COURSE SYLLABUS AND COURSE REQUIREMENTS
ACADEMIC YEAR 2022/23 SEMESTER 2

Course title	*Programming autonomous systems*
Course Code	IVB270ANMI
Hours/Week: le/pr/lab	2/0/2
Credits	4
Degree Programme	Computer science Bsc
Study Mode	*Full-time*
Requirements	Mid-term grade
Teaching Period	4
Prerequisites	Digital logic design 1, Programming 1
Department(s)	Dept. Of Information Technology
Course Director	Dr. Tukora Balázs
Teaching Staff	*Dr. Tukora Balázs*

COURSE DESCRIPTION

A short description of the course (max. 10 sentences).
Neptun: Instruction/Subjects/Subject Details/Basic data/Subject description

In this course the students get practical knowledge in microcontroller programming and creating their hardware environment.

SYLLABUS

Neptun: Instruction/Subjects/Subject Details/Syllabus

1. GOALS AND OBJECTIVES

Goals, student learning outcome.
Neptun: Instruction/Subjects/Subject Details/Syllabus/Goal of Instruction

Getting acquainted with the programming of autonomously working devices.

2. COURSE CONTENT

Neptun: Instruction/Subjects/Subject Details/Syllabus/Subject content

	TOPICS
LECTURE	1. *Hardware basics of circuits with microcontrollers* 2. *Microcontroller hardware and software fundamentals* 3. *Programming microcontrollers with peripherals*
PRACTICE	
LABORATORY PRACTICE	1. *Arduino IDE* 2. *Digital and analog inputs: push buttons, potentiometers etc.* 3. *Outputs: LED, PWM, LCD display* 4. *Sensors: photo resistor, temperature probe etc.*

DETAILED SYLLABUS AND COURSE SCHEDULE

ACADEMIC HOLIDAYS INCLUDED

LECTURE

week	**Topic**	**Compulsory reading; page number (from … to …)**	**Required tasks (assignments, tests, etc.)**	**Completion date, due date**
1.	Introduction, discussion of requirements			
2.	Hardware basics of microcontroller circuits 1 – digital techniques review	[1] page 1-22		
3.	Hardware basics of microcontroller circuits 2 – inputs, outputs	[1] page 23-41		
4.	Hardware basics of microcontroller circuits 2 – powering, interfaces, communication	[1] page 42-62		
5.	Circuit simulation: Tinkercad 1	[2] whole document		
6.	Circuit simulation: Wokwi	[3] whole document		
7.	Test			
8.	Repeat test			
9.	Spring holiday			
10.	Project work announcement			
11.	Submission of project work plans			
12.	Project work consultation			
13.	Project work consultation			
14.	Presentation of project works			
15.	Presentation of project works			

PRACTICE, LABORATORY PRACTICE

week	**Topic**	**Compulsory reading; page number (from … to …)**	**Required tasks (assignments, tests, etc.)**	**Completion date, due date**
1.	-			
2.	Arduino circuits			
3.	Arduino circuits			
4.	Arduino circuits			
5.	Tinkercad simulations			
6.	Tinkercad simulations			
7.	Wokwi simulations			
8.	Wokwi simulations			
9.	Spring holiday			
10.	Project work			
11.	Project work			
12.	Project work			
13.	Project work			
14.	Project work			
15.	Project work			

3. ASSESSMENT AND EVALUATION

(Neptun: Instruction/Subjects/Subject Details/Syllabus/Examination and Evaluation System)

ATTENDANCE

In accordance with the Code of Studies and Examinations of the University of Pécs, Article 45 (2) and Annex 9. (Article 3) a student may be refused a grade or qualification in the given full-time course if the number of class absences exceeds 30% of the contact hours stipulated in the course description.

Method for monitoring attendance *(e.g.: attendance sheet / online test/ register, etc.)*

Attendance sheet on practices

ASSESSMENT

Cells of the appropriate type of requirement is to be filled out (course-units resulting in mid-term grade or examination). Cells of the other type can be deleted.

Course resulting in mid-term grade *(PTE TVSz 40§(3))*

Mid-term assessments, performance evaluation and their ratio in the final grade *(The samples in the table to be deleted.)*

Type	Assessment	Ratio in the final grade
Test	*Max 80 points*	*80%*
Project work	*Max 20 points*	*20%*

The students write a test at the half of the semester (see the detailed schedule) in the subjects that have been discussed during the lectures so far. The maximum score they can obtain is 80 points. 50% (40 points) is needed to pass the test. Anyone who has failed, can improve their score in a repeat test. If none of the test and the repeat test has been passed, the student fails the subject.
In addition the students can optionally work on an individual project according to the instructions of the lecturer. After they have accomplished and presented their work, they can obtain further 20 points depending on the quality of their solution. Thus the students can obtain 100 points during the semester altogether.
The sum of the scores of the test and the individual project work determines the final grade as following:

Grade calculation as a percentage

based on the aggregate performance according to the following table

Course grade	Performance in %
excellent (5)	85 % …
good (4)	70 % ... 85 %
satisfactory (3)	55 % ... 70 %
pass (2)	40 % ... 55 %
fail (1)	below 40 %

The lower limit given at each grade belongs to that grade.

Opportunity and procedure for re-takes (PTE TVSz 47§(4))

The specific regulations for improving grades and resitting tests must be read and applied according to the general Code of Studies and Examinations. E.g.: all tests and assessment tasks can be repeated/improved at least once every semester, and the tests and home assignments can be repeated/improved at least once in the first two weeks of the examination period.

Repeat test to improve the test points and repeated presentation of project work are possible.

4. SPECIFIED LITERATURE

In order of relevance. (In Neptun ES: Instruction/Subject/Subject details/Syllabus/Literature)

COMPULSORY READING AND AVAILABILITY

[1] Dr. Tukora Balázs: Hardware basics – for the subject Programming autonomous systems, electronic lecture notes, PTE, MIK, Dept. of Information Technology, online
[2] https://www.tinkercad.com/circuits
[3] https://docs.wokwi.com/?utm_source=wokwi