uc3m

COURSE: FUNDAMENTALS OF ALGEBRA		
DEGREE: Applied Mathematics and Computation	**YEAR: 1**	**TERM: 1**

WEEK	SESSION	DESCRIPTION	GROUP		WEEKLY PROGRAMMING FOR STUDENTS		
			LECTURE	SEMINAR	NOTES	LECTURE HOURS	STUDENT WORK
1	1	**1. LOGIC AND PROOFS** 1.1. Propositional logic	X		Book study, chapters 1.1-1.3 [R]	1.66	6
	2	Discussion of selected exercises		X	Odd numbered exercises. Compare with solutions (*)	1.66	
2	3	1.2. Predicates and Quantifiers	X		Book study, chapters 1.4-1.5 [R]	1.66	6
	4	Discussion of selected exercises		X	Odd numbered exercises. Compare with solutions (*)	1.66	
3	5	1.3. Introduction to proofs	X		Book study, chapters 1.7-1.8 [R]	1.66	6
	6	Discussion of selected exercises		X	Odd numbered exercises. Compare with solutions (*)	1.66	
4	7	**2. SETS AND FUNCTIONS** 2.1. Sets and set operations 2.2. Functions	X		Book study, chapters 2.1-2.3 [R] / 1.1-1.3 [W]	1.66	6
	8	Discussion of selected exercises		X	Odd numbered exercises. Compare with solutions (*)	1.66	
5	9	2.3. Well ordering and induction	X		Book study, chapters 5.1-5.2 [R] / 1.5 [W]	1.66	6
	10	**MIDTERM 1: Chapters 1 & 2**		X	Review of Chapters 1 & 2. Prepare for the Midterm	1.66	
6	11	**3. BOOLEAN ALGEBRA** 3.1. Boolean functions 3.2. Logic gates 3.3. Minimization of circuits	X		Book study, chapters 12.1-12.4 [R]	1.66	6
	12	Discussion of selected exercises		X	Odd numbered exercises. Compare with solutions (*)	1.66	
7	13	**4. INTEGERS AND MODULAR ARITHMETIC** 4.1. Divisibility 4.2. Modular arithmetic	X		Book study, chapters 4.1 [R] / 2.1-2.3 and 5.1[W]	1.66	6
	14	Discussion of selected exercises		X	Odd numbered exercises. Compare with solutions (*)	1.66	
8	15	4.3. Primes and Greatest common divisor	X		Book study, chapters 4.3 [R] / 2.4-2.5 [W]	1.66	6
	16	Discussion of selected exercises		X	Odd numbered exercises. Compare with solutions (*)	1.66	
9	17	4.4. Solving congruences	X		Book study, chapters 4.4-4.5 [R]	1.66	6
	18	Discussion of selected exercises		X	Odd numbered exercises. Compare with solutions (*)	1.66	

10	19	4.5. Cryptography	X		Book study, chapter 4.6 [R]	1.66	6
	20	4.6. Introduction to Rings	X		Book study, chapters 3.1-3.3 [W]	1.66	
	21	Discussion of selected exercises		X	Odd numbered exercises. Compare with solutions (*)	1.66	
11	22	**5. GROUPS** 5.1. Definitions 5.2. Subgroups	X		Book study, chapters 4.1-4.3 [W]	1.66	6
	23	**MIDTERM 2: Chapters 3 & 4**		X	Review of Chapters 3 & 4. Prepare for the Midterm	1.66	
12	24	5.3. Lagrange´s Theorem 5.4. Homomorphisms	X		Book study, chapters 4.4-4.5 [W]	1.66	6
	25	Discussion of selected exercises		X	Odd numbered exercises. Compare with solutions (*)	1.66	
13	26	**6. RINGS** 6.1. Integral domains and Fields 6.2. Euclidean Domains 6.3. Ideals and Homomorphisms	X		Book study, chapters 5.2-5.4 [W]	1.66	6
	27	Discussion of selected exercises		X	Odd numbered exercises. Compare with solutions (*)	1.66	
14	28	6.4. Unique Factorization Domains 6.5. Factorization in Q[x]	X		Book study, chapters 5.5-5.6 [W]	1.66	6
	29	Discussion of selected exercises		X	Odd numbered exercises. Compare with solutions (*)	1.66	
					Subtotal 1	**48**	**84**
					Total 1 *(Hours of class plus student homework hours between weeks 1-14)*	**132**	
15		Tutorial sessions			Prepare for the final exam	3	3
16-18		Assessment			Prepare for the final exam		12
					Subtotal 2	**3**	**15**
					Total 2 *(Hours of class plus student homework hours between weeks 15-18)*	**18**	
TOTAL *(Total 1 + Total 2)*							**150**

REFERENCES:

- [R] Kenneth H Rosen. Discrete Mathematics and Its Applications. McGraw-Hill Education. 2011 (7ed)
- [W] David A.R. Wallace. Groups, Rings and Fields. Springer Undergraduate Mathematics Serie. 2001 (2ed)

(*) Do some of the recommended exercises in [R] or [W] corresponding to the previous lecture in large group and compare with the solutions in the book.