Course title	Supplementary chapter of mathematical statistics. Testing statistical hypotheses
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	5
Prerequisites	Probability theory. Mathematical statistics.
Science field, science sub-field	Mathematics
Equivalent course	-

COURSE DESIGNER(S)

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

COURSE ABSTRACT

The aim of this course is to provide grounding for mathematical specialty students in the aspects of the main methods and results of statistical decision making based on statement and testing of statistical hypotheses that are of relevance to practical work. The statement starts with formal definitions of the risk function, decision rule, randomization procedure, the admissible test, test power and size, the Bayes approach, and the fundamental Neyman-Pearson lemma. The high emphasis places on the methods of construction the most powerful tests for one-parametrical density families and for linear hypothesis testing.

RESULTS

On completion of the course the students should be able to perform the statistical analysis of uncertainty, to formulate and to test the statistical hypotheses for one-parametrical density families with monotone likelihood ratio, to make good use the computer mathematical technology for statistical decision making.

REQUIREMENTS FOR AWARDING CREDIT POINTS

Practical work – 25%, exam – 75%

COURSE PLAN

No.	*Topic*	*Planned amount in hours*
1.	**Fundamentals of the mathematical statistics**	**4**
2.	**Criteria**	**6**
3.	**Admissible criteria**	**4**
4.	**Neyman-Pearson lemma**	**8**
5.	**Hypothesis rearrangement and inverse tests**	**4**
6.	**Randomization**	**4**

7.	**Baysian procedure**	**6**
8.	**Minimax strategy**	**6**
9.	**One-parametrical class with monotone likelihood ratio**	**6**
10.	**One-sided hypotheses**	**6**
11.	**Two-sided hypotheses**	**6**
12.	**The simplest hypotheses on parameters of normal samples.**	**4**

Basic textbooks

1.	**E.I.Lehmann. Testing Statistical Hypotheses.** NY:Jonh Weley, 1959
2.	**J.Carkovs. Alternatīvā statistiskā metode.** R.:RTU, 1984
3.	**J.Carkovs. Vienkāršas hipotēzes par normālā sadalījuma parametriem.** R.:RTU,1986.

Further reading

1.	**D.R.Cox and D.V.Hinkley. Teoretical Statistics.** London: Chapman & Hall, 1994
2.	**V.Carkova. Matemātiskā statistika.** R. LU,1979

Periodicals, internet resources and other sources

1.	**http://www.itl.nist.gov/div898/handbook/index.htm**
2.	**http://www.minitab.com/training/courses**
3.	**http://www.statsoft.com/**