COURSE SYLLABUS AND COURSE REQUIREMENTS
ACADEMIC YEAR 2022/2023 SEMESTER 1

Course title	*Robotic systems*
Course Code	IVM193ANMI
Hours/Week: le/pr/lab	2/2/0
Credits	5
Degree Programme	Computer Science Msc English
Study Mode	*full-time*
Requirements	exam
Teaching Period	3
Prerequisites	-
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

Robots never work alone: they are surrounded by different equipment, devices and tools, and are integrated into the IT system of the production. This course will explain the place of robots in manufacturing.

SYLLABUS

Neptun: Instruction/Subjects/Subject Details/Syllabus

1. GOALS AND OBJECTIVES

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

Familiarisation with some of the important application areas of robots, robot integration possibilities, requirements, possibilities and problems in the field of industrial robotics and mobile robotics.

2. COURSE CONTENT

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

	TOPICS
LECTURE	1. *History of robots, industrial robots, basic concepts and their interpretation* 2. *Applications of robots in different industrial sectors* 3. *Types of robots and their applications* 4. *Robot control* 5. *Integration of robots in manufacturing systems* 6. *Robots in discrete production: welding, assembly, material handling, disassembly, etc.* 7. *Application and programming of mobile robots.*
PRACTICE **LABORATORY PRACTICE**	1. *Programming robot arms* 2. *ROS Robot Operating System*

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	…		…
2.	Robot types, robot structures, programming methods	[1], lecture notes		
3.	Robots in industry, areas of application	[1], lecture notes		
4.	Robots in industry, areas of application	[1], lecture notes		
5.	Theoretical background of robot control: defining position and orientation	lecture notes		
6.	Spatial transformations	lecture notes		
7.	Transformations in robotics	lecture notes		
8.	Geometry of robot arms, Denavit-Hartenberg convention	lecture notes		
9.	Autumn holiday			
10.	Forward and inverse kinematics	lecture notes		
11.	IK solving methods	lecture notes		
12.	Robot path control	lecture notes		
13.	Robot dynamics	lecture notes		
14.	Mobile robotics: history, basic concepts	lecture notes		
15.	Mobile robotics: navigation	lecture notes		

PRACTICE, LABORATORY PRACTICE

week	**Topic**	**Compulsory reading; page number (from … to …)**	**Required tasks (assignments, tests, etc.)**	**Completion date, due date**
1.	-			
2.	Programming robot arms: introducion			
3.	Programming robot arms: working with ABB robots			
4.	Programming robot arms: movements			
5.	Programming robot arms: offline programming			
6.	Complex robot programming exercise 1			
7.	Complex robot programming exercise 2			
8.	Complex robot programming exercise 3			
9.	autumn holiday			
10.	Programming ROS			
11.	Programming ROS			
12.	Programming ROS			
13.	Case studies: ROS			
14.	Case studies: mobile robotics			
15.	Assignment review			

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

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-unit with final examination

Mid-term assessments, performance evaluation and their weighting as a pre-requisite for taking the final exam

(The samples in the table to be deleted.)

Type	Assessment	*Weighting as a proportion of the pre-requisite for taking the exam*
1. *Assignment to be solved individually*	*0-100%*	*100%*
2.		
3.		
4.		

Requirements for the end-of-semester signature

(Eg.: mid-term assessment of 40%)

Passed test

Re-takes for the end-of-semester signature (PTE TVSz 50§(2))

The specific regulations for grade betterment and re-take must be read and applied according to the general Code of Studies and Examinations. E.g.: all the tests and the records to be submitted can be repeated/improved each 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.

Successful presentation of the assignment.

Type of examination *(written, oral): oral*

The exam is successful if the result is minimum ***40*** ***%.*** *(The minimum cannot exceed 40%.)*

Calculation of the grade *(TVSz 47§ (3))*

The mid-term performance accounts for ***50*** %, the performance at the exam accounts for ***50*** % in the calculation of the final grade.

Calculation of the final grade based on aggregate performance in percentage.

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.

4. SPECIFIED LITERATURE

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

COMPULSORY READING AND AVAILABILITY

[1.] FESTO Introduction to Industrial Robotics, Neptun/Teams
[2.]

RECOMMENDED LITERATURE AND AVAILABILITY