| | | | | |
|---|---|---|---|---|
| **Obuda University**<br>John von Neumann Faculty of Informatics | | | Applied Mathematics Institute | |
| **Name and code: Intelligent Development tools NMXIF1SMNE** **Credits*: 3***<br><br>*2019/20 year II. semester* | | | | |
| | | | | |
| Subject lecturers: Dr Kósi Krisztián | | | | |
| Prerequisites (with code): | | | | |
| Weekly hours: | Lecture: | Seminar.: | Lab. hours: 2 | Consultation: |
| Way of assessment: | | | | |
| **Course description:** | | | | |
| *Goal*: To help the Students understand nonlinear control problems, and help them in obtaining some coding experience in simulating such programs. | | | | |
| *Course description:*<br>In Robotic specialization, the non-linear control is the key. This course shows the fundamental basics of that field from a Computer Science perspective. This course reveals certain significant elements of the ample spectrum of that field, from the theory to actual coding. | | | | |

| **Lecture schedule** | |
|---|---|
| *Education week* | *Topic* |
| 1. | Mathematical background |
| 2. | Mathematical background |
| 3. | Introduction to Julia language, Laplace Transform |
| 4. | First Order Differential Equations |
| 5. | Second Order Differential Equations |
| 6. | Series of Functions |
| 7. | 1st. Midterm |
| 8. | Metric Space, Numerical Methods |
| 9. | Fixed Point Iteration, Modelling and Simulation |
| 10. | Introduction to non-linear robotics, Lyapunov's stability definitions and theorems. |
| 11. | Robust Control, VSSM |
| 12. | Adaptive Control, RFPT |
| 13. | 2nd. Midterm |
| 14. | Retake Midterm |

**Midterm requirements**

| *Education week* | *Topic* |
|---|---|
| 7 | **1st. Midterm** |
| 13 | **2nd. Midterm** |
| 14 | **Retake Midterm** |
| 3,7,14 | **Mathematical background test.** |

2020. 02. 08.

**Final grade calculation methods**

| Achieved result | Grade |
|---|---|
| 88%-100% | excellent (5) |
| 75%-88<% | good (4) |
| 62%-75<% | avrage (3) |
| 50%-62<% | satisfactory (2) |
| 0%-50<% | failed (1) |

The Mathematical background test is about Bachelor level math knowledge, it has to be 50% to pass, and it has three attempts, at 3rd.7th. 14th. weeks. If someone fails it three times, will be denied from the course. If someone absent at seminars more than four times will also denied from the course. If someone did not write both test will be denied from the course. The evaluation mark will be determined on the basis of the results of two midterm tests. The worst midterm can be retaken in the last week.

**Type of exam**

**Type of replacement**

At the last week the worst midterm test can be retaken.

**References**

Mandatory:
Lecture Notes

Recommended:
System and Control Theory - József K. Tar - László Nádai - Imre J. Rudas. TYPOTEX 2012, ISBN 978- 963-279-676-5
Applied Nonlinear Control, Slotine and Li, Prentice-Hall 1991
M. Oberguggenberger, A. Ostermann.: Analysis for Computer Scientists. In: Undergraduate Topics in Computer Science. Springer-Verlag Ltd. London, 2011
Elements of the Theory of Functions and Functional Analysis - A.N. Kolmogorov, S.V. Fomin