Software Defined Radio and Programmable Circuit Design

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Software Defined Radio Course Outline

- Chapter 1. Introduction
  - Definition, Ideal Concept, History and Benefits
  - General Architecture, Evolution towards Cognitive Radio
- Chapter 2. Baseband Processing
  - Bit-level Processing, Modulation, Pulse-shape Filtering
- Chapter 3. Digital Front End (DFE)
  - DFE Tx: Architectures, Specific Aspects
  - DFE Rx: Architectures, Specific Aspects
- Chapter 4. Example of a SDR Platform: the USRP

Software Defined Radio Laboratory Outline

Digital Radio TX & RX Models using Simulink (Matlab)

(Location: Orange Lab)

- 1st Laboratory:
  - Digital Modulation Techniques
- 2nd Laboratory:
  - RF Impairments
  - CIC Filters
- 3rd Laboratory:
  - Carrier Recovery Techniques: The Costas Loop
  - Early-late Gate Timing Recovery.

- **Evaluation:** Tests that will be given at the end of each lab

Examination (SDR part)

- Final Exam: 25 points
- Laboratory: 25 points

Resources

- Moodle page: http://cr.uk.to/moodle
- Username: firstname.lastname
- Password: sdr!2016

Bibliography

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- T. J. Rouphael – *RF and DSP for Software Defined Radio – A Multistandard Approach*, Elsevier, 2008
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- P. Burns – *Software Defined Radio for 3G*, Artech House, 2002
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