

# Course syllabus

## Markov processes and martingales

### BMETE95MM07

**Instructor:** Simon Károly

**Semester:** 2024/25/2;

**Language:** English;

**Course attendance:** Students must participate in at least 70% of the classes.

**Homeworks:** Homework exercises will regularly be assigned on the website of the course. Solving the homework exercises is considered an important part of the completion of the course. Homework exercises must be submitted and will be graded. For any of the 10 series of homework exercises students can get 0,1 or 2 points. Those who complete at least  $2/3$  of a series get 2 points. Those who complete between  $1/3$  and  $2/3$  get 1 point, and those who complete less than  $1/3$  of a series of homework exercises get 0 points. So, those students who complete at least  $2/3$  of each of the homework assignments get 20 points altogether.

**Midterm tests:** There are two midterm tests during the semester. The questions are exercises similar to those presented in class or given as homeworks. The maximal number of points at both midterm tests is 15.

**Grading policy:** Minimal requirements for completing the course are the following:

- minimum 8 points from submitted homework assignments **and**
- minimum 6 points from each midterm test.

Those who meet these requirements get a signature and can proceed to the exam. The exam consists of two parts: theoretical part with questions like definitions, theorems and proofs; exercise part with exercises similar to some homework exercises. The maximal number of points at the exam is 50. The total number of points is a score between 0 and 100.

**Grading scale:**

0–39%	fail (1)
40–54%	pass (2)
55–69%	satisfactory (3)
70–84%	good (4)
85–100%	excellent (5)

**Midterms:**

- 1st midterm 19th March at 08:15 in lecture room H 46,
- 2nd midterm 14th May at 08:15 in lecture room H 46.

**Topics:**

- Martingales
- Markov chains
- Renewal processes
- Point processes
- Discrete state Markov processes

**Suggested literature**

- R. Durrett: Probability: Theory and Examples, 4th edition, Cambridge University Press, 2010
- D. Williams: Probability with Martingales, Cambridge University Press, 1991

**Further information:** Via e-mail at [simonk@math.bme.hu](mailto:simonk@math.bme.hu).