University/Academy: Arab Academy for Science and Technology & Maritime Transport
Faculty/Institute: College of Computing and Information Technology
Program: Computer Science

Form No. (12)
Course Specification

1- Course Data

Course Code:	Course Title:	Academic Year/Level:
CS202	Discrete Structures	Year 2 / Semester 3
Specialization:	**No. of Instructional Units:** 2 hrs lecture 2 hrs section	**Lecture:**

2- Course Aim	This course covers the mathematical structures fundamentals of computer science. Topics discussed include logic of compound and quantified statements, number theory and methods of proof, sequences and mathematical induction, set theory, counting methods, functions and relations.
3- Intended Learning Outcome:	
a- Knowledge and Understanding	**Students will be able to demonstrate knowledge of:** K14. Demonstrate basic knowledge and understanding of a core of analysis, algebra, applied mathematics and statistics. • Distinguish mathematical and philosophical logic • Identify propositions in natural language • Understand inverses, converses, and contrapositions for propositions • Learn about quantified statement. • Understand the difference between universal and existential statement. • Know the basic rules of inference • Learn the Fundamental Theorem of Arithmetic • Learn Odd and even Numbers • Learn Rational Numbers • Learn the Fundamental Theorem of Arithmetic • Identify Prime Numbers • Learn Quotient-Remainder theorem • Learn basics of probability. • Understand fundamentals of counting (counting elements in a list, possibility trees, multiplication rule, addition rule, difference rule, inclusion/exclusion). • Understand permutations and combinations. • Know the basic properties of functions • Identify injective, surjective, and bijective functions • Know how binary relations are distinguished from other types • Understand why induction works

	• Understand the distinction between Weak and Strong Induction
b- Intellectual Skills	**By the end of the course, the student acquires high skills and an ability to understand:** I2. Realize the concepts, principles, theories and practices behind computing and information as an academic discipline. • Evaluate propositions • Simplify expressions via application of equivalences • Distinguish predicates from propositions • Determine the veracity of expressions • Recognize common fallacious arguments • Distinguish inductive and deductive reasoning • Distinguish valid and sound arguments • Recognize when to apply each counting method. • Distinguish combinations from permutations • Identify reflexive, symmetric, and transitive relations • Identify partial and total orders, and equivalence relations

c- Professional Skills	**By the end of the course the student will have the ability to:** P8. Handle a mass of diverse data, assess risk and draw conclusions. • Use logical operators to construct compound propositions • Translate to and from conversational English • Construct inverses, converses, and contrapositions for propositions • Convert such expressions to and from logic notation • Use the rules of inference to construct valid arguments • Use different counting methods. • Construct mathematical induction proofs
d- General Skills	**Students will be able to:** G1. Demonstrate the ability to make use of a range of learning resources and to manage one's own learning. G3. Show the use of information-retrieval. G5. Exhibit appropriate numeracy skills in understanding and presenting cases involving a quantitative dimension. • Practice Logic Thinking • Verify theory with practice
4- Course Content	

#	CLO
1	Use logic to determine the validity of an argument.
2	Construct the proof of a theorem.
3	Understand the terminology, operations, and symbols of set theory.
4	Use combinatorial techniques when needed in solving problems.
5	Identify a function; specifically, subjective, injective, and bijective functions.
6	Identify a relation; specifically, a partial order, equivalence relation, or total order.

5- Teaching and Learning Methods	Lectures, Labs.
6- Teaching and Learning Methods for Students with Special Needs	• Students with special needs are requested to contact the college representative for special needs (currently Dr Hoda Mamdouh in room C504) • Consulting with lecturer during office hours. • Consulting with teaching assistant during office hours. • Private Sessions for redelivering the lecture contents. • For handicapped accessibility, please refer to program specification.
7- Student Assessment:	
a- Procedures used:	Exams
b- Schedule:	Week 7 exam Week 12 exam Week 16Final exam
c- Weighing of Assessment:	7th week exam 30% 12th week exam 20% Term work 10% Final exam 40%
8- List of References:	
a- Course Notes	
b- Required Books (Textbooks)	Susanna Epp, *Discrete Mathematics with Applications*, 4th Edition, Cengage Learning, 2010, ISBN 0495391328
c- Recommended Books	Judith L. Gersting, *Mathematical Structures for Computer Science,* 6th ed., W. H. Freeman Press, 2006.
d- Periodicals, Web Sites, ..., etc.	people.cs.uchicago.edu/~laci/reu02/tutorials.pdf math.about.com/od/discretemath/Discrete_Math.htm .

Course Instructor: **Head of Department:**

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