

Electronics for biomedical applications

Week 1

	Monday	Tuesday	Wednesday	Thursday	Friday
	8th April	9th April	10th April	11th April	12th April
8:15-9:45					
10:00-11:30	1				
11:45-13:15					
14:00-15:30					2
15:45-17:15					3

Week 2

	Monday	Tuesday	Wednesday	Thursday	Friday
	22nd April	23rd April	24th April	25th April	26th April
8:15-9:45		4		6	
10:00-11:30		5		7	
11:45-13:15					
13:30-15:00					
15:15-16:45					

Week 3

	Monday	Tuesday	Wednesday	Thursday	Friday
	29th April	30th April	1st May	2nd May	3rd May
8:15-9:45	8				
10:00-11:30	9				
11:45-13:15					
13:30-15:00					
15:15-16:45					

Week 4

	Monday	Tuesday	Wednesday	Thursday	Friday
	13th May	14th May	15th May	16th May	17th May
8:15-9:45					
10:00-11:30				10	
11:45-13:15				11	
13:30-15:00					
15:15-16:45					

Week 5

	Monday	Tuesday	Wednesday	Thursday	Friday
	20th May	21st May	22nd May	23rd May	24th May
8:15-9:45		12			
10:00-11:30		13			

11:45-13:15					
13:30-15:00					
15:15-16:45					

Week 6

	Monday	Tuesday	Wednesday	Thursday	Friday
	27th May	28th May	29th May	30th May	31st May
8:15-9:45		14			
10:00-11:30		15			
11:45-13:15					
13:30-15:00					
15:15-16:45					

Technical content

Many examples of the course and tutorial can be simulated with the free software LtSpice, to be downloaded here:
<https://www.analog.com/en/resources/design-tools-and-calculators/ltspice-simulator.html>

Part 1: Introduction to the basics of integrated electronics for biomedical interfaces

1	Introduction to CMOS integrated circuit, and diode : example of pulse oxymeter
2	The MOS transistor (example of FNIRS for brain activity)
3	Fundamental circuits based on one transistor (one biomedical sensor = one fundamental circuit)
4	Structure of integrated amplifiers

5

Structure of integrated amplifiers

Part 2: Study of biomedical circuits (stimulation circuits, timers, filters, acquisition)

6

biomedical filtering: Gm-C techniques

7

biomedical filtering: Gm-C techniques

8

biomedical filtering: Gm-C techniques

9

Study of cases of biomedical circuits

10

Study of cases of biomedical circuits

11

Study of cases of biomedical circuits

12

Study of cases of biomedical circuits

13

Amplifier circuits for biomedical acquisition: example of pulseoximeter and ECG

14

Design with LtSpice (project) : Filter for brain wave classification

15

Design with LtSpice (project) : Filter for brain wave classification