level/year at which this course is offered: 1st LEVEL (FIRST YEAR)

4. Course General Description:

Students are introduced to: Elementary logic; Methods of proof; Relations, basic definitions and properties, special types of relations, Proofs: Introduction to proofs, Methods of proving, Methods: direct proofs, Proof by induction, proofs by contradiction, Mistakes in proofs, looking for counter examples, Polynomials on the set of real numbers - partial fractions.

5. Pre-requirements for this course (if any):

None

6. Co-requisites for this course (if any):

none

7. Course Main Objective(s):

1. Have knowledge of the methods of proof (induction, contrapositive, contradiction).
2. Studying the sets theory and its relationships.
3. Studying the relations and their properties and how we can represent, also studying the equivalence relation.
4. Have knowledge of groups and their properties.
5. Studying the rings and their properties

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100%
2	E-learning	0	0%
3	Hybrid	0	100%



No	Mode of Instruction	Contact Hours	Percentage
	<ul style="list-style-type: none"> Traditional classroom E-learning 		
4	Distance learning	0	100%

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	0
3.	Field	0
4.	Tutorial	0
5.	Others (specify)	0
Total		45

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	The student should demonstrate a comprehensive and a coherent knowledge in set theory, the relations between their elements, the functions and their properties.	K1	Start each chapter by general idea and the benefit of it. Demonstrate the course information and principles through lectures.	Exams Midterms Final examination.
1.2	The student should be able to choose a strategy to prove mathematical problems using different methods of proof.	K1	Provide main ways to deal with the exercises	Homework
2.0	Skills			
2.1	The students will explain and interpret a	S1	Encourage the student to look for some complicated	Midterm exams Quizzes



Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	general knowledge of discrete mathematics		problems in different references.	
2.2	Enable students to analyse the mathematical problems.	S1	Ask the student to attend lectures to practice solving problems.	Doing homework. Check the problems solution.
2.3	Students' ability to write physical equations in a correct mathematical way.	S1	Homework assignments.	Discussion of how to simplify or analyses some problems.
3.0	Values, autonomy, and responsibility			
3.1	To cultivate students' ability to respect, appreciate, and understand one's own culture and the culture of other nations.	V1	Ask the students to search the internet and use the library. Encourage them to attend lectures regularly by assigning marks for attendance.	Homework and discussions.

C. Course Content

No	List of Topics	Contact Hours
1.	Set theory (Basic concepts in set theory, set operations, relations and functions, cardinality)	12
2.	Logic: Propositional logic, conditional statements, truth tables of compound propositions, logical equivalence, constructing new logical equivalence, rules of inference.	12
3.	Proofs: Introduction to proofs, Methods of proving, Methods: direct proofs, Proof by induction, proofs by contradiction, Mistakes in proofs, looking for counter examples.	12
4.	Relations: relations and their properties, equivalence relations	3
5.	Polynomials on the set of real numbers - partial fractions	6
Total		45





D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm	5 th week	30%
2.	Homework	3 rd – 5 th – 8 th week	5%
3.	e-Test	9 th week	5%
4.	Quizzes	2 nd – 4 th - 7 th week	10%
5.	Final exam	12 th week	40%
6	Discussion	10 th week	10%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Kenneth H. Rosen , Discrete Mathematics and Its Applications, WCB/Mc Graw-Hill, 2012 2) Rhonda Huetteenmuelle, Precalculus Demystified, Mc GrawHill , 2nd edition, 2012
Supportive References	
Electronic Materials	http://www.arxiv.org/ / http://www.lms.ac.uk/ http://www.ams.org/ http:// mathforum.org/advanced/ http://www.zentrablblatt-math.org/ zmath/en/ http://www.ma.hw.ac.uk
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	- The size of the hall must be proportionate to the number of students etc.) - Provide enough seats for students
Technology equipment (projector, smart board, software)	smart board
Other equipment (depending on the nature of the specialty)	



F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	students	Indirect "Students' academic experience evaluation" questionnaire done by the students at the end of each term. - "Program evaluation" questionnaire done by the students at the end of each term.
Effectiveness of Students assessment	Measuring of learning outcome unit	Direct – systemic tools
Quality of learning resources	Students and teacher	Indirect "Course evaluation" questionnaire done by the students on the university portal at the end of each term.
The extent to which CLOs have been achieved	coordinators	Direct Observations (form)
Other	coordinators	Direct Observations (form)

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Department Council
REFERENCE NO.	16
DATE	30/12/2024

