uc3m | Universidad Carlos III de Madrid

Stochastic Dynamical Systems

Academic Year: (2023 / 2024) **Review date: 27-04-2023**

Department assigned to the subject: Statistics Department

Coordinating teacher: MEILAN VILA, ANDREA

Type: Electives ECTS Credits : 6.0

Year : 4 Semester :

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Probability and Data Analysis

DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction to Stochastic Processes
2. Discrete Markov Chains
3. Continuous time Markov Chains
4. Renewal Processes
5. Queuing theory
6. Random Graphs
7. Case studies:

Monte Carlo Algorithm, PageRank Algorithm, Call centers, Social networks.

LEARNING ACTIVITIES AND METHODOLOGY

Theory (4 ECTS). Theory classes with additional material available on the Web.
Practical classes (2 ECTS) Problem solving classes. Problem based learning classes.

ASSESSMENT SYSTEM

Final exam (60% of the final grade). Partial exams, problem lessons and homeworks (40% of the final grade).

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

BASIC BIBLIOGRAPHY

- R. Durrett Essentials of stochastic processes, Springer, 2012 (2nd ed.)

ADDITIONAL BIBLIOGRAPHY

- S.M. Ross Stochastic Processes, John Wiley & Sons, inc., 1996 (2nd. ed.)

BASIC ELECTRONIC RESOURCES

- R. Durrett . Essentials of Stochastic Processes: http://www.math.duke.edu/~rtd/EOSP/EOSP2E.pdf