Universidad Carlos III de Madrid
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COURSE: Design of Analog and Digital Subsystems		
MASTER: ELECTRONIC SYSTEMS ENGINEERING AND APPLICATIONS	**YEAR: 2014-15**	**TERM: 1st**

WEEKLY PLANNING							
WEEK	**SESSION**	**DESCRIPTION**	**GROUPS (mark X)**		**Special room for session (computer classroom, audio-visual classroom...)**	**WEEKLY PROGRAMMING FOR STUDENT**		
			LECTURES	**SEMINARS/ LAB[1]**		**DESCRIPTION**	**CLASS HOURS**	**HOMEWORK HOURS (Max. 7h week)**
1	1	Introduction. Fundamentals of Register-Transfer Level (RTL) design.	X			Get course material. Study lesson	1,5	
1	2	Design Evaluation and Optimization. Area and delay estimation. Design constraints.	X			Study lesson	1,5	4
2	3	Design Evaluation and Optimization. Design optimization for area and performance	X			Study lesson	1,5	
2	4	Exercises of RTL design		X	COMPUTER ROOM	Exercises	1,5	5
3	5	Design Evaluation and Optimization. Power estimation and optimization. Clocking issues	X			Study lesson	1,5	5

3	6	Examples of design evaluation and optimization		X	COMPUTER ROOM	Exercises using computer tools	1,5	
4	7	Fundamentals of High-Level Synthesis	X			Study lesson	1,5	5
4	8	High-Level Synthesis. Loops	X			Study lesson	1,5	
5	9	High-Level Synthesis. Interfaces and memories	X			Study lesson Work on mid-term assignment	1,5	5
5	10	Examples of High-Level Synthesis		X	COMPUTER ROOM	Study lesson Work on mid-term assignment	1,5	
6	11	Exercises of High-Level Synthesis		X		Exercises using computer tools Work on mid-term assignment	1,5	5
6	12	Exercises of High-Level Synthesis		X	COMPUTER ROOM	Exercises using computer tools Work on mid-term assignment	1,5	
7	13	Introduction to Hardware/Software Codesign	X			Study lesson Prepare mid-term exam	1,5	5
7	14	Mid-term Exam	X			Prepare mid-term exam	1,5	
8	1	Active Filter synthesis I	x			Review of active filter synthesis methods, biquads, state variable, gyrators	1,5	5
8	2	Active Filter synthesis II	x			Effect of finite opamp gain, bandwidth. Gm-C filters	1,5	
9	3	Active Filter synthesis - Exercises		x		Desing example and simulation	1,5	5
9	4	Sample & Hold Circuits	x			MOS switches, S&H basics, charge injection, aperture time, exercises.	1,5	
10	5	Noise in electronic circuits I		x		Spectral Power density, Filtered Noise, Thermal, Flicker, Shot noise sources.	1,5	5

10	6	Noise in electronic circuits II	x			Noise models of semiconductors. Noise circuit analysis using SPICE. Noise in sampled data systems.	1,5	
11	7	Noise in electronic circuits - Exercises		x		Exercises and simulation	1,5	5
11	8	Switched capacitor circuits	x			Basic integrators, delaying- nondelying, 1st and 2nd order filters	1,5	
12	9	Switched capacitor circuits - Exercises		x		Transfer function calculation. Exercises	1,5	5
12	10	Data conversión circuits	x			Nyquist A/D and D/A converters	1,5	
13	11	Noise shaping techniques	x			Oversampling. Noise shaping. Sigma-delta A/D and D/A converters	1,5	5
13	12	Data conversión exercises		x		Exercises and simulation	1,5	
14	13	Time circuits and signal synthesis	x			Delay lines, Ring oscillators, Time to Digital Converters. Dual modulus synthesizers, DDS synthesizers.	1,5	5
14	14	Time circuits and signal synthesis - Exercises	x			Phase noise and jitter concepts . Exercises	1,5	

[1] **A maximum of 1-2 lab sessions**

Subtotal 1	42	68
Total 1 *(Hours of class plus student homework hours between weeks 1-7)*		110

1-14		Tutorials, handing in, etc						20	
8		Assessment						6	14

Subtotal 2	6	34
Total 2 *(Hours of class plus student homework hours at week 8)*		40

TOTAL *(Total 1 + Total 2)*	150