UNIVERSITY of NICOSIA

# Course Syllabus

| Course Code | Course Title | ECTS Credits |
|---|---|---|
| COMP-303 | Data Mining | 6 |
| **Prerequisites** | **Department** | **Semester** |
| None | Computer Science | Fall |
| **Type of Course** | **Field** | **Language of Instruction** |
| Elective | Computer Science | English |
| **Level of Course** | **Lecturer** | **Year of Study** |
| 1st Cycle | Dr Ioannis Katakis | 3rd |
| **Mode of Delivery** | **Work Placement** | **Corequisites** |
| Face to Face | N/A | None |

**Course Objectives:**

The main objectives of the course are to:

- The main objectives of the course are to:
- Provide understanding of what is Data Mining
- Determine when and how we can use Data Mining tools
- Introduce the concepts and techniques of pre-processing of the data to be analyzed,
- Introduce the concepts and techniques of statistical methods, Decision Trees, Clustering
- Methods and Association Rules from data

**Learning Outcomes:**

After completion of the course students are expected to be able to:

1. analyze problems and find abstract solutions
2. use the basic data mining concepts and problem solving techniques
3. prepare data to be analyzed
4. apply statistical methods to analyze data
5. use Decision Trees to analyze data
6. use Clustering Methods to analyze data
7. extract Association Rules from data.

**Course Content:**

1. Introduction to Data Mining
    a. What is Data Mining?
    b. What tasks can Data Mining accomplish?
2. Data preprocessing
    a. Data cleaning
    b. Handling missing Data
    c. Data transformation
3. Classification
    a. Classification and Regression Trees
    b. C4.5
    c. Naïve Bayes
    d. Neural Networks
    e. kNN
4. Clustering methods
    a. Hierarchical Clustering Methods
    b. K-Mean clustering
5. Association rules
    a. Support, Confidence, Frequent Itemsets
    b. A priori algorithm

**Learning Activities and Teaching Methods:**

Lectures, Demonstration of Data Mining Tools, Assignments, Projects.

**Assessment Methods:**

Mid-term exam, Project, Assignments/Quizzes, Final Exam.

**Required Textbooks / Readings:**

| Authors | Title | Publisher | Year | ISBN |
|---|---|---|---|---|
| Tan, Steinbach, Kumar | *Introduction to Data Mining* | Pearson | 2005 | 0321321367 |

**Recommended Textbooks / Readings:**

| Authors | Title | Publisher | Year | ISBN |
|---|---|---|---|---|
| Han, Kamber, Pei | Data Mining: Concepts and Techniques, Third Edition | Morgan Kaufmann | 2011 | 9380931913 |
| Witten, Frank, Hall | Data Mining: Practical Machine Learning Tools and Techniques | Morgan Kaufmann | 2011 | 0123748569 |