

Tárgytematika / Course Description

Stochastic Processes

GKNM_MSTA024**Tárgyfelelős neve /****Teacher's name:** dr. Harmati István Árpád**Félév / Semester:** 2025/26/1**Beszámolási forma /****Assesment:** Vizsga**Tárgy heti óraszám /****Teaching hours(week):** 2/2/0**Tárgy féléves óraszám /****Teaching hours(sem.):**

OKTATÁS CÉLJA / AIM OF THE COURSE

The main of the course is to give a gentle insight into the most basic stochastic processes. Thus, developing and strengthening the stochastic, probabilistic thinking of the students.

TANTÁRGY TARTALMA / DESCRIPTION

Planned course schedule (the proper schedule depends on the background of the students):

week 1: Probability review I

week 2: Probability review II

week 3: Examples of stochastic processes.

week 4: Introduction to Markov chains. Transition matrix, transition diagram.

week 5: Markov chains: long-term behavior. Steady-state distribution.

week 6: Classification of states. Communication classes. Periodicity.

week 7: Return time. Pagerank.

week 8: Markov chains with infinite states.

week 9: Bernoulli process. Poisson process

week 10: Introduction to queueing systems.

week 11: Little formula. M/M/1

week 12: M/M/ ∞ . M/M/k. M/M/k/n

week 13: Auto- and cross-correlation. Stationary processes.

week 14: Summary, overview

SZÁMONKÉRÉSI ÉS ÉRTÉKELÉSI RENDSZERE / ASSESMENT'S METHOD

Students may write (not obligatory) two midterm tests (weeks 8 and 14) and may get an offered grade based on the result. In other cases, the students have to write an exam.

Written exam grades vs. percentage:

0-49: 1 (fail)

50-59: 2 (pass, satisfactory)

60-74: 3 (fair, average)

75-84: 4 (good)

85-100: 5 (excellent)

KÖTELEZŐ IRODALOM / OBLIGATORY MATERIAL

Alberto Leon-Garcia: Probability, Statistic and Random Processes for Electrical Engineering

AJÁNLOTT IRODALOM / RECOMMENDED MATERIAL