1. Subject name	**Analitical Methots in System Technique I.**				
2. Subject name in Hungarian	Analitikus módszerek a rendszertechnikában I.				
3. Code	**BMEKOVJD001**	4. Evaluation type	**exam grade**	5. Credits	**4**
6. Weekly contact hours	**2 (0) Lecture**	**0 (0) Practice**	**0 (0) Lab**		
7. Curriculum	**PhD Programme**	8. Role	**Basic course**		
9. Working hours for fulfilling the requirements of the subject					**120**
Contact hours	28	Preparation for seminars	30	Homework	15
Reading written materials	15	Midterm preparation	0	Exam preparation	32
10. Department	**Department of Aeronautics and Naval Architectures**				
11. Responsible lecturer	Dr. Zobory István				
12. Lecturers	Dr. Zobory István				
13. Prerequisites					

14. Description of lectures

Sets. Basic number sets. Numerical sequences and numerical series. Convergency. Defining functions. Description of functions. Multivariate functions. Limit value, continuity and differentiability. Concept of Riemann-integral. Convergency concepts. Important function series: Taylor-series and Fourier-series. Basic numerical methods. Polynomial interpolations. Lagrange-interpolation, Hermite-interpolation and spline-interpolation. The method of least square. Numerical solution to algebraic equations. Method of intervallum-dividing. String-method. Section method. Tangent method. Successive approximation. Numerical integration. The Newton-Cotes procedure. The trapeze-rule. The Simpson-trule. Linear algebra and matrix calculus. Linear space. Linear sub-space. Linear independence. Generator-system. Basis. Scalar product. Ortogonality. Norma.Metric space. Matrices and vectors. Standard basis. Description of the elements of the linear space by using different bases. Homogeneous linear mappings and their matrices. Rang of matrices. Basis-dependence of the matrix of a linear mapping. Matrix product. Determinants. Inverse matrix. Linear set of equations. Condition of solvability based on the rang of the coefficient matrix. The Gaussean algorithm. Improvement of the accuracy. Iterative methods. The accelerating algorithm of Seidel. Treatment of contradictory (principally not solvable) set of equations.

15. Description of practices

16. Description of labortory practices

17. Learning outcomes

A. Knowledge B. Skills

- Students must know comprehensively, interpret in a constructive way and apply in his research activities in an innovative way the following elements of analysis methods: examination procedures of single variate and multivariate functions; procedures for interpolation and numerical integration; methods of linear mapping; operations of matrix algebra; methods of solution to linear system of equations.

C. Attitudes D. Autonomy and Responsibility

- Students must pursue to get knowledge of the new scientific results, the latter are applied with responsibility and initiates new resource activities in new fields of knowledge in an innovative way.

18. Requirements, way to determine a grade (obtain a signature)

Accepted homework sent before the deadline and written exam.

19. Opportunity for repeat/retake and delayed completion

According to the TVSZ.

20. Learning materials

1. Zobory, I.: Analitikus módszerek a rendszertechnikban I. Egyetemi jegyzet. BME Vasúti Járművek és Járműrendszeranalízis Tanszék. Budapest, 2011.
2. Rudin, W.: A matematikai analízis alapjai. Tipotex Kft., Budapest, 2010.

Effective date	27 November 2019	**This Subject Datasheet is valid for**	Inactive courses