

# **ELENCO DEI CORSI EROGATI DALLA SCUOLA DI DOTTORATO DEL POLITECNICO DI BARI PER IL XXXVII CICLO (A.A. 2021-2022)**

## **1. Fundamentals of Information Theory, 2 CFU, SSD: ING-INF/03**

Syllabus:

Definition and measures of Information

Entropy concept

Mutual and conditional information

Shannon Theorem

Channel capacity with gaussian noise

Example of source coding

Application of Information theory to security concepts

## **29. Implementation and application of Design of Experiment techniques to experimental and numerical campaign, 2 CFU, SSD: ING-IND/14.**

Syllabus:

1. Review of main statistical tools related to Design of Experiment (4 hours)

a. Descriptive statistics

b. Inferential statistic

c. Test of hypothesis

d. ANOVA

2. Factorial design (4 hours)

a. One variable

b. 2 variables without and with replication

c. Multi parameters

3. SRM surface response methodology (2 hours)

4. Study cases (8 hours)

a. Experimental setup and analysis

b. Application in Machine Design

c. DOE for numerical simulations

5. Guided implementation of an individual study case

## **30. Sustainability in smart manufacturing: open research questions, 2 CFU, SSD: ING-IND/16.**

Syllabus:

Introduction to sustainability issues

Open research issues:

Energy and energy storage

Manufacturing processes and technologies

Smart production and sustainable performance

## **32. Collective intelligence of human groups, 2 CFU, SSD: ING-IND/35.**

Syllabus:

-Origin and definitions

- Building blocks

- Drivers

- Statistical physics of collective decision making

- Discrete and continuous models

- Phase Transition, Criticality and the Emergence of Swarm intelligence.