Dottorato di Ingegneria dell'Informazione
Calendario corsi Giugno-Luglio 2015

Introduzione alle Equazioni alle Derivate Parziali
(Introduction to Partial Differential Equations)
Prof. Russell Allan Johnson, DIMAI, Università di Firenze
12 ore = 3 cfu (4 lezioni di 3 ore)

Lunedì 29 giugno 2015 ore 10-13, Aula 204, Santa Marta
Martedì 30 giugno 2015 ore 10-13, Aula 204, Santa Marta
Giovedì 2 luglio 2015 ore 10-13, Aula 204, Santa Marta
Venerdì 3 luglio 2015 ore 10-13, Aula 204, Santa Marta

Programma:
I. Introduzione, alcuni esempi importanti di equazioni alle derivate parziali.
II. Alcuni metodi di soluzione di equazioni alle derivate parziali.
III. Equazioni alle derivate parziali e l'Analisi funzionale.
Program of the Course:
I. Introduction; some important examples of partial differential equations.
II. Some methods for solving partial differential equations.
III. Partial differential equations and Functional analysis.

===

Transport and access optical networks
Prof. Marco Santagiustina, Dip.to di Ing. dell'Informazione, Università di Padova
8 hours=2 cfu

Mercoledì 1 Luglio 2015 ore 15-18, Aula 108, Santa Marta
Mercoledì 8 Luglio 2015 ore 15-17, Aula 108, Santa Marta
Giovedì 9 Luglio 2015 ore 9:30-12:30, Aula 114, Santa Marta

Abstract:
Optical fibers are a fundamental element of telecommunication networks. Their introduction in long-haul links has revolutionized the high capacity transport network, which connects cities and continents, and has been the primary engine for the birth and growth of Internet. More recently the decrease of the costs of optical devices and the steadily increasing bandwidth demand of telecommunication services is fostering the diffusion of optical fibers into the access networks.
In the first part of the course the main properties of optical fibers will be reviewed and some optical components, that are used in the networks, will be also presented. In the second part, it will be described how fiber properties and optical devices performance eventually determine the design of fiber optics transport and access networks.

Program:
1. Introduction: the evolution of transport and access optical networks
2. Light propagation in an optical fiber
    a. The propagation modes
    b. Intra- and inter-modal dispersion
    c. Intrinsic and extrinsic losses
    d. The effects due to the light polarization and to medium non-linearity (brief overview)
    e. Optical network devices (brief overview)
3. Transport optical networks
    a. Time and wavelength division multiplexed systems
    b. Coherent systems
    c. Future directions: space division multiplexing (brief overview)
4. Access optical networks
    a. Passive vs. active optical networks
    b. Radio-over-fiber techniques (brief overview)

===

Architetture Riprogrammabili per la Sintesi di Apparati Radio
(Software Defined Architectures for Radio Synthesis)
Ing. Luca Simone Ronga e Ing. Renato Pucci, CNIT, Italy
8 hours=2 cfu

Lunedì 6 Luglio 2015 ore 11-13, Aula 204, Santa Marta
Martedì 7 Luglio 2015 ore 11-13, Aula 204, Santa Marta
Martedì 14 Luglio 2015 ore 15-17, Aula 204, Santa Marta
Mercoledì 15 Luglio 2015 ore 15-17, Aula 204, Santa Marta

Abstract:
Software based radio design, also called Software Defined Radio, has been attracting manufacturers for years, but technological limitations confined their diffusion to specific contexts (military communications). The technological barriers are now removed and the software design is rapidly becoming a common practice. The course will explore the main aspects related to software based signal processing for radio communication devices. Starting from some Open-Source framework for SDR, the course will describe the current and future programmable devices for signal processing, followed by an introduction to FPGA radio synthesis process with Xilinx tools, and finally closing with an overview of future trends on digital radio design.

Program:
- Day 1 - Framework and Hardware Open Source SDR (Gnuradio, Ossie, Redhawk, USRP, Nutaq)
- Day 2 – Examples of Radio Design (Ossie, Gnuradio, Nutaq)
- Day 3 – Reprogrammable Devices (DSP, FPGA, GPP, ASIC e Ibridi) and FPGA Radio Synthesis (Xilinx tools)
- Day 4 - From Firmware Defined Radio to Software Defined Radio on FPGAs