



Jordan University of Science and Technology
Faculty of Science & Arts
Mathematics Department

MATH145 Fundamentals Of Mathematics

First Semester 2020-2021

Course Catalog

3 Credit Hours. Statements, Connectives, Tautology and Contradiction, Equivalent Statements, Open Sentences and Quantifiers and their Negations. Natural Numbers and Integers (Definition of: odd, even divides, GCD, LCM, The Euclidean Algorithm), Rational Numbers and Irrational Numbers (Definitions). Mathematical Proof (direct, indirect and proof by contradiction, proof in two or more parts), Mathematical Induction, Complete Induction. Sets (definition, belonging and inclusion), Power Sets (the number of elements in a power set with proof by induction), Union, Intersection, Difference, Universal Sets and Compliments, Indexed Family of Sets (with the Archimedean Property), Arbitrary Union and Arbitrary Intersection, Pairwise Disjoint Family of Sets, Generalized De Morgans Laws. The Well-Ordering Principle of Natural Numbers and its proof by induction, Cartesian Product of Sets, Permutations and Combinations and Pascal Triangle, Binomial Theorem.

Text Book

Title	A Transition to Advanced Mathematics
Author(s)	Douglas Smith, Maurice Eggen, Richard St. Andre
Edition	7th Edition
Short Name	Text Book
Other Information	Text Book

Instructor

Name	Prof. Khaled Bataineh
Office Location	Ph4
Office Hours	Sun : 08:00 - 10:00 Mon : 08:00 - 10:00 Tue : 08:00 - 10:00 Wed : 08:00 - 10:00 Thu : 08:00 - 10:00
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Class Schedule & Room

Section 1:

Lecture Time: Sun, Tue : 13:00 - 14:30

Room: منصة الكترونية

Section 2:

Lecture Time: Sun, Tue : 14:30 - 16:00

Room: منصة الكترونية

Prerequisites

Line Number	Course Name	Prerequisite Type
901010	MATH101 Calculus I	Prerequisite / Pass

Tentative List of Topics Covered

Weeks	Topic	References
Week 1	Statements, Connectives	
Week 2	Tautology and Contradiction, Equivalent Statements	
Week 3	Open Sentences and Quantifiers and their Negations	
Week 4	Natural Numbers and Integers (Definition of: odd, even divides, GCD, LCM, The Euclidean Algorithm), Rational Numbers and Irrational Numbers (Definitions).	
Week 5	Direct Proof	
	Indirect Proof and Proof by Contradiction	
Week 7	proof in two or more parts, and proof of if and only if statements	
Week 8	Mathematical Induction	
Week 9	Complete Induction	
Week 10	Sets (definition, belonging and inclusion), Power Sets (the number of elements in a power set with proof by induction), Union, Intersection	
Week 11	Difference, Universal Sets and Compliments	
Week 12	Indexed Family of Sets (with the Archimedean Property), Arbitrary Union and Arbitrary Intersection, Pairwise Disjoint Family of Sets	
Week 13	Generalized De Morgans Laws. The Well-Ordering Principle of Natural Numbers and its proof by induction	

Week 14	Cartesian Product of Sets and their interactions with union and intersection and complements	
Week 15	Permutations and Combinations and Pascal Triangle, Binomial Theorem	
	Revision	

Mapping of Course Outcomes to Program Student Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Understand the tools of mathematical logic and its equivalences, besides the quantifiers and quantified statements. [4SLO1, 2SLO2, 4SLO3]	35%	Mid Exam, quiz, final
Be able to prove mathematical statements and theorems using different methods of proof. [4SLO1, 2SLO2, 4SLO3]	35%	Mid Exam, quiz, final
Understand the basics of sets and set operations and being able to prove statements on sets. [4SLO1, 2SLO2, 4SLO3]	30%	final

Relationship to Program Student Outcomes (Out of 100%)					
SLO1	SLO2	SLO3	SLO4	SLO5	SLO6
40	20	40			

Evaluation	
Assessment Tool	Weight
Mid Exam	39%
quiz	11%
final	50%

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