جامعة الملك عبدالله
للعلوم والتقنية
King Abdullah University of
Science and Technology

Course Syllabus: Discrete Mathematics - AMCS 162

Division	Computer, Electrical and Mathematical Sciences & Engineering
Course Number	AMCS 162
Course Title	Discrete Mathematics
Academic Semester	Spring
Academic Year	2016/2017
Semester Start Date	01/22/2017
Semester End Date	05/18/2017
Class Schedule (Days & Time)	04:00 PM - 05:30 PM | Mon Wed

Instructor(s)

Name	Email	Phone	Office Location	Office Hours
Jean-Marie Morvan	jean-marie.morvan@kaust.edu.sa	+966128080617		By appointment

Teaching Assistant(s)

Name	Email

Course Information

Comprehensive Course Description	Students will learn basic concepts in Discrete Mathematics, and learn how to apply these concepts. Many themes will be addressed: - Reasoning: The goal is to be able to construct a proof, by using the basic concept of logic (implication, negation, equivalence...) - Elements of set theory: Classical notions in set theory and maps will be taught (union, intersection of subsets of a set for instance, injective, surjective, bijective maps between sets,...), order and equivalence relations defined on a set, operations on a set, the notion of group. - Discrete structures as combinatorics, graph and trees will be studied in details, with some classical theorems. - Classical results in Arithmetics will be also studied, including results on prime numbers. Many examples and problems will be given to the students during the class and as homeworks.
Course Description from Program Guide	This course covers elementary discrete mathematics for computer science and engineering. It emphasizes mathematical definitions and proofs as well as applicable methods. Topics include formal logic notation, proof methods; induction, well-ordering; sets, relations; elementary graph theory; integer congruences; asymptotic notation and growth of functions; permutations and combinations, and counting principles.
Goals and Objectives	At the end of the semester, the students must be able to understand the basic concepts studied during the course, and apply the main results and theorems in different contexts. During the tests and the final exam, the students will have to answer to simple questions related to different chapters of the syllabus. They also must be able to explain carefully their answers.
Required Knowledge	No special knowledge is required, only classical elementary mathematics.
Reference Texts	Discrete Mathematics, (second edition), Norman L. Biggs. This book is in the library.
Method of evaluation	**40.00**% - Final exam **50.00**% - Tests **10.00**% - Quiz(zes)

Nature of the assignments	Every week, some homeworks will be given to the students. These homeworks can be done easily if the students learn carefully the lesson of the week. The solutions of the homeworks will be given one week after. Quizes and tests are also organized during the semester.
Course Policies	Absences must be justified. Each week, some homeworks will be given to the students. The students are required to solve the questions and explain their solutions to the group during the class.
Additional Information	

Tentative Course Schedule

(Time, topic/emphasis & resources)

Week	Lectures	Topic
1	Mon 01/23/2017 Wed 01/25/2017	Foundations of logic, statement, truth table.
2	Mon 01/30/2017 Wed 02/01/2017	Elements of sets theory, maps.
3	Mon 02/06/2017 Wed 02/08/2017	Relations on a set.
4	Mon 02/13/2017 Wed 02/15/2017	Order, equivalence relations
5	Mon 02/20/2017 Wed 02/22/2017	Introduction on Graphs.
6	Mon 02/27/2017 Wed 03/01/2017	Main properties of graphs (Connectivity, Euler and Hamilton paths...).
7	Mon 03/06/2017 Wed 03/08/2017	Trees: Main definitions and properties.
8	Mon 03/13/2017 Wed 03/15/2017	Operations on a set.
9	Mon 03/20/2017 Wed 03/22/2017	Notion of Groups, Examples.
10	Mon 03/27/2017 Wed 03/29/2017	Boolean algebras.
11	Mon 04/03/2017 Wed 04/05/2017	Integers (N, Z), Proof by induction.
12	Mon 04/10/2017 Wed 04/12/2017	Combinatorics.
13	Mon 04/17/2017 Wed 04/19/2017	Elements of arithmetics.
14	Mon 04/24/2017 Wed 04/26/2017	General problems in discrete mathematics, and different applications.
15	Mon 05/01/2017 Wed 05/03/2017	Final examination.
16	Mon 05/08/2017 Wed 05/10/2017	
17	Mon 05/15/2017 Wed 05/17/2017	
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Note

The instructor reserves the right to make changes to this syllabus as necessary.