



<b>SUBJECT:</b> System-on-Chip and efficient electronic circuit integration techniques		
<b>MASTER DEGREE:</b> Master in Electronic Systems Engineering and Applications	<b>ECTS:</b> 3	<b>QUARTER:</b> 4

TIMETABLE FOR THE SUBJECT								
WEEK	SESSION	DESCRIPTION OF EACH SESSION	GROUP (X mark)		Indicate if a different lecture room is needed (computer, audiovisual, etc.)	HOMEWORK PER WEEK		
			1	2		DESCRIPTION	ATTENDING HOURS	HOMEWORK Max. 7H/WEEK
1	1	<b>Introduction:</b> <ul style="list-style-type: none"> <li>- Microelectronics</li> <li>- Moore's law</li> <li>- State-of-the-art of SoC</li> <li>- Fabrication</li> <li>- Scaling problems</li> </ul>	X			Study of bibliography	1,5	3,25
1	2	<b>Advanced CMOS design:</b> <ul style="list-style-type: none"> <li>- Advanced transistor models and second-order effects in low voltage CMOS technology</li> <li>- Spice models and simulator limits</li> <li>- Examples</li> </ul>	X			Study of bibliography	1,5	3,25
2	3	<b>Integrated Amplifiers (I). Key Concepts</b> <ul style="list-style-type: none"> <li>- Differential signals</li> <li>- Amplifier stages</li> <li>- Current Mirrors and examples</li> <li>- Review of basic stages with active loads</li> <li>- Differential pair</li> <li>- Examples of amplifiers</li> </ul>	X			Study of bibliography Solve proposed exercises	1,5	3,25
2	4	<b>Integrated Amplifiers (II). Frequency Response, compensation of amplifiers. Miller opamp</b> <ul style="list-style-type: none"> <li>- Parasitics model</li> <li>- Basic stage frequency response</li> </ul>	X			Study of bibliography Solve proposed exercises	1,5	3,25



		<ul style="list-style-type: none"><li>- Miller effect</li><li>- Example</li><li>- Architecture of Miller opamp</li><li>- Design considerations</li><li>- Examples</li><li>-</li></ul>						
3	5	<b>Integrated Amplifiers (III): OTAs</b> <ul style="list-style-type: none"><li>- Architecture</li><li>- Gain and frequency response</li><li>- Design considerations</li><li>- Examples</li></ul>	X			Study of bibliography Solve proposed exercises	1,5	3,25
3	6	<b>Practice 1:</b> <ul style="list-style-type: none"><li>- Scaling in low voltage technology</li><li>- Mismatch and offset analysis</li></ul>	X		Laptop / synchronous online	Practical work	1,5	3,25
4	7	<b>Integrated comparators: Latched comparators</b> <ul style="list-style-type: none"><li>- Architecture</li><li>- Design considerations</li><li>- Examples</li></ul>	X			Study of bibliography Solve proposed exercises	1,5	3,25
4	8	<b>Test I</b>	X			Exam preparation	1,5	3,25
5	9	<b>Practice 2:</b> <ul style="list-style-type: none"><li>- Delta-Sigma converter</li></ul>	X		Laptop / synchronous online	Practical work	1,5	3,25
5	10	<b>Inverter-based circuits:</b> <ul style="list-style-type: none"><li>- Gain circuits</li><li>- Time mode comparators</li><li>- Time mode converters: TDCs, VCO-based ADCs</li></ul>	X			Study of bibliography Solve proposed exercises	1,5	3,25
6	11	<b>Practice 3:</b> <ul style="list-style-type: none"><li>- VCO-based ADC</li></ul>	X		Laptop / synchronous online	Practical work	1,5	3,25



6	12	<b>Lay-out</b> <ul style="list-style-type: none"><li>- Lay-out rules</li><li>- Parasitics extraction</li><li>- Practical example</li></ul>	X			Study of bibliography Solve proposed exercises	1,5	3,25
7	13	<b>Practice 4:</b> <ul style="list-style-type: none"><li>- Lay-out practice</li></ul>	X		Laptop / synchornous online	Practical work	1,5	3,25
7	14	<b>Robust Design</b> <ul style="list-style-type: none"><li>- PVT variations</li><li>- Design for robustness</li><li>- Calibration Techniques and Examples</li></ul>	X			Study of bibliography Solve proposed exercises	1,5	3,25
8	-	Tutorials				-	2	-
8	-	Exam				Exam preparation	3	4
<b>TOTAL HOURS</b>							26	49