Master Degree in Electrical Engineering

Lab Electrical Measurements *(6 CFU)*

Ing. Erika Pittella, PhD

A.A. 2019-2020

Class schedule

Calendar		Lectures
Wednesday 26th February	2 PM - 5 PM	
Thursday 27th February	2 PM - 4 PM	
Wednesday 4th March	2 PM - 5 PM	1. Introduction to the course.
Thursday, 5th March	2 PM - 4 PM	didactic suspension for the decree-law of 4 March 2020 President of the Council of Ministers
Wednesday 11 March	2 PM - 5 PM	didactic suspension for the decree-law of 4 March 2020 President of the Council of Ministers
Thursday, 12th March	2 PM - 4 PM	didactic suspension for the decree-law of 4 March 2020 President of the Council of Ministers
Wednesday 18 March	2 PM - 5 PM	2. course in conference call Causes of uncertainty, random and systematic errors, maximum error, metrological compatibility between measures, error propagation law. Random variables, type uncertainty and its evaluation of category A and category B, law of propagation of uncertainty, composed uncertainty, expanded uncertainty. How to write correctly a measurement result.
Thursday 19 March	2 PM - 4 PM	3. Measurement procedure and rules for making a good measure. DC power supply and signal generator, connecting cables and visualization of a signal waveform on the DSO.
Wednesday 25 March	2 PM - 5 PM	4. Presentation of the digital multimeter (DMM)
Thursday 26 March	2 PM - 4 PM	5. DMM specifications. Measurement of DC voltages, measurements of resistances and DC

		current. Measurement of AC voltages with DMM.
Wednesday 1 April	2 PM - 5 PM	6. AC measurement with the DMM. Introduction to the Voltmeter-Ammeter method for measurement of resistance Indirect measurement of a resistance: - voltmeter downstream
Thursday 2 April	2 PM - 4 PM	- voltmeter upstream 7. Introduction to the 4-wire measurements. Measurement of a small resistance
Wednesday 8 April	2 PM - 5 PM	8. The digital sampling oscilloscope (DSO). Input unit. Sampler & ADC unit.
Thursday 9 April	2 PM - 4 PM	Beginning of Easter holidays
Wednesday 15 April	2 PM - 5 PM	9. Trigger, CPU and memory, display unit.
Thursday 16 April	2 PM - 4 PM	Class canceled.
Wednesday 22 April	2 PM - 5 PM	10. Vertical axis settings. Vertical axis specifications. Measurement of the effective value of a sinusoidal waveform. Compatibility with the DMM meas.
Thursday 23 April	2 PM - 4 PM	11. DSO horizontal axis settings and specifications. Measurement of the frequency of a sinusoidal waveform. Duty cycle definition.
Wednesday 29 April	2 PM - 5 PM	12. Duty cycle measurements. Presentation of the probe, compensation of the probe.
Thursday 30 April	2 PM - 4 PM	13. Filter frequency response and its measurement mode. Introduction to the RC low pass filter. DSO measurement in double trace mode of the absolute value and the phase of the RC low pass filter frequency response @ the cut-off frequency.
Wednesday 6 May	2 PM - 5 PM	14. DSO measurement in X-Y mode of the phase of the RC low pass filter frequency response @ the cut-off frequency.
Thursday 7 May	2 PM - 4 PM	15. Response to the step and its measurement mode.

		Rise time measurement of RC low pass filter step response.
Wednesday 13 May	2 PM - 5 PM	16. Introduction to the RLC low pass filter. Introduction to the measurement with the DSO of the suppressed band slope of the frequency response absolute value of an RLC filter. Measurement with the DSO of the suppressed band slope of the frequency response absolute value of an RLC filter.
Thursday 14 May	2 PM - 4 PM	17. LCR meter.
Wednesday 20 May	2 PM - 5 PM	18. Introduction to LabVIEW NI Front Panel and Block Diagram, subVI.
Thursday 21 May	2 PM - 4 PM	19. Waveform generation. Measurements on a waveform.
Wednesday 27 May	2 PM - 5 PM	20. Experimental test.
Thursday 28th May	2 PM - 4 PM	**21.** Experimental test.

Laboratorio di Metodi e Strumenti di Misura

DIAEE

via delle Sette sale