| 1. Subject name | **Mechatronics, microcomputers** | | | | |
|---|---|---|---|---|---|
| 2. Subject name in Hungarian | Mechatronika és mikroszámítógépek | | | | |
| 3. Code | **BMEKOKAM604** | 4. Evaluation type | mid-term grade | 5. Credits | **4** |
| 6. Weekly contact hours | **2 (10) Lecture** | **0 (0) Practice** | **2 (11) Lab** | | |
| 7. Curriculum | **Vehicle Engineering MSc (J)** | 8. Role | **Mandatory (mc) at Vehicle Engineering MSc (J)** | | |

| 9. Working hours for fulfilling the requirements of the subject | | | | **120** | |
|---|---|---|---|---|---|
| Contact hours | 56 | Preparation for seminars | 18 | Homework | 4 |
| Reading written materials | 18 | Midterm preparation | 24 | Exam preparation | 0 |

| 10. Department | **Department of Control for Transportation and Vehicle Systems** |
|---|---|
| 11. Responsible lecturer | Dr. Gáspár Péter |
| 12. Lecturers | Lövétei István |
| 13. Prerequisites | |

### 14. Description of lectures

The developement and disciplines of mechatronics. Theoretical structures of automats (controlled and regulated machines). A historical overwiev of the development of computing. Integrated cir ciut technology. Generation of microcontrollers, its main types. Main elements of robot controllers (overwiev). Sensors, actuators. Programming of embedded systems. Tools of the hardware engineering (AutoCad, OrCad, Protel). Simulation softwares (Symula, MatLab). Motor controlling, regulation. Pneumatic machines. Transport application examples (cars platoon on public roads, the 75 Hz train controlling system).

### 15. Description of practices


### 16. Description of labortory practices

Microcontroller - type 8051 - programming by Assembly and C languages. Machine and compiled languages in microcomputer programming. Architectures of microcontrollers, push button and led controlling. Programming of cloks, timers, interrupts and AD converters. Programming of virtual display and Num Pad.

### 17. Learning outcomes

A. Knowledge
- knows the basics of building embedded systems
- knows the basic serial communication techniques
- knows the basic principles of A / D and D / A conversion
- knows basic signal processing algorithms

B. Skills
- capable of programming embedded systems
- is able to design data collection systems

C. Attitudes
- is interested in modern IT solutions

D. Autonomy and Responsibility
- is able to apply the knowledge acquired here to other similar, yet unknown systems

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

2 midterm exams from theory and two individual programming task (one ASM code, one C code). The final grade is the mean of the grades of the four tasks.

### 19. Opportunity for repeat/retake and delayed completion

Both midterm exams can be retried once, both individual tasks can be delayed completed.

### 20. Learning materials

Chew/Sen Gupta: Embedded Programming, Second Edition, 2008, ISBN: 978-0-9800541-0-1, Lecture notes

| Effective date | 10 October 2019 | This Subject Datasheet is valid for | Inactive courses |