American University of Sharjah
Department of Mathematics & Statistics
MTH 213: Discrete Mathematics
Course Policy and Syllabus –Spring 2012

Instructor Information:

Instructor	Office	Ext.	Office Hours	E-mail
Ayman Badawi	NAB 262	2573	Tuesday 11:30-12:30 AND M, W: 11:30-13	abadawi@aus.edu

Note: Other office hours are available by appointment, just send me an email.

Course Description (Cross listed with CMP 213):

Covers prepositional and predictive logic, sets, functions and related algorithms, asymptotic analysis of functions, mathematical induction, recursive definitions, counting, relations, graphs, trees and Boolean algebra.

Prerequisite: MTH 102 or MTH 103.

Course Link: You will find announcements as well as information about tests, quizzes, and homework assignments at ilearn: http://ilearn.aus.edu/

Also you may visit http://www.ayman-badawi.com   (soon MTH213 will be available)

Aim: *Teach logical and analytical reasoning which is necessary for developing the problem-solving skills and creativity.* This will be done by introducing the students to different branches of discrete mathematics (logic, sets theory, number theory, and graph theory).

Course Objectives: To achieve our aim, we will explore

- Basic results in logic and their rules in mathematics.
- Mathematical reasoning including Induction and Recursions.
- Sets theory and set operations.
- Properties of functions such as one-to-one and onto.
- Basic results in number theory including integers, division, and applications.
- Relations and their properties.
- Basic counting methods and principles.
- Basic definitions and terms in graph theory.
- The representation of graphs and graph isomorphism.

- Directed and undirected graphs and their properties.
- Spanning trees and algorithms to find them.

Course Outcomes: After successfully completing this course, the students should be able to:

1. Check the validity of an argument.
2. Construct and validate proofs using different methods such as induction and contradiction.
3. Identify functions and discuss their properties.
4. Apply the division, Euclidean, and Fermat algorithms.
5. Apply basic principles of counting including the multiplication rule, and counting elements of disjoint sets.
6. Use graph theory to solve network problems.
7. Use graph theory to represent, model and explore a variety of real-life problems.
8. Identify the shortest paths in a weighted graph.
9. Find all (minimum) spanning trees in a (weighted) graph.
10. Use (minimum) spanning trees for modeling, analyzing, and solving real-life problems

Textbook: *Discrete Mathematics with Graph Theory,* by E. G. Goodaire, and M. M. Parmenter, *3rd Edition, Pearson Prentice Hall, 2006.*

Sections to be covered:
Chapter 0: *The Foundations, Sections: 0.1-0.2*
Chapter 2: *Sets and Relations, Sections: 2.1-2.3*
Chapter 3: *Functions, Sections: 3.1-3.3*
Chapter 4: *The Integers, Sections: 4.1-4.4*
Chapter 5: *Induction and Recursion, Sections: 5.1-5.3*
Chapter 6: *Principles of Counting, Sections: 6.1-6.3*
Chapter 9: *Graphs, Sections: 9.1-9.3*
Chapter 10: *Paths and Circuits, Sections: 10.1-10.4*
Chapter 11*: *Applications of Paths and Circuits, Sections: 11.2-11.3*
Chapter 12: *Trees, Sections: 12.1-12.3*

Quizzes and Exams:

1. There will be two mid-term exams, HW,   in-class quizzes, and a comprehensive final exam. One quiz will be dropped.
2. No make-up quizzes will be given. If you miss a quiz for whatever reason, you will get zero for that quiz.
3. No make-up exam will be given. With a valid written excuse and making immediate arrangements with the instructor, a missed exam might be replaced with the grade of the final exam and/or the average grade of all tests (including final) and/or quizzes.

Assessment:

	Date and Time	Weight	Chapters
HW and Quizzes	HW5% + in class Quizzes 15%	20%	TBA
Exam I	Tuesday March 27, 5-6:30	22.5%	TBA
Exam II	Tuesday, May 15, 5-6:30	22.5%	TBA
Final Exam	TBA	35%	Comprehensive

Attendance.
Attendance is compulsory. A student missing more than 7 classes will receive a WF.

Getting Help.
Students are advised to take advantage of the instructor's office hours. However, before seeking help from anyone, make sure you read your lecture notes and textbook. See the examples similar to the problem in question then try to do the problem yourself.
It should be emphasized that students who miss a class without a valid written and/or legitimate excuse will not be offered a one-on-one lecture discussion during office hours to substitute the missed class.

Academic Misconduct will not be tolerated. You are expected to submit your own work. Copying, cheating or plagiarism, when detected, will result in an F grade in the course for all who are involved (i.e. it does not matter if somebody copied your homework, project etc., you are guilty as well).
As an institution of higher education, the university views academic integrity as an educational as well as judicial issue. Academic violations include (but not limited to) the following: plagiarism, inappropriate collaboration, dishonesty in examinations, dishonesty in papers, work done for one course and submitted to another, deliberate fascination of data, etc. See the Student Handbook at http://www.aus.edu/osa/handbook/ for more details.

Incomplete Grades. Failing to show up in time for the final exam will result in a zero in that exam. Only in exceptional cases, which should be approved by the instructor, the Chair and the Dean, will the student be allowed to take a make-up exam or given an "Incomplete" grade. It is the responsibility of the student to find out from his/her instructor the exact date, time and place of the make-up exam.

University Calendar: It is wise to make a reminder for yourself of important dates such as last day to drop without a penalty, pre-registration, financial aid application submission, holidays, final exams, etc. See http://www.aus.edu/calendar

We are asked (no choice) to add this statement:

College of Arts and Sciences
Academic Integrity Statement

The College of Arts and Sciences is committed to promoting the highest standards of academic integrity. With this statement we set forth the terms and processes by which incidents of cheating, plagiarism and other violations of academic integrity will be addressed.

Violations of academic integrity are listed in the Academic Integrity section of the Undergraduate and Graduate Catalogues of the University. These include, but are not limited to:

- Plagiarism
- Inappropriate collaboration
- Inappropriate proxy
- Dishonesty in examinations or submitted work
- Work completed for one course being submitted for another
- Deliberate falsification of data
- Interference with other students' work
- Copyright violations
- Complicity in academic dishonesty

Plagiarism is the act of presenting another person's work as your own. Plagiarism can take many forms. The following is a non-exclusive list of examples that constitute the academic offense of plagiarism:

- copying another student's paper or any other written source
- submitting a paper written for you by someone else, a paid service or a Website
- downloading a paper from the Internet and presenting it as your own work
- using a sentence or even part of a sentence from any outside source without putting quotation marks around it and citing the source
- using ideas, facts, and opinions from another source without citing the source

Plagiarism is a serious form of academic dishonesty and is not tolerated at this university. Please consult the Student Academic Integrity Code in the AUS Undergraduate Catalog (pp. 22-25) for further information concerning academic dishonesty.

The College of Arts and Sciences follows a strict policy in cases where plagiarism and other academic integrity violations are determined to have occurred.

For a first offense, the student will receive an XF for the course. The professor will report the name of the offending student to both the Head of the Department in which the incident occurred and the Dean of the College of Arts and Sciences. The information is kept on file and will be shared with the Dean of CAS, the deans of all other schools/colleges at AUS, and the Office of Student Affairs.
Students so reported may not discuss the incident with the professor concerned.
A second offense, or a first offense which is particularly egregious based on the judgment of the Head of the Department and Dean, may be grounds for removal from a major, suspension, or dismissal. By registering for this course I acknowledge that I have read and understand the CAS Academic Integrity Statement and its consequences.

Sections	Suggested Exercises

0.1	T/F, 1(a,e,f), 2(a,d,k,o,q), 3(b,g,j), 4(a,d,j), 5(c,d,k,m,j), 6(b,e,g,k), 7(b,g,k), 8.
0.2	T/F, 1(a,c), 2, 3(b,f), 8, 10, 15, 17, 23, 30, 32.
Review Exercises for Ch.0: 2(a,b,d), 3(a,b,d), 10, 13, 15	
2.1	T/F, 1(b,e),3, 5,10,12
2.2	T/F, 1 (b), 3(b,c), 5(b,d,f),15,20
2.3	T/F, 5,9, 10
Review Exercises for Ch.2: 2, 3, 6, 10, 11, 12, 13, 14	
3.1	T/F, 1(b,d), 4, 12, 17, 19, 21,31
3.2	T/F, 3, 5, 6(d), 8, 9, 13, 27, 28
3.3	T/F, 3, 6, 12c,17, 19(a,b,c), 20, 21
Review Exercises for Ch.3: 1-15, 17	
4.1	T/F, 5, 9, 11
4.2	T/F, 7, 9, 12, 20, 30
4.3	T/F, 1, 9, 20, 28, 35
4.4	6, 9, 11, 13, 22, 23
4.5	TBA
Review Exercises for Ch.4: 2, 7, 8, 9, 18, 19, 20	
5.1	T/F, 4(d,g,i), 5, 6(a,c,e), 9(b,g),11
5.2	T/F, 1, 3, 8, 14, 17, 20, 23, 27, 48, 50
5.3	T/F, 4, 8, 11, 16, 18
Review Exercises for Ch.5: 1,6,11,13,16,20,25,27	
6.1	T/F, 3, 6, 9, 15
6.2	T/F, 4, 6, 8,10, 15, 22, 23
6.3	T/F, 3, 6, 9, 13, 25
Review Exercises for Ch.6: 1, 2, 6, 7, 10	
9.1	T/F, 1, 3, 4(b,h)
9.2	T/F, 4,6,14,18(e,f,h), 21(b,e,f),27,35
9.3	T/F, 4(a,b,d), 6,9b, 10
Review Exercises for Ch.9: 1, 3(b), 5(a,b), 7, 12, 15, 18	
10.1	T/F,3,4,7,13,21
10.2	T/F, 3,4, 5,6,7,8,9,21
10.3	T/F,2,5,8(a,b),9(a,b),14,15,16
10.4	T/F(1,2,3,4,5), 1-10.
Review Exercises for Ch.10: 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 19, 21, 23, 25	
12.1	T/F, 8, 9, 10, 11,16, 24
12.2	T/F, 2, 3, 4, 5,6, , 8, 9, 10, 11, 12, 13, 15
12.3	T/F, 1, 3.
Review Exercises for Ch.12: 3, 5, 6, 7, 8, 9, 10, 11	