UNIVERSITY of NICOSIA

Course Syllabus

Course Code	Course Title	ECTS Credits
COMP-446	Web and Social Data Mining	6
Prerequisites	**Department**	**Semester**
COMP-344	Computer Science	Fall
Type of Course	**Field**	**Language of Instruction**
Core	Data Science	English
Level of Course	**Lecturer**	**Year of Study**
1st Cycle	Dr Ioannis Katakis	4th
Mode of Delivery	**Work Placement**	**Corequisites**
Face to Face	N/A	None

Course Objectives:

The main objectives of the course are to:

- Explain the connection of information retrieval with search engines and how they work.
- Present the main elements of Link Analysis and more specifically to introduce algorithms like PageRank and HITS.
- Provide examples of how sentiment analysis can be applied on multiple social and business applications
- Define the main types of recommendation systems (item-based, user-based).
- Demonstrate how graph mining can be applied on social networks and provide examples of problems that can be solved with these techniques.

Learning Outcomes:

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

1. Understand the basic concepts of information retrieval.
2. Apply the HITS and PageRank algorithms on an artificial dataset.
3. Understand the different applications of sentiment analysis and opinion mining.
4. Know how the analysis of user-generated data in web server logs can lead to improving web sites and understanding the users.
5. Explain how recommendation systems work and give examples of real world applications.
6. Apply graph mining algorithms to social networks.

Course Content:

1. Information Retrieval and Web Search
    a. Basic Concepts of Information Retrieval
    b. Relevance Feedback
    c. Evaluation Measures
    d. Text and Web Page Pre Processing
    e. Inverted Index
    f. Latent Semantic Indexing
2. Link Analysis
    a. PageRank
    b. HITS
3. Sentiment Analysis and Opinion Mining
    a. Applications
    b. The problem of Sentiment Analysis
    c. Document Sentiment Classification
    d. Sentence Subjectivity and Sentiment Classification
4. Web Usage Mining
    a. Data Collection and Pre-Processing
    b. Data Modeling
5. Recommendation Systems
    a. Basic Concepts (Utility Matrix, Long Tail, Applications)
    b. Content-Based Recommendations
    c. Collaborative Filtering
    d. Dimensionality Reduction
6. Mining Social-Network Graphs
    a. Social Networks as Graphs
    b. Clustering of Social Network Graphs
    c. Community Detection
    d. Event Detection in Social Networks

Learning Activities and Teaching Methods:

Lectures, Demonstration of Web Mining and Sentiment Analysis Tools, Assignments, Projects.

Assessment Methods

Mid-term exam
Projects
Final Examination

Participation/Homework Assignments/Quizzes

Required Textbooks / Readings:

Title	Authors	Publisher	Year	ISBN
Mining Massive Datasets (2nd Edition)	Jure Leskovec, Anand Rajaraman, Jeff Ullman	Cambridge University Press	2014	978-1107077232 (Free e-book)
Web Data Mining: Exploring Hyperlinks, Contents, and Usage Data	Bing Liu	Springer	2011	978-3642194597

Recommended Textbooks / Readings:

Title	Authors	Publisher	Year	ISBN
Networks, Crowds, and Markets: Reasoning about a Highly Connected World	David Easley, Jon Kleinberg	Cambridge University Press	2010	978-0521195331 (Free e-book)
Sentiment Analysis: Mining Opinions, Sentiments, and Emotions	Bing Liu	Cambridge University Press	2015	978-1107017894