MATH-332 **Stochastic processes**

Mountford Thomas

Cursus	Sem.	Type
Mathematics	BA6	Opt.

Language of teaching	English
Credits	5
Session	Summer
Semester	Spring
Exam	Written
Workload	150h
Weeks	14
Hours	**4 weekly**
Courses	2 weekly
Exercises	2 weekly
Number of positions	

Summary

The course follows the text of Norris and the polycopie (which will be distributed chapter by chapter).

Content

We will follow the book of Norris beginning with a recap of basic probability. Then we pass to the definition of Markov chains and the definition of irreducible. We analyze notions of recurrence and transcience, particularly for irreducible chains. We then define positive recurrence and stationary distributions before proving the convergence theorem for aperiodic positive recurrent markov chains. The last two topics are continuous times Markov Chains and renewal theorms.

Keywords

Stationary distributions. Irreducibility. Aperiodicity. Communicating classes. Transcience and recurrance. Transition matrices. Operators.

Learning Prerequisites

Required courses

Second year probability.

Learning Outcomes

By the end of the course, the student must be able to:

- Compute stationary distributions
- Classify communicating classes
- Solve hitting probabilities
- Use the renewal theorem
- Check irreducibility

Transversal skills

- Demonstrate the capacity for critical thinking

Teaching methods

Lectures followed by exercise sessions

Assessment methods

The greater part of the note will be determined by the final (written) exam. There will also be small contribution by a "midterm" exam and by exercises.

Supervision

Office hours	No
Assistants	No

Resources

Bibliography

Markov Chains by J. Norris is recommended but not obligatory.

Ressources en bibliothèque

- Markov Chains / Norris

Notes/Handbook

Notes will be made available