



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	2018/2019
Semester Start Date	01/27/2019
Semester End Date	05/23/2019
Class Schedule (Days & Time)	01:00 PM - 02:30 PM Sun Wed

Instructor(s)				
Name	Email	Phone	Office Location	Office Hours
Malek Smaoui	Malek.Smaoui@KAUST.EDU. SA	+966128080331	4303, 1, Al-Khawarizmi (bldg. 1)	Sun, Mon, Wed, Thu 9:00 to 12:00, Please email the day before at most for appointment.

Teaching Assistant(s)	
Name	Email

Course Information	
Comprehensive Course Description	<p>Students will learn basic concepts in Discrete Mathematics, and learn how to apply these concepts. Many themes will be addressed:</p> <ul style="list-style-type: none"> - 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. <p>Many examples and problems will be given to the students during the class and as homeworks.</p>
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.

Method of evaluation	50.00% - Tests 10.00% - Homework /Assignments 50.00% - Final exam
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. 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 submit a hard copy of their solution during the class.
Additional Information	

Tentative Course Schedule

(Time, topic/emphasis & resources)

Week	Lectures	Topic
1	Sun 01/27/2019 Wed 01/30/2019	Foundations of logic, statement, truth table.
2	Sun 02/03/2019 Wed 02/06/2019	Elements of sets theory, maps.
3	Sun 02/10/2019 Wed 02/13/2019	Relations on a set.
4	Sun 02/17/2019 Wed 02/20/2019	Order, equivalence relations
5	Sun 02/24/2019 Wed 02/27/2019	Introduction on Graphs.
6	Sun 03/03/2019 Wed 03/06/2019	Main properties of graphs (Connectivity, Euler and Hamilton paths...).
7	Sun 03/10/2019 Wed 03/13/2019	Trees: Main definitions and properties.
8	Sun 03/17/2019 Wed 03/20/2019	Operations on a set.
9	Sun 03/24/2019 Wed 03/27/2019	Spring break
10	Sun 03/31/2019 Wed 04/03/2019	Boolean algebras.
11	Sun 04/07/2019 Wed 04/10/2019	Integers (N, Z), Proof by induction.
12	Sun 04/14/2019 Wed 04/17/2019	Combinatorics.
13	Sun 04/21/2019 Wed 04/24/2019	Some applications of combinatorics in different fields, in particular in the theory of graphs.
14	Sun 04/28/2019 Wed 05/01/2019	Elements of arithmetics.
15	Sun 05/05/2019 Wed 05/08/2019	Some theorems on prime numbers and applications
16	Sun 05/12/2019 Wed 05/15/2019	Final exam
17	Sun 05/19/2019 Wed 05/22/2019	Final exams week

Note

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