uc3m | Universidad Carlos III de Madrid

Mathematics for data analysis

Academic Year: (2021 / 2022)   **Review date: 02-07-2021**

Department assigned to the subject: Mathematics Department

Coordinating teacher: RASCON DIAZ, CARLOS

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Proficiency in high school mathematics

OBJECTIVES

While there are many applied mathematics techniques and concepts that are useful (and used) in the Big Data analysis context, this course focus on the basics of those based on linear algebra, as it underlies many of the most importants applications and algorithms. Thus, the course is intended to understand the mathematical ideas behind those applications and algorithms (usually implemented in black-box software) so practitioners have a deeper knowledge of the results arising from them, allowing for a better interpretation.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Linear Systems
2. Vectors
3. Matrices
4. Diagonalization
5. Orthogonality
6. Symmetric Matrices

LEARNING ACTIVITIES AND METHODOLOGY

This course is in Flipped-Classroom format:
- The students must visualize some videos before attending the class
- In the class, there'll be a review of the theoretical concepts of the videos, and some problems will be solved
- The students must solve extra problems as homework

Tutorials are available

ASSESSMENT SYSTEM

Weekly quizzes

Final Exam

% end-of-term-examination:	60
% of continuous assessment (assigments, laboratory, practicals…):	40

BASIC BIBLIOGRAPHY

- David C. Lay, Steven R. Lay, Judi J. McDonald Linear Algebra and Its Applications, Pearson; 5 edition, 2016

ADDITIONAL BIBLIOGRAPHY

- W. Keith Nicholson Linear Algebra with Applications, McGraw-Hill, 6th edition, 2009

BASIC ELECTRONIC RESOURCES

- Marc Peter Deisenroth, A Aldo Faisal, and Cheng Soon Ong . Mathematics for Machine Learning: https://mml-book.github.io/