1. Subject name	**Analitical Methots in System Technique III.**				
2. Subject name in Hungarian	Analitikus módszerek a rendszertechnikában III.				
3. Code	**BMEKOVJD003**	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	0
Reading written materials	30	Midterm preparation	0	Exam preparation	32
10. Department	**Department of Aeronautics and Naval Architectures**				
11. Responsible lecturer	Dr. Zoller Vilmos				
12. Lecturers	Dr. Zoller Vilmos				
13. Prerequisites	**recommended: BMEKOVJD001 - Analitical Methots in System Technique I.** **recommended: BMEKOVJD002 - Analitical Methots in System Technique II.**				

14. Description of lectures

In the main part linear partial differential equations. First order equations. The solution as an integral-manifold. Homogeneous and non-homogeneous equations. Characteristic curve, characteristic equation. First order partial differential equations. Constant coefficient linear partial differential operator with complex coefficients. The Cauchy-Riemann operator. In the main part linear second order partial differential equations. Classification. Constant coefficient second order partial differential equations. Hyperbolic type equations. The wave operator. Parabolic type equations. Thermal operator. Schrödinger operator. Fourth order operators: Euler-Bernoulli, Rayleigh and Timoshenko beam operators. Elliptic type equations. Initial value and Boundary value problems. The Fourier method. Basic concepts of topology. Generalisation of the metric space, the topologic space. Local convexity. The space of basic functions. Distributions. Direct product. Convolution. Fourier transform of distributions. Basic solutions. Linear differential operator of constant coefficient. First order case. The wave operator. Klein-Gordon equation. Basic solution to the wave-equation. Basic solution for the thermal operator. Basic solution for the Cauchy-Riemann operator. Basic solution for the Laplace operator, connection with the Poisson equation. Basic solution for the Helmholtz operator

15. Description of practices

16. Description of labortory practices

17. Learning outcomes

A. Knowledge B. Skills

- Students must know comprehensively, interpret in a constructive ay and apply in his research activities in an innovative way the following elements of analysis methods: solution methods of partial differential equations; procedures of topology and distribution theory; application methods of Laplace transformation and Fourier operator.

C. Attitudes D. Autonomy and Responsibility

- Students must pursue to get knowledge of the new scientific results, the latter is 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)

Regular participation at the lectures and written exam.

19. Opportunity for repeat/retake and delayed completion

According to the TVSZ.

20. Learning materials

1. Zoller, V.: Analitikus módszerek a rendszertechnikban III. Kézirat. BME Vasúti Járművek és Járműrendszeranalízis Tanszék. Budapest, 2013.
2. Brown, F.T.: Engineering System Dynamics. Taylor & Francis, Boca Raton, London, New-York, 2007

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