



## Syllabus

### *Text Mining for Business Applications - 55703*

*Last update 20-09-2023*

*HU Credits:* 3

*Responsible Department:* Business Administration

*Academic year:* 0

*Semester:* 1st Semester

*Teaching Languages:* English

*Campus:* Mt. Scopus

*Course/Module Coordinator:* Prof. Ronen Feldman

*Coordinator Email:* [ronen.feldman@huji.ac.il](mailto:ronen.feldman@huji.ac.il)

*Coordinator Office Hours:* Monday 2pm-3pm

*Teaching Staff:*  
Prof Ronen Feldman

*Course/Module description:*

*The course provides an overview of the main techniques and applications of the*

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text-mining field. Main topics are information categorization, information extraction, building crawlers for data gathering and sentiment analysis. There is a big emphasis on large language models and generative AI.

Course/Module aims:

The objective of the course is to provide methods for text-mining and experiment with building systems for analyzing large collections of documents. The course focuses on different techniques, algorithms for realizing these techniques and applications of the techniques in the business world.

Learning outcomes - On successful completion of this module, students should be able to:

Design and build a fundamental text mining system for analyzing large collections of documents. Students will be able to apply various methods for information categorization, information extraction, building crawlers for data gathering and sentiment analysis.

We will learn how to use R for building Text Mining Systems. We will use Large Language models and utilize them for innovative analysis of large collections of documents.

Attendance requirements(%):

70%

Teaching arrangement and method of instruction: Frontal lecture of the material. Students' lectures on using text-mining techniques for solving a business problem. Execution of applied research in teams of 2-3 students.

Course/Module Content:

- Introduction to Text Mining
- a. Architecture of Text Mining Systems
- 2. Term Extraction
- 3. Text Categorization
  - a. RIPPER
  - b. Naive Bayes
  - c. Sleeping Experts for Phrases
  - d. SVM
  - e. KNN
  - f. Online Methods
  - g. Committees
  - h. Begging and Boosting

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4. Information Extraction
    - a. General Architecture
    - b. HMM
    - c. Knowledge Based Systems
    - d. Boot Strapping
    - e. Unsupervised relation Extraction
  5. Analytics
    - a. Maximal Association Rules
    - b. Trend Analysis
    - c. Distribution Analysis
    - d. Comparing Profiles
  6. Link Analysis
    - a. Pajek
  7. Sentiment Analysis
    - a. Document Level Sentiment Analysis
    - b. Sentence level Sentiment Analysis
    - c. Aspect based Sentiment Analysis
    - d. Comparative Sentiment Analysis
    - e. Sentiment Analysis Applications
  8. Visualizations
    - a. Circle Graphs
    - b. Spring Graphs
    - c. Trend Graphs
  9. Applications
    - a. Content Management
      - i. Classification of documents
      - ii. Automatic organization of internet content
      - iii. Clustering of documents
    - b. Marketing
      - i. Discussion boards analysis
      - ii. Blogs analysis
      - iii. Creation of perceptual maps
    - c. Accounting
      - i. Analysis of SEC filings (10Ks, 10Qs, 8Ks)
      - ii. Automatic Detection of Problematic Issues in company reports
    - d. News Analysis
      - i. Named Entity Extraction
      - ii. Event Detection
      - iii. Social Networks Analysis
      - iv. Trend Analysis
    - e. BioTech
      - i. Relations between genes, proteins, drugs, diseases
      - ii. Monitoring Company Drug Development Activities
    - f. Competitive Intelligence
      - i. Analyzing competitors press releases and web sites
    - g. Anti Terror Applications
      - i. 9/11 analysis

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- ii. Connectivity Analysis
  - iii. Centrality Analysis
  - iv. Blocks Modeling
  - 10. Text Mining Packages
    - a. Stanford NLP tools
    - b. Analyst Notebook
    - c. NetMap

Required Reading:

*The Text Mining Handbook: Advanced Approaches in Analyzing Unstructured Data (Hardcover) by Ronen Feldman and James Sanger, Cambridge University Press*

*The Handbook of Data Mining (N. Ye, ed.). Lawrence-Erlbaum Associates.*

*Handbook of Data Mining and Knowledge Discovery Edited by WILLI KLÖSGEN, Fraunhofer Institute for Autonomous Intelligent Systems, Sankt Augustin, Germany, and the late JAN M. ZYTKOW*

*KDD-2000-2014 Conference on Knowledge Discovery and Data Mining, proceedings and CD-ROM, ACM Press*

*George Chang, Marcus J. Healey, James A. M. McHugh, Jason T. L. Wang, Mining the World Wide Web: An Information Search Approach , Kluwer Academic Publishers, 2001, ISBN 0-7923-7349-9*

*R. Kohavi, M. Spiliopoulou, J. Srivastava, editors, WEBKDD'2000 Web Mining for E-Commerce -- Challenges and Opportunities, KDD-2000 workshop proceedings, August 2000, Boston, MA*

*R Feldman Techniques and applications for sentiment analysis Communications of the ACM 56 (4), 82-89*

*B Rozenfeld, R Feldman Self-supervised relation extraction from the Web Knowledge and Information Systems 17 (1), 17-33*

*O Netzer, R Feldman, J Goldenberg, M Fresko Mine your own business: Market-structure surveillance through text mining Marketing Science 31 (3), 521-543*

Additional Reading Material:

Grading Scheme:

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*Essay / Project / Final Assignment / Home Exam / Referat 70 %*  
*Submission assignments during the semester: Exercises / Essays / Audits / Reports*  
*/ Forum / Simulation / others 10 %*  
*Presentation / Poster Presentation / Lecture 20 %*

*Additional information:*