MICRO-710  PLLs and clock & data recovery  Kayal Maher

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<th>Cursus</th>
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<td>Génie électrique</td>
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**Remarque**
June 17th to 21st, 2019. ROOM: ELA1 or ELA2.

**Summary**
The course is covering following aspects: Fundamentals of Analog PLLs, Interference Effects, Deadzone and Phase Noise, VCO Design, All-Digital PLL Architecture and Implementation, Digitally-Controlled Oscillator, Time-to-Digital Converter, RC-Oscillators, Designing XTAL and MEMS Oscillator.

**Content**

**Day 1:**
- Fundamentals of Analog PLLs
- Interference Effects in PLLs
- Spiral Inductor Interference, Deadzone and Phase Noise

**Day 2:**
- VCO Design
- Jitter and Phase Noise in PLLs

**Day 3:**
- All-Digital PLL Architecture and Implementation
- Digitally-Controlled Oscillator (DCO)
- Time-to-Digital Converter (TDC)

**Day 4:**
- Oscillator Basics: Feedback and Power Consumption
- RC-Oscillators
- Designing XTAL and MEMS Oscillator from MHz to GHz
- Low Phase Noise and Low Jitter 0.1-10GHz VCO

**Day 5:**
- Fractional-N PLLs for Frequency Synthesis
- FDC-Based Digital PLLs

**Note**
* Organized by MEAD/EPFL
Contact: education@mead.ch

**Keywords**
Clock Recovery, PLL, VCO Circuits, Oscillators, Transceivers

**Learning Prerequisites**
Recommended courses
Analog IC Design

Resources

Ressources en bibliothèque

• Analog-to-Digital Conversion / Pelgrom
• Structured Analog CMOS Design / Kayal
• Understanding delta-sigma data converters / Schreier
• Understanding Delta-Sigma Data Converters / Pavan
• RF analog impairments modeling for communication systems simulation: application to OFDM-based transceivers / Smaini
• All-Digital Frequency Synthesizer in Deep-Submicron CMOS / Staszewski
• Charge-Based MOS Transistor Modeling: The EKV Model for Low-Power and RF IC Design / Enz
• Analog Design Essentials / Sansen
• Methodology for the Digital Calibration of Analog Circuits & Systems / Kayal