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| **Óbudai University**<br>Donát Bánki Faculty of Mechanical and Safety Engineering | | | Institute of Mechatronics and Vehicle Engineering | |
| **Course name and Neptun-code: System Engineering BMERTE3BNE** **Credits*: 4***<br>*Full time, 1st Semester of the Academic year 2024/25* | | | | |
| Faculties in which the subject is taught: **BSc in Mechatronics** | | | | |
| Supervised by: | Prof. Dr. Pokorádi László full professor | Lecturer: | Prof. Dr. Pokorádi László full professor | |
| Prerequisites conditions | Mathematics II. | | | |
| Lessons per week | Theory: - | Classroom practice.: **2** | Labor: **1** | Consultation: |
| Exam type (s,v,f): | **exam** | | | |

**A tananyag**

*Aim:* Development of engineering and problem-solving thinking, presentation of the tools of mathematical modeling required for engineering work, acquisition of basic modeling and systems analysis methods.

**Schedule**

| Week | Topics |
|---|---|
| 1. | Theoretical Background |
| 2. | Parameters & Signals |
| 3. | Dimensions of Parameters |
| 4. | Classification of Systems |
| 5. | Models |
| 6. | Mathematical Modelling I. |
| 7. | Mathematical Modelling II. |
| 8. | Dimensional Analysis |
| 9. | Description of physical processes |
| 10. | Graphs & Networks |
| 11. | Deterministic System's Modelling |
| 12. | Application of Models |
| 13. | Monte-Carlo Simulation |
| 14. | Retake |

**Literatures:**


1. Pokorádi László – Szabolcsi Róbert: Mathematical Models Applied to Investigate Aircraft Systems. Budapest: Mûegyetemi Kiadó, 1999. 146 p. Monographical Booklets in Applied and Computer Mathematics; 12. ISBN:ISSN 1417 278 X.
2. ALBERT-LÁSZLÓ BARABÁSI: Network Science, https://barabasi.com/book/network-science
3. Applied Dimensional Analysis and Modeling, Kindle Edition
4. System Book, http://sysbook.sztaki.hu/bevezeto_en.php
5. Moodle electronic materials