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|--|---|--|------------------------|-------------------------|-----------|
| <b>1. Subject name</b>   | <b>Discrete event systems with traffic applications (PhD)</b>       |  |                        |                         |           |
| <b>2. Subject name in Hungarian</b>  | Diszkrét eseményű rendszerek és közlekedési alkalmazásaik (PhD)     |  |                        |                         |           |
| <b>3. Code</b>   | <b>BMEKOKAD015</b>  | <b>4. Evaluation type</b>                  | <b>exam grade</b>      | <b>5. Credits</b>       | <b>3</b>  |
| <b>6. Weekly contact hours</b>   | <b>2 (0) Lecture</b>  | <b>0 (0) Practice</b>                      | <b>0 (0) Lab</b>       |                         |           |
| <b>7. Curriculum</b>   | <b>PhD Programme</b>  | <b>8. Role</b>                             | <b>Specific course</b> |                         |           |
| <b>9. Working hours for fulfilling the requirements of the subject</b>   |   |  |                        |                         | <b>90</b> |
| <b>Contact hours</b>   | 28  | <b>Preparation for seminars</b>            | 6                      | <b>Homework</b>         | 24        |
| <b>Reading written materials</b>   | 6   | <b>Midterm preparation</b>                 | 16                     | <b>Exam preparation</b> | 10        |
| <b>10. Department</b>  | <b>Department of Control for Transportation and Vehicle Systems</b> |  |                        |                         |           |
| <b>11. Responsible lecturer</b>  | Dr. Hangos Katalin  |  |                        |                         |           |
| <b>12. Lecturers</b>   | Dr. Hangos Katalin  |  |                        |                         |           |
| <b>13. Prerequisites</b>   |   |  |                        |                         |           |
| <b>14. Description of lectures</b>   |   |  |                        |                         |           |
| <p>Basic concepts and techniques for describing discrete-event systems: discrete-event systems theory, Petri nets and automata, qualitative difference equations, rules and rule systems with time-dependent predicates, inference and search, graph-type models, effect graphs</p> <p>Solving discrete-event system models, availability graph. Dynamic analysis of discrete-event systems: constraint, availability analysis, dead ends.</p> <p>Model-based generation and verification of discrete control sequences. Direct and prediction diagnostics based on discrete-event system models.</p> <p>Generalization of discrete-event system models to describe different classes of hybrid systems.</p> |   |  |                        |                         |           |
| <b>15. Description of practices</b>  |   |  |                        |                         |           |
| <b>16. Description of laboratory practices</b>   |   |  |                        |                         |           |
| <b>17. Learning outcomes</b>   |   |  |                        |                         |           |
| A. Knowledge   |   |  |                        |                         |           |
| <ul style="list-style-type: none"> <li>The subject knowledge provides high-level theoretical knowledge to PhD students intending to delve into transport science to solve modeling, dynamic analysis, diagnostic, and control tasks in transport systems that can be described as discrete events</li> </ul>   |   |  |                        |                         |           |
| B. Skills C. Attitudes D. Autonomy and Responsibility  |   |  |                        |                         |           |
| <b>18. Requirements, way to determine a grade (obtain a signature)</b>   |   |  |                        |                         |           |
| An individual task for modeling and dynamic analysis of a simple discrete event transport system. The prerequisite for obtaining the signature and for passing the exam is the complete and timely submission of the individual student assignment. The exam is oral.  |   |  |                        |                         |           |
| <b>19. Opportunity for repeat/retake and delayed completion</b>  |   |  |                        |                         |           |
| <b>20. Learning materials</b>  |   |  |                        |                         |           |
| 1. C. G. Cassandras, S. Lafortune: Introduction to Discrete Event Systems. Springer, 2008.   |   |  |                        |                         |           |
| 2. Lakner R., Hangos K., Gerzson M.: Intelligens irányító rendszerek. Tzpotex Kiadó, Bp. 2011. pp. 1.-87.  |   |  |                        |                         |           |
| <b>Effective date</b>  | 27 November 2019  | <b>This Subject Datasheet is valid for</b> |                        | Inactive courses        |           |