
Academic Year: (2023 / 2024)**Review date: 15-07-2023**

Department assigned to the subject: Computer Science and Engineering Department**Coordinating teacher: GENOVA FUSTER, GONZALO****Type: Compulsory ECTS Credits : 3.0****Year : 1 Semester : 2**

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Data Programming (19138)

OBJECTIVES

- Knowledge of the general principles of API design and operation, as well as the most common information exchange formats.
- Ability to identify and access online APIs to download social observational data.
- Ability to compile structured databases from unstructured sources.

DESCRIPTION OF CONTENTS: PROGRAMME

1. An introduction to Web Scraping
 - What is Web Scraping?
 - Types of Web Scraping
 - Data formats: XML and HTML
 - Practical access to XML and HTML
 - Automation for Web Scraping programs
 - Selenium and JavaScript based scraping
 - Ethical issues with Web Scraping
 - Practical exercises
2. Data APIs
 - What is an API
 - Fundamentals of API communication
 - An introduction to the JSON format
 - Create your own API (and share it)
 - REST architecture
 - APIs as a way to share and obtain data (any kind)
 - Automation of API requests
 - Talking with Databases
 - Authentication and ethical access to APIs
 - Practical exercises
3. Automation of Data Acquisition
 - Why do we need automation?
 - Accessing servers
 - Technologies for automating programs
 - Automating cron jobs
 - Logging tasks
 - Practical exercises

LEARNING ACTIVITIES AND METHODOLOGY

Training Activities:

- Theoretical-practical classes
- Tutorials
- Group work
- Individual student work
- Partial and final examinations

Teaching Methods:

- Presentations in the professor's lecture room with computer and audiovisual support, in which the main concepts of the subject are developed and a bibliography is provided to complement the students' learning.
- Critical reading of texts recommended by the subject professor: Press articles, reports, manuals and/or academic articles, either for later discussion in class, or to expand and consolidate knowledge of the subject.
- Resolution of practical cases, problems, etc. raised by the professor, either individually or in a group.
- Presentation and discussion in class, under the moderation of the professor, of topics related to the content of the subject, as well as practical case studies.
- Developing pieces of work and reports, individually or in group.

ASSESSMENT SYSTEM

- Participation in the class (10%)
- Individual or group work done during the course (70%)
- Final exam (20%)

In the extraordinary call, the evaluation system will be as follows:

1) Exam: 100%

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|---|----|
| % end-of-term-examination: | 20 |
| % of continuous assessment (assignments, laboratory, practicals...): | 80 |

BASIC BIBLIOGRAPHY

- Barberá, P. & Steinert-Threlkeld, Z. How to use social media data for political science research. In The SAGE handbook of research methods in political science and international relations (Vol. 2, pp. 404-423). , SAGE Publications Ltd, <https://dx.doi.org/10.4135/9781526486387>, 2020
- Freelon, D. Computational research in the post-API age. , Political Communication, 35(4), 665-668., 2018
- Nyhuis, D. Web data collection: potentials and challenges. In: The SAGE handbook of research methods in political science and international relations (Vol. 2, pp. 387-403). , SAGE Publications Ltd, <https://dx.doi.org/10.4135/9781526486387>, 2020
- Perriam, J., Birkbak, A., & Freeman, A. Digital methods in a post-API environment. , International Journal of Social Research Methodology, 23(3), 277-290., 2020

ADDITIONAL BIBLIOGRAPHY

- Aydin, O. R Web Scraping Quick Start Guide: Techniques and tools to crawl and scrape data from websites., -, 2018
- Munzert, S., Rubba, C., Meißner, P., & Nyhuis, D. Automated data collection with R: A practical guide to web scraping and text mining. , John Wiley & Sons., 2014

BASIC ELECTRONIC RESOURCES

- . Application Programming Interfaces in R: https://sicss.io/2020/materials/day2-digital-trace-data/apis/rmarkdown/Application_Programming_interfaces.html
- . Using APIs to get data: <https://cfss.uchicago.edu/notes/application-program-interface/>
- . Screen scraping with R: https://cbail.github.io/ids704/screenscraping/rmarkdown/Screenscraping_in_R.html