Math 232 Syllabus

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Office Hours **UTR 10:05AM-10:50AM and UTR 12:20PM-01:10PM**
ALSO BY APPOINTMENT

Text:

Mathematical Proofs, A transition to Advanced Mathematics (3rd edition: International Edition) by Gary Chartrand et al., Published by Pearson.

Description:

Finite and infinite sets. Equivalence relations and congruence. Divisibility and the fundamental theorem of arithmetic. Well-ordering and axiom of choice. Groups, subgroups, symmetric groups, cyclic groups and order of an element, isomorphisms, cosets and Lagrange's Theorem.

Goals:

This course is intended to introduce students to some fundamental concepts in mathematics and to familiarize them with mathematical proofs and rigor. The aim is to provide students with the appropriate background for more advanced courses in mathematics.

Resources:

This course will be supplemented by the following websites

- My personal website: http://faculty.kfupm.edu.sa/MATH/mshahrani/
- BlackBoard: (Version 9.1 on https://blackboard.kfupm.edu.sa/)
  Syllabus, Lecture Notes, Homework Problem Sets, Grades, Attendance, etc.

Evaluation:

		POINTS
Homework	Submitted Every Saturday (Problem Sets will posted on BlackBoard)	100
Tutorials + Projects	Participation in Tutorial Sessions and Projects	40 **(BONUS)**
Exam 1	See Calendar Below	100
Exam 2	See Calendar Below	100
Final	Date: TBA, Place: TBA	200
		Total: 500

Course Schedule:

Week	Date (DD/MM/2013)	Section	Topic
0			Chapter 0: Communicating Mathematics (**Reading**)
1	01/09 – 05/09	1.1	Describing a Set

Week	Date (DD/MM/2013)	Section	Topic	
		1.2	Subsets	
		1.3	Set Operations	
		1.4	Indexed Collections of Sets	
		1.5	Partitions of Sets	
		1.6	Cartesian Products of Sets	
2	08/09 – 12/09	2.1	Statements	
		2.2	The Negation of a Statement	
		2.3	The Disjunction and Conjunction Statements	
		2.4	The Implication	**Tutorial 1**
		2.5	More on Implications	
		2.6	The Biconditional	
3	15/09 – 19/09	2.7	Tautologies and Contradictions	
		2.8	Logical Equivalence	
		2.9	Some Fundamental Properties of Logical Equivalence	
		2.10	Quantified Statements	
		2.11	Characterizations of Statements	
4	22/09 – 26/09	3.1	Trivial and Vacuous Proofs	
		3.2	Direct Proofs	
		3.3	Proof by Contrapositive	**Tutorial 2**
		3.4	Proof by Cases	
		3.5	Proof Evaluations	
5	29/09 – 03/10	4.1	Proofs Involvoing Divisibility of Integers	
		4.2	Proofs Involvoing Congruence of Integers	
		4.3	Proofs Involvoing Real Numbers	
	Exam 1	4.4	Proofs Involvoing Sets	
		4.5	Fundamental Properties of Set Operations	
		4.6	Proofs Involvoing Cartesian Products of Sets	
6	06/10 – 09/10	5.1	Counterexamples	
		5.2	Proof by Contradiction	**Tutorial 3**
		5.3	A Review of Three Proof Techniques	
		5.4	Existence Proofs	
		5.5	Disproving Existence Statements	
			Id al-Adha Vacation	
7	21/10 – 24/10	6.1	The Principle of Mathematical Induction	

Week	Date (DD/MM/2013)	Section	Topic	
		6.2	A More General Principle of Mathematical Induction	
		6.3	Proof by Minimum Counterexample	
		6.4	The Strong Principle of Mathematical Induction	
8	27/10 – 31/10	8.1	Relations	
		8.2	Properties of Relations	Tutorial 4
		8.3	Equivalence Relations	
		8.4	Properties of Equivalence Classes	
9	03/11 – 07/11	8.5	Congruence Modulo n	
		8.6	The Integers Modulo n	
		9.1	The Definition of Function	
10	10/11 – 14/11	9.2	The Set of All Functions from A to B	
		9.3	One-to-One and Onto Functions	
		9.4	Bijective Functions	Tutorial 5
		9.5	Composition of Functions	
		9.6	Inverse Functions	
11	17/11 – 21/11	9.7	Permutations	
		10.1	Numerically Equivalent Sets	
		10.2	Denumerable Sets	
12	24/11 – 28/11	10.3	Uncountable Sets	
	Exam 2	10.4	Comparing Cardinalities of Sets	Tutorial 6
		10.5	The Schröder-Bernstein Theorem	
13	01/12 – 05/12	11.1	Divisibility Properties of Integers	
		11.2	The Division Algorithm	
		11.3	Greatest Common Divisors	
		11.4	The Euclidean Algorithm	
		11.5	Relatively Prime Integers	
14	08/12 – 12/12	11.6	The Fundamental Theorem of Arithmetic	
		12.1	Limits of Sequences	Tutorial 7
		12.2	Inifinite Series	
15	15/12 – 19/12	12.3	Limits of Functions	
		12.4	Fundamental Properties of Limits of Functions	
16	22/12 – 24/12	12.5	Continuity	
		12.6	Differentiability	

KFUPM | MATH 232 | 2013-2014 CALENDAR

SEPTEMBER 2013						
S	M	T	W	Th	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

1 Classes Start
23 National Day

OCTOBER 2013						
S	M	T	W	Th	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

3 Major Exam 1 (07:00PM – 09:00PM)
9 Classes Pause for Id al-Adha Vacation
10-20 Id al-Adha Vacation
21 Classes Resume

NOVEMBER 2013						
S	M	T	W	Th	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

28 Major Exam 2 (07:00PM – 09:00PM)

DECEMBER 2013						
S	M	T	W	Th	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

24 Last Day of Classes

JANUARY 2014						
S	M	T	W	Th	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

26 Term 132: Classes Start