Academic Year 2024-2025
Syllabus
Algorithms, Data and Security
CFU 6
Prof. Valeria Cardellini

Course Description
Nowadays, many organizations produce and/or analyse huge quantities of data, which is a key asset for their strategies. The main objective of this course is to introduce students to the notion of algorithmic intelligence, by providing a basic toolkit of algorithmic and quantitative methods to analyse and extract value from data, in particular Big data. In addition, since IT systems and data are everywhere and Internet of Things devices increasingly surround us, the course introduces basic notions of cybersecurity, cryptocurrencies and Distributed Ledger Technology.

Teaching Method
Lectures will be based on oral presentations. Some kind of analysis will also be presented at the board, and used for open discussions. Some part of every lecture will be dedicated to in-class discussions and interaction between the instructor and students will be strongly encouraged. A software tool for social network analysis and recommendation systems will be used to develop a case study.

Schedule of Topics

Topic 1	Fundamentals in algorithms and data organization
Topic 2	Recommender systems and recommendation algorithms
Topic 3	Social networks
Topic 4	Cybersecurity
Topic 5	Cryptocurrencies and Distributed Ledger Technology (Blockchain and Bitcoin)

Textbook and Materials
Lecture notes and course material, including articles and videos, will be made available throughout the course through the course web site:
https://economia.uniroma2.it/ba/globalgovernance/corso/1282/.

Assessment
There will be a midterm and a final, plus a presentation using a software tool for network analysis. Midterm and final will be 85% of the final grade, the presentation will be 15% of the final grade, and both attending and non-attending students are required to do the presentation.
Regarding the evaluation of the written part (85%, midterm + final) the following cases apply:
- Attending students who pass the midterm exam: 16/30 is considered a pass for the midterm, and their final grade of the written part will be the average between the final exam and the midterm exam and should be at least equal to 18/30.
- Attending students who fail the midterm exam: Students who fail the midterm may attempt their exam again on the first round of the exam session. In this case, they relinquish their possibility to do the exam in the second round. This final exam counting for 85% of the grade will be written and will relate to the entire programme.
- Non attending students who pass the midterm exam: there will be an additional written question in the final exam.
- Non attending students who fail the midterm exam: there will be an additional question in the written exam.

Office hours
By appointment: cardellini@ing.uniroma2.it

E-mail and office phone number
cardellini@ing.uniroma2.it
Tel: + 39 06 7259 7388

NOTE: If you are an **Erasmus or a non Global Governance student** who would like to attend one or more courses in the Global Governance programme, please be aware that, **before enrolling in the course**, you should have read the code of conduct and the procedural rules characterizing our programme. We assume that, if you enrol in the course, **you have read and accepted all Global Governance values and rules**. Notice that attendance is expected from the very first lesson and you need to attend at least 80% of the course to be considered an attending student.

Description of the methods and criteria for testing learning

The examination assesses the student's overall preparation, ability to integrate the knowledge of the different parts of the program, consequentiality of reasoning, analytical ability and clarity of presentation, in accordance with the Dublin descriptors (1. knowledge and understanding; 2. applying knowledge and understanding; 3. making judgements; 4. learning skills; 5. communication skills).

The examination will be graded according to the following criteria:

Unsuitable: important deficiencies and/or inaccuracies in the knowledge and understanding of the topics; the topics are exposed in an incoherent manner and with inappropriate language.

18-20: barely sufficient knowledge and understanding of most of the topics, with some missing items; sufficient capacity for analysis; the topics are sometimes exposed in an inconsistent manner and with inappropriate/technical language;

21-23: basic knowledge and understanding of most of the topics; ability to analyze and synthesize correctly with sufficiently coherent logical argumentation, with possibly some inaccuracy in the technical language.

24-26: good knowledge and understanding of most of the topics; good analytical and synthetic skills with rigorously expressed arguments, though with possibly a few inaccuracies in the technical language.

27-29: complete knowledge and understanding of the topics; good capacity for analysis and synthesis. Arguments presented in a rigorous manner and with appropriate/technical language, with only minor inaccuracies.

30-30L: very good level of knowledge and thorough understanding of topics. Excellent analytical and synthetic skills and independent judgement. Arguments expressed in an original manner and in appropriate technical language.