



The Hashemite University
Faculty of Science
Course Syllabus

Department of Mathematics

Course Title: Foundations of Mathematics

Course Number: 110101251

Pre-requisite: no pre-requisite

Credit Hours: 3

Designation: Compulsory

Instructor: Dr. Mohammad Sarsak

Instructor's E-mail: sarsak@hu.edu.jo

Course Description (Catalog): This course familiarizes students with logic, methods of mathematical proof, set theory, relations, functions as well as countable and uncountable sets.

Text Book: A Transition to Advanced Mathematics, by D. Smith, M. Eggen, and R. St. Andre, 6th ed., Thomson Brooks/Cole, 2006.

References: (1) Discrete Mathematics and its Applications, K.H. Rosen, 7th ed., McGraw-Hill, 2013.

(2) Discrete Mathematical Structure, B. Kolman, R.C. Busby and S.C. Ross, 5th ed., Prentice-Hall, 2004.

Major Topics Covered:

Topics	No.of Weeks	Contact Hours*
Logic and proofs	4	12
Set theory	3	9
Relations	3	9
Functions	3	9
Cardinality	2	6
Total	15	45

*Contact Hours include lectures, quizzes and exams.

❖ **Specific Outcomes of Instruction (Course Learning Outcomes):**

After completing this course units, the students will be able to:

	Course Learning Outcomes (CLO)	(SO*)
CLO1.	Distinguish different types of mathematical statements and produce them in logical symbols, and deduce the negation of mathematical statements (including conditional and quantified, simple and compound statements).	(a), (k)
CLO2.	Describe suitable proof method for a given type of mathematical statements, and apply these methods to prove mathematical statements of different types (including proof by induction).	(a), (k)
CLO3.	Perform operations on sets and on indexed families of sets. Prove containment of set.	(a), (k)

Course Learning Outcomes (CLO)		(SO*)
CLO4.	Determine whether a given relation is an equivalence relation, an ordering relation. And outline the partition resulting from an equivalence relation and vice versa, and compare elements in an ordering relation.	(a), (k)
CLO5.	Determine whether a given relation is a function, and deduce whether a function is one to one, onto or both. And evaluate images and preimages of sets.	(a), (k)
CLO6.	Demonstrate the equivalency of two sets. Classify sets as finite, countable infinite or uncountable. Decide the order of given sets according to their cardinalities.	(a), (k)

*(SO) = Student Outcomes Addressed by the Course.

❖ **Student Outcomes (SO) Addressed by the Course:**

#	Outcomes Description	Contribution
	Applied and Natural Sciences Student Outcomes	
(a)	an ability to apply knowledge of mathematics, science, and applied sciences	H
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to formulate or design a system, process or program to meet desired needs	
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify and solve applied sciences problems	
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	
(h)	the broad education necessary to understand the impact of solutions in a global and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern scientific and technical tools necessary for professional practice.	M
H=High, M= Medium, L=Low		

Grading Plan:

First Exam:	30 points	--/--/--
Second Exam:	30 points	--/--/--
Final Exam:	40 points	--/--/--

General Notes:(Attendance Policy) students are expected to attend every class and arrive on time in compliance with HU regulations. In case you find yourself in a situation that prevents you from attending class or exam, you have to inform your instructor. If you miss more than 6 classes for the (Sunday, Tuesday, and Thursday model) or 4 classes for the (Monday and Wednesday Model), you cannot pass the course. Makeup excuses will be accepted only for very limited justified cases, such as illness and emergencies. Changing your section without informing your instructors is not accepted at all.