Università degli Studi di L'Aquila - Dipartimento di Ingegneria e Scienze dell'Informazione e Matematica

Course catalogue

Page compiled on 23/06/2018

Programme of Course "Calcolo delle Probabilità e Statistica Matematica"

- Code: DT0003
- Type of course unit: Compulsory (Bachelor Degree in Computer Science curriculum General)
- Level of course unit: Undergraduate Degrees
- Semester: 1

Number of ects credits: (Bachelor Degree in Computer Science) 6 (workload 150 hours)

Teachers: Davide Gabrielli (gabriell@univaq.it), Umberto Triacca (umberto.triacca@univaq.it)

1	**Course objectives**	An introduction to the theory of probability up to the weak law of large numbers
2	**Course content and learning outcomes (dublin descriptors)**	Topics of the module include: • BASIC PROBABILITY: probability space, sets and elementary operations, Venn diagragms, basic axioms, inclusion-exclusion formula, enumeration principle and generalized enumeration principle, uniform probability spaces, permutations and combinations, conditional probability, disintegration formula, Bayes Formula, independence. • RANDOM VARIABLES AND EXPECTED VALUE: discrete and continuous random variables, mass distribution and density, distribution function, joint and marginal distributions, expected value and its properties, variance and covariance, weak law of large numbers. • EXAMPLES OF RANDOM VARIABLES: random variables of the following type: Bernoulli, binomial, Poisson, uniform, Gaussian, exponential, geometric. • INTRODUCTION TO STATISTICAL INFERENCE: the inference problem, parametric and non parametric inference • ELEMENTS OF PARAMETRIC ESTIMATES: random samples, estimators, mean squared error. Estimators for finite samples and their properties (bias and efficiency). Estimators for large samples (consistency and asymptotic normality). maximum likelihood method, estimates for intervals. • ELEMENTS OF HYPOTHESIS VERIFICATION: the statistical test, general facts, first order error, significance level and the p value. The power function of a test. Hypothesis test on the average of a Gaussian sample with given variance. Hypotesis test on the average of Gaussian sample with unknown variance.
3	**Course prerequisites**	elementary mathematics and some notions of mathematical analysis
4	**Teaching methodsand language**	frontal lectures **Language**: Italian **Reference textbooks** • S M Ross, ***Probabilità e statistica***. Maggioli.
5	**Assessment methods**	written exam with exercises and theoric questions