UNIVERSITY OF ECONOMICS - VARNA
MASTER DEGREE STUDIES CENTER
DEPARTMENT „STATISTICS AND APPLIED MATHEMATICS"

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

SYLLABUS

SUBJECT: "FUNDAMENTALS OF MATHEMATICS";

PROGRAMME: "Computer Science"; MASTER`S DEGREE

YEAR OF STUDY: 5 ; SEMESTER: 9 (other fields graduates);

TOTAL STUDENT WORKLOAD: 360 h.; incl. curricular 60 h.

CREDITS: 12

DISTRIBUTION OF WORKLOAD ACCORDING TO THE CURRICULUM

TYPE OF STUDY HOURSE	WORKLOAD, h.	TEACHING HOURS PER WEEK, h
CURRICULAR: incl.		
• LECTURES	30	2
• SEMINARS (tutorials)	30	2
EXTRACURRICULAR	300	-

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. <u>ANNOTATION</u>

The main aim of the subject „Fundamentals of Mathematics" is to generate and cultivate in students skills and erudition for working with all the fundamental mathematical terms and to apply them in IT models, computer graphics and other 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 computer subjects. Basic elements of Linear Algebra and Analytical Geometry are thoroughly considered as well as their applications in computer science. Basic subtopics of Calculus are studied, concerning most of all functions, derivatives and integrals. The basic elements of one variable and multivariable functions are observed, putting a stress on those examples which are usually involved in IT models.

II. <u>THEMATIC CONTENT</u>

No	TITLE OF UNITS AND SUBTOPICS	NUMBER OF HOURS		
		L	S	L.E.
1. Linear Algebra		**8**	**8**	
1.1	Determinant. Basic Applications			
1.2	Matrix. Rank and Operations			
1.3	Inverse of a Matrix. Matrix Equations. Gauss-Jordan Method			
1.4	Linear System of Equations. Methods of Gauss and Cramer			
2. Analytical Geometry		**8**	**8**	
2.1	Co-ordinate systems. Vectors – Basic Operations			
2.2	Equation of a Line. Slope. Intersection Points			
2.3	Lines and Curves in 3D. Planes and Surfaces			
2.4	Changes of Co-ordinate Systems. Affine Transformations			
3. Calculus		**14**	**14**	
3.1	Series and Limits. Convergent Series			
3.2	Functions of One Variable. Limits and Discontinuity			
3.3	Derivative and Differential of a Function. L'Hospital's Rule			
3.4	Examining Functions			
3.5	Multivariable Functions. Partial Derivatives, Applications			
3.6	Local Extreme Points of Multivariable Functions			
3.7	Integrals – Indefinite and Definite. Applications			
Total:		**30**	**30**	

III. FORMS OF CONTROL:

No. by row	TYPE AND FORM OF CONTROL	№	Extracurricular h.
1.	**Midterm control**		
1.1.	Course Project / Term Homework	1	90
1.2.	Tests	2	60
	Total midterm control:	**3**	**150**
2.	**Final term control**		
2.1.	Examination (test)	1	150
	Total final term control:	**1**	**150**
	Total for all types of control:	**4**	**300**

IV. LITERATURE

REQUIRED (BASIC) LITERATURE:
1. James Van Dyke et al. (2012) *Fundamentals of Mathematics*, 10-th edition, Belmont.
2. Gareth J. Janacek et al. (2013) *Mathematics for Computer Scientists,* bookbon.com

RECOMMENDED (ADDITIONAL) LITERATURE:
1. Geoffrey Akst et al. (2009) *Fundamental Mathematics through Applications,* Pearson.