



### RF MICROELECTRONICS

Anno immatricolazione	2020/2021
Anno offerta	2020/2021
Normativa	DM270
SSD	ING-INF/01 (ELETTRONICA)
Dipartimento	DIPARTIMENTO DI INGEGNERIA INDUSTRIALE E DELL'INFORMAZIONE
Corso di studio	ELECTRONIC ENGINEERING
Curriculum	Microelectronics
Anno di corso	1°
Periodo didattico	Secondo Semestre (08/03/2021 - 14/06/2021)
Crediti	9
Ore	82 ore di attività frontale
Lingua insegnamento	English
Tipo esame	SCRITTO E ORALE CONGIUNTI
Docente	MAZZANTI ANDREA (titolare) - 9 CFU
Prerequisiti	Basic knowledge of Analog Electronics
Obiettivi formativi	<p>This course is aimed at introducing students to the design of integrated transceivers for wireless communications. At the end, attendees will have gained knowledge of fundamental parameters describing system performances, insights into alternative processing architectures and ability to design the following building blocks: low noise amplifiers, up and down converters, power amplifier, phase locked loop, phase detector, filter, voltage controlled oscillator, frequency synthesizer. As an example, the design of a complete transceiver will be described starting from the specifications of a telecommunication application, such as GSM, W-CDMA, WLAN. Based on computer aided design experience carried out in the Laboratory, the student will be able to finalize the design of single blocks integrated in most advanced CMOS nodes and will be ready for the design of complete transceivers.</p>

<b>Programma e contenuti</b>	<p>Basic concepts for transcievrs Non-linearities, inter-symbol interference, phase noise in oscillators, sensitivity and dynamic range, image rejection.</p> <p>Modulation Choice of digital schemes for optimum power and spectral efficiency in wireless systems.</p> <p>Transceiver architectures Super-heterodynedirect conversion, low-IF, Direct Conversion.</p> <p>Design of CMOS integrated blocks low-noise amplifier; up and down-converters; voltage controller oscillators; phase detector; charge pump, filters, phase locked loop; frequency synthesizer; power amplifiers.</p> <p>Application example Design of CMOS transceiver building blocks for applications of commercial interest.</p>
<b>Metodi didattici</b>	<p>Lectures (hours/year in lecture theatre):60 Practical class (hours/year in lecture theatre): 24</p>
<b>Testi di riferimento</b>	<p>B. Razavi. RF Microelectronic circuits. Prentice Hall PTR, Upper Saddle River, NJ 07458.</p>
<b>Modalità verifica apprendimento</b>	<p>At the end of the course, the student will prepare a report regarding the design carried out in the Laboratory. The examination includes a excercises to be solved by the student, followed by an oral discussion on the course program. No inter-mediate examination is foreseen.</p>
<b>Altre informazioni</b>	
<b>Obiettivi Agenda 2030 per lo sviluppo sostenibile</b>	<p><a href="#">\$lbl legenda sviluppo sostenibile</a></p>