



### **Description**

This course introduces the students to the concepts of probability and helps them understand the fundamentals of this area of mathematics. The idea is to have a better grasp on the concepts of probability in order to be able to see clearly how they contribute to the efficiency of most machine learning algorithms.

### **Learning Objectives and Outcomes**

- Understand what is a probability and what are its properties
- Understand the concepts of independence, marginal, joint and conditional probability, probability distribution, mean, variance, standard deviation
- Understand the difference between discrete and continuous probability distribution
- Understand what makes the normal distribution different from all the other probability distributions
- Be able to use Bayes Theorem

### **Course Schedule and Contents**

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|------------|---|
| Session #1 | <ul style="list-style-type: none"><li>▪ Reminder: connection between probability and machine learning</li><li>▪ Definition of a probability, a random variable</li><li>▪ Explanation of the properties of a probability</li><li>▪ Concept of independence of 2 events</li><li>▪ Difference between marginal and joint probability</li></ul> |
| Session #2 | <ul style="list-style-type: none"><li>▪ Mean, variance and standard deviation</li><li>▪ Discrete probability vs continuous probability</li><li>▪ Density function</li><li>▪ Probability distributions</li></ul>   |
| Session #3 | <ul style="list-style-type: none"><li>▪ Normal distribution</li><li>▪ Central limit theorem</li></ul>   |
| Session #4 | <ul style="list-style-type: none"><li>▪ Conditional probability and Bayes theorem</li><li>▪ Assignment</li></ul>  |



**Grading**

Assignment: 100%

**Policies**

- I expect you to submit your reports on time to receive proper credit/grade.
- Any work submitted must be your own.
- I expect everyone to contribute equally to group assignments
- Attendance in every class is expected. Class participation and discussion are strongly encouraged.
- Late work will not be accepted unless prior arrangements have been made directly with me.
- Cases will be decided on an individual basis.

Good Luck!