Course title	**Stochastic process II**
Volume *(number of credit points)*	4
Volume *(number of contact hours)*	64
Number of lectures	48
Number of seminars, practical and laboratory works	16
Course level: 1-4 – bachelor; 5-6 – master; 7 – doctoral; T – further education	6
Prerequisites	Probability theory. Stochastic process
Science field, science sub-field	Mathematic
Equivalent course	

COURSE DESIGNER(S)

Name	*Surname*	*Personal ID No*
Viktorija	Carkova	200540-10107

COURSE ABSTRACT

The aim of this course is to acquaint the mathematical specialty students with contemporary approach to stochastic processes modeling, and to describe the general principles of stochastic processes and their classification into different types, to explain what is meant by the Markov property in the context of a stochastic process. Most detail the Poisson process and their applications to queuing theory are studied. The course places high emphasis on stochastic Ito integral with application to Gaussian stationary processes and their linear filtration p[problems.

RESULTS

On completion of the course the students should be able to state the essential features of a continuous time Markov process model, to explain what is meant by the Markov property in the context of a stochastic process; to derive and analyze the Kolmogorov equations for a Markov process, to define a Poisson process, derive the distribution of the number of events in a given time interval, derive the distribution of inter-event times, and apply these results to queuing system theory; to apply the stochastic Ito integral to Gaussian stationary processes and their linear filtration p[problems.

REQUIREMENTS FOR AWARDING CREDIT POINTS

Seminars – 25%, Exam 75%

COURSE PLAN

No.	*Topic*	*Planned amount in hours*
1.	**Definition of the stochastic process**	**4**
2.	**Process with independent increments**	**4**
3.	**Brownian Motions process**	**4**

4.	**Irregularity properties**	**4**
5.	**The Poisson process**	**4**
6.	**Sufficient conditions for Poisson properties**	**4**
7.	**Statistic modeling of the Poisson process**	**4**
8.	**Markov process with discrete state space**	**4**
9.	**Queuing theory**	**4**
10.	**Information and entropy.**	**4**
11.	**Stationary stochastic processes**	**4**
12.	**Stochastic Ito integral**	**6**
13.	**Spectral expression of Gaussian stationary process**	**4**
14.	**Transformation of Gaussian stationary process by a linear system.**	**4**
15.	**Filtration and forecasting of Gaussian stationary process**	**6**

LITERATURE

Basic textbooks

1.	**V.Carkova, D.Kalniņa. Gadījuma procesi. R:LU, 1981**
2.	**A. Borovkovs. Varbūtību teorija.M:Nauka,1986 (kriev.)**

Further reading

1.	**V. Carkova. Markova ķedes. R:LU,2001**
2.	**.Feller. Introduction to Probability Theory and its Application.Vol.I,II. NY: John Wiley&Sons Inc,1957**
3.	**S.Ross. Introduction to Probability Models. NY: academic Press Inc.,1985**
4.	**J. Rozanov. Gadījuma procesi. M: Fizmat.,1987. (kriev)**

Periodicals, internet resources and other sources

1.	**http://www.winlab.rutgers.edu/~crose/545_html/stochastic2/node1.html**
2.	**http://en.wikipedia.org/wiki/Stochastic_process**
3.	**http://gams.nist.gov/serve.cgi/Class/M/**