Załącznik nr 2 do Zarządzenia Nr 417/2015

Faculty of Civil and Environmental Engineering						
Study programme:	**Construction and Building Systems Engineering**	Degree level: full-time/part-time programme:	**Bachelor's degree**			
Specialization		Diploma path:				
Module name:	**Mathematics I**					
Module type:	**obligatory**	Semester:	**1**	ECTS	**5**	Module ID: **CBSE1108**
No. of hrs in semester:	L - 30 C - 30 LC- 0 P- 0 SW- 0 S- 0					
Prerequisites:	*Complete with prerequisites or "-"*	"-"				
Aims and objectives:	A civil engineering program provides students with the writing, calculus and mathematics skills used in the field: linear algebra, matrices, determinants, vector analysis, derivatives, integrals, sequences and series. The student learns logical inference. The student acquires the ability to work in a group solving common Math problems.					
Forms of teaching activities:	*lecture, classes*	*Assessment:*	*Evaluation must be relevant to the intended learning outcomes*			
		lecture – written exam, tests; classes – two tests; consultations - presentation and discussion				
Module content:	Introduction to mathematics; complex numbers: field of complex numbers, de Moivre's formula, applications; linear algebra and geometry: matrices, determinants, Gauss elimination and its application in solving of linear equations, vector spaces, metric space, Euclidean space, coordinate systems (Cartesian, polar, spherical, cylindrical), vector analysis (scalar and vector product in coordinates), equations of line & plane, application to analysis of polyhedral objects and in physics (mechanics); differentials calculus of functions of one variable: limit of a sequence and a function, continuity of function, derivative of function, differential functions, Rolle's and Taylor's (Maclaurin's) theorem, extreme of function, convex curve features, point of inflection; integral calculus of functions of one variable: primitive function, indefinite integral, integration by parts and by substitution, integration of rational functions; definite integral; interpretation of definite integrals and geometric and physical applications.					
Teaching methods:	multimedia lectures, training					

Learning outcome	*Specify min. 4, max. 8 learning outcomes in the following order: knowledge – skills – competence. Each learning outcome must be verifiable*	*Reference to the programme learning outcomes*
	Student will be able to:	
LO1	demonstrate mathematical knowledge and skills in the areas of matrices, determinants, vectors and complex numbers,	CBSE_W01
LO2	demonstrate mathematical knowledge and skills in the areas of calculus I (functions, differentation, integration),	CBSE_W01
LO3	demonstrate mathematical knowledge and skills in using of sequences (series) in approximation,	CBSE_W01
LO4	apply mathematical knowledge to solving problems in engineering,	CBSE_W01
LO5	formulate problems in engineering using linear algebra and/or geometry and/or calculus I,	CBSE_W01
LO6	demonstrate improved analytical ability, in particular their skills at problem-solving.	CBSE_W01
No. of learning outcome	Methods of assessing the learning outcome	Type of teaching activities (if more than one) during which the outcome is assessed

LO1	class discussion, test, written exam	L,C	
LO2	class discussion, test, written exam	L,C	
LO3	class discussion, test, written exam	L,C	
LO4	class discussion, test, written exam	L,C	
LO5	class discussion, test, written exam	L,C	
LO6	class discussion, test, written exam	L,C	
Student workload (in hours)	lecture attendance	15*2h=	30
	participation in classes	15*2h=	30
	preparation for classes		60
	participation in student-teacher sessions related to the classes		1
	preparation for and participation in exams/tests		6
		TOTAL:	127
Quantitative indicators	Student workload – activities that require direct teacher participation:30h+30h+1h	61	ECTS 2,5
	Student workload – practical activities: 30h+60h+7h	97	3,5
Basic references:	*[1] Marcel B. Finan: Introductory Notes in Linear Algebra for the Engineers, Arcansas Tech University, Department of Mathematics. [Access: October 2016]* *[2] V.V. Konev: Linear Algebra,Vector Algebra, Analytical Geometry, Tomsk Polytechnic University 2001-2009. http://portal.tpu.ru/SHARED/k/KONVAL/Textbooks/Tab1/Konev-Linear_Algebra_Vector_Algebra_and_Analytical_Geome.pdf [Access: October 2016]*		
Supplementary references:	*[1] Sigurd Angenent: Calculus. Lecture notes. Free Software Foundation, 2006 https://www.math.wisc.edu/~angenent/Free-Lecture-Notes/free221.pdf [Access: October 2016] [2] Heinrich W Brinkmann: Linear algebra and analytic geometry. Addison-Wesley Pub. Co., 1971. [3] P. R. Halmos: Linear Algebra Problem Book. Cambridge: Cambridge University Press, 1995. [4] James Stewart: Essential Calculus. Brucs/Cole Cengage Learning, 2013.*		
Unit:	Department of Geospatial Information Studies and Spatial Economy		
Date of issuing the programme:	01.02.2017	Author of the programme:	Edwin Koźniewski, Assoc. Prof. DSc, PhD

L - lecture C - classes LC - laboratory classes P-project
SW - specialization workshop S - seminar