The National School of Artificial Intelligence
المدرسة الوطنية العليا للذكاء الاصطناعي

SYLLABUS

Domain: Computational Math — Field: Computer Science

Specialty: Artificial Intelligence

Semester: 3 — Academic year: 2023/2024

Identification of the teaching subject

Title: Probability

Teaching unit: Fundamental

Number of Credits: 4 — Coefficient: 2

Total number of hours per week:

- Classes (number of hours per week): 1h30
- Tutorial (number of hours per week): 1h30
- Practical work (number of hours per week):

Responsible for the teaching subject

Surname, First name, Grade: Remita Riad, Professor

Office Location (Block, Office):

Email: riad.remita@ensia.edu.dz

Course timetable and location for the two sections: Sunday 08h30 and 10h10 Amphi 2

Description of the teaching subject

Prerequisite: Probability.

General objective of the subject: This course covers the classical aspects of probability theory and focuses on the probabilistic model and its basic properties. It also considers random experiments whose characteristic of interest can be modelled by univariate or multivariate random variables (discrete or continuous). It introduces random vectors, sequences of random variables, and different aspects of convergence.

Learning objectives: (from 3 to 6 objectives, include only the objectives you evaluate)

Discrete and continuous random variables, Distribution functions, Expectation, Joint distribution, Limit theorems.

Content of the teaching material

Chapter I. Random variables. Discrete and continuous random variables

Chapter II. Properties of expectation, Limit theorems. Generating functions

Chapter III. Random vector - Joint distributions

Evaluation methods

Nature of the control	Weighting in % of total
Exam	60
Midterm exam	20
Mini tests (minimum 2)	2*7=14
Practical work	-
Personal project	-
Group work	-
Field trips	-
Attendance (Presence / Absence)	6
Others (Brochure validation TP)	-
Total	**100%**

References & Bibliography

Textbook (Principal Reference) :		
Titre de l'ouvrage	**Auteur**	**Éditeur et année d'édition**
Probability and Statistics for Computer Science	David Forsyth	Springer, 2018
Les références de soutien si elles existent :		
Titre de l'ouvrage (1)	**Auteur**	**Éditeur et année d'édition**
Introduction in probability and statistics for scientists and engineers	Sheldon M. Ross	Academic Press, 2014
Titre de l'ouvrage (2)	**Auteur**	**Éditeur et année d'édition**
Statistiques et probabilités.	Bernard Verlant, Geneviève Saint-Pierre.	Foucher, 2008.

Course schedule

Week	Course title	Date
1	**I. Random variables**: Definitions, Cumulative distribution function.	24/09
2	Discrete random variable	01/10
3	Continuous random variable	08/10
4	Usual discrete distributions	15/10
5	Usual continuous distributions	22/10
6	Approximations	29/10
7	**II. Properties of expectation, limit theorems** Expectation – Moments and centered moment of order n Conditional expectation	05/11
8	Convergences	12/11
9	Generating function, moment generating function and characteristic function	19/11
10	Limit theorems Weak law of large numbers – Central limit theorem – strong law of large numbers	26/11
11	**III. Random vector** Joint distributions Discrete case	03/12
12	Continuous case	10/12
13	Sum of random variables	17/12
14	Distribution of a function of random vector	07/01
15	Examples	14/01
	End of semester exam	