

DIGITAL INSTRUMENTATION

1.1. Identification

University:	Alma Mater Studiorum – Università di Bologna											
School:	School of Engineering											
Course:	Digital Instrumentation											
ECTS:	6											
Semester:	<i>Winter</i>				X	<i>Summer</i>						
Category	<i>Fundamental course</i>				X	<i>Specialisation course</i>						
Module	<i>MFI</i>		<i>MFII</i>		<i>MFIII</i>	X	<i>MSI</i>		<i>MSII</i>		<i>MSIII</i>	
Teachers:	Luca Selmi											
Language:	<i>English</i>	X	<i>Italian</i>	X	<i>Swedish</i>		<i>Spanish</i>					

1.2. Learning-outcomes

- knowledge of the internal architecture of the most common modern instruments
- knowledge of the most common specifications

1.3. Competencies

▪ General

- To have critical understanding of instrumentation specs.
- To be able to select the most appropriate instruments for the most common measurement tasks
- To be able to choose the appropriate technological solutions to set up dedicated benches of computer controlled instruments.

▪ Specific

- To perform basic measurements with scopes, signal, network, impedance and logic analyzers.
- To set up measurement benches.
- To understand the technical specifications of the most modern instruments
- To develop computer programs for controlling the operation of instrumentation.

1.4. Contents

1. Overview of modern instrumentation and data flow in an instrument.
2. Architecture, specification and usage of basic instruments for signal analysis (scopes, analog and digital signal analyzers).

3. Architecture, specification and usage of basic instruments for digital circuit analysis (logic analyzers, data word generators).
4. Architecture specification and usage of basic instruments for component analysis (network analyzers, impedance analyzers, TDR systems)
5. Standards and techniques for computer control of modern instrumentation.

1.5. Teaching Methodology

- Lectures.
- Laboratory sessions using instruments and instrumentation control environments such as, e.g. Labview, Matlab, etc....

1.6. Evaluation

- Oral exams, including discussion of the laboratory work.

1.7. Bibliography

A. Coombs (ed.), *Electronic instrument handbook*, McGraw Hill.
AAVV, *Spectrum/Network Measurements*, prentice Hall.
Teacher's Lecture Notes.