UNIVERSITY OF ECONOMICS - VARNA

FACULTY OF INFORMATICS

DEPARTMENT „STATISTICS AND APPLIED MATHEMATICS“

ACCEPTED BY:
Rector:
(Prof. Dr. Plamen Iliev)

SYLLABUS

SUBJECT: “APPLIED MATHEMATICS”;

PROGRAMME: „Accounting“; BACHELOR`S DEGREE

YEAR OF STUDY: 1; SEMESTER: 1;

TOTAL STUDENT WORKLOAD: 270 h.; incl. curricular 75 h.

CREDITS: 9

DISTRIBUTION OF WORKLOAD ACCORDING TO THE CURRICULUM

TYPE OF STUDY HOURSE	**WORKLOAD, h.**	**TEACHING HOURS PER WEEK, h**
CURRICULAR: incl. • LECTURES • SEMINARS (lab. exercises)	 30 45	 2 3
EXTRACURRICULAR	195	-

Prepared by:

1. ……..…..
(Assoc. Prof. Dr. Rosen Nikolaev)

2. ……..…
(Chief Assist. Prof. Dr. Radan Miryanov)

Head of department: …….
"Statistics and Applied Mathematics" (Assoc. Prof. Dr. Rosen Nikolaev)

I. ANNOTATION

The main aim of the subject „Applied Mathematics" is to generate and cultivate in students skills and erudition for working with all the fundamental mathematical terms and to apply them in solving basic economical problems, inspired from practice.

In the present program a stress is put on those topics from the fundamental mathematical chapters, which concern directly the specialized economical subjects. Basic elements of Linear Algebra and Analytical Geometry are thoroughly considered as well as their applications in economics. Basic subtopics of Financial Mathematics are studied, concerning most of all interests, discounts and annuities. The basic elements of one variable and multivariable functions are observed, putting a stress on those examples which are usually involved in mathematical models of economical processes. Some Combinatorics and Probability topics are also examined, as they concern random processes, often used in economics and seen in practice.

II. THEMATIC CONTENT

No	TITLE OF UNITS AND SUBTOPICS	NUMBER OF HOURS		
		L	S	L.E.
1. Linear Algebra		**4**	**6**	
1.1	Determinant. Basic Applications			
1.2	Matrix. Rank. Inverse of a Matrix. Matrix Equations			
1.3	Linear System of Equations			
2. Analytical Geometry		**5**	**7**	
2.1	Line Segments. Vectors			
2.2	Equation of a Line. Slope			
2.3	Angles. Perpendicular and Parallel Lines			
2.4	Distance Between Points			
2.5	Plane Curves			
3. Financial Mathematics		**5**	**9**	
3.1	Use of Percentages			
3.2	Simple Interest and Compound Interest			
3.3	Discount.			
3.4	Annuity.			
4. Calculus		**6**	**9**	
4.1	Basic Functions. Curve Sketching			
4.2	Limits. Asymptotes. L'Hospital's Rule			
4.3	Continuous and Discontinuous Functions			
4.4	Differentiation and Derivatives. Application in Economics			
4.5	Local Extrema of $f(x)$. Basic Applications			
4.6	Integrals. Applications. Consumer and Producer Surpluses			
5. Multivariable Functions		**5**	**7**	
5.1	Partial Derivatives			
5.2	Exact Differential. Gradient			
5.3	Local Extrema of $f(x;y)$			
5.4	The Least Squares Method			

6. Combinatorics and Probability		**5**	**7**	
6.1	Enumeration, Combination and Permutation of Sets			
6.2	Probability Axioms			
6.3	Basic Probability Theorems			
6.4	Random Variables			
Total:		**30**	**45**	

III. FORMS OF CONTROL:

No. by row	TYPE AND FORM OF CONTROL	№	extra-curricu-lar, h.
1.	**Midterm control**		
1.1.	Course Project / Term Homework	**1**	**40**
1.2.	Tests	**2**	**60**
	Total midterm control:	**3**	**100**
2.	**Final term control**		
2.1.	Examination (test)	**1**	**95**
	Total final term control:	**1**	**95**
	Total for all types of control:	**4**	**195**

IV. LITERATURE

REQUIRED (BASIC) LITERATURE:

1. **Wainwright**, K. et al. *Fundamental Methods of Mathematical Economics*, McGraw-Hill Education; 4-th edition (October 2004).

2. **Barnett**, Raymond A. et al. *College Mathematics for Business, Economics*, Life Sciences and Social Sciences, Pearson, 2011.

RECOMMENDED (ADDITIONAL) LITERATURE:

1. **Simon**, Carl P. et al. *Mathematics for Economists*, Norton, 1994.