UNIVERSITÀ DEGLI STUDI DI PALERMO

unipa

DI_UNIPA – VIALE DELLE SCIENZE (BUILD. 9)

Seminars on DSP and Coding Theory

As part of the "Staff Mobility for Teaching" action within the Erasmus + agreement existing between the Universities of Palermo and Iaşi,

Erasmus+

Prof. ***Daniela TĂRNICERIU***,

Dean of the Faculty of Electronics, Telecommunications and Information Technology of the "Gheorghe Asachi" Technical University of Iaşi (Romania), and **Professor** of Digital Signal Processing and Coding Theory at the same University, will hold two seminars on ***"Linear prediction and optimum linear filtering"*** and ***"Error correcting codes"***.

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The two seminars will take place in "Aula Savagnone" (Build. 9), Department of Engineering at UniPa, respectively on Tuesday 17 May 2022 (from 10:30 to 12:00) and on Thursday 19 May 2022 (from 15:30 to 18:00).

Students belonging to the master degrees in "Ingegneria Elettronica", "Electronics Engineering" and "Ingegneria dei Sistemi Ciber-Fisici per l'Industria" are invited to the seminars. Students attending and presenting a short report on each seminar will be granted with 0,5 credits per seminar.

For more information please contact:
Prof. Giuseppe Lullo
Prof. Stefano Mangione
Prof. Costantino Giaconia
Prof. Alessandro Busacca

Main topics of the seminars:

Linear prediction and optimum linear filtering

- Introduction
  - Terms and definitions
  - Representation of stochastic processes
- Models for random processes
- Relationships between filter parameters and autocorrelation sequence
- Forward prediction
- Backward prediction
- Relationships between prediction errors and lattice structure
- Normal equations
- Data Compression by Linear Prediction
- Wiener filter for filtering and prediction

Error correcting codes

- What is Forward Error Correction?
- Why do we need it?
- How does it work?
- A Brief History of FEC
  - Hamming codes
  - BCH codes
  - Reed – Solomon Codes
- The Shannon Capacity formula and what it means
- Modern Approaches to Advanced FEC
  - Concatenated Codes
  - Turbo Codes
  - Low Density Parity Check Codes
- Where are they used?