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. *Individual project in the subject of robotics*

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, robot types	[1] chapters 2, 3.4		…
2.	Robot structures, programming methods	[1] chapters 3, 4		
3.	Robots in industry, areas of application	[1] chapter 2.1		
4.	Robots in industry, areas of application	[1] chapters 2.2, 2.3		
5.	Theoretical background of robot control: defining position and orientation	[2] chapter 4		
6.	Spatial transformations, transformations in robotics	[2] chapters 5, 6		
7.	Geometry of robot arms, Denavit-Hartenberg convention	[2] chapter 7.1		
8.	Forward and inverse kinematics	[2] chapter 7.2, 7.3		
9.	Robot path control	[2] chapter 8		
10.	Mobile robotics: history, basic concepts	[3] p. 1-33		
11.	Mobile robotics: navigation	[3] p. 34-57		
12.	Test		Test	
13.	Repeat test		Repeat test	

PRACTICE, LABORATORY PRACTICE

week	Topic	Compulsory reading; page number (from … to …)	Required tasks (assignments, tests, etc.)	Completion date, due date
1.	-			
2.	Discussion of homework assignment – introducing project topics, topic selection			
3.	Consultation			
4.	Consultation			
5.	Consultation			
6.	Consultation			
7.	Consultation			
8.	Consultation			
9.	Consultation			
10.	Consultation			
11.	Consultation			
12.	Consultation			
13.	Presentation of the individual project works			

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%*	*50%*
2. *Test*	*0-100%*	*50%*
3.		
4.		

Requirements for the end-of-semester signature
(Eg.: mid-term assessment of 40%)

Passing the test and giving a satisfactory presentation.

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.

If someone fails the test, they can retake the test one time.

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 grade calculated on the test/assignment results is offered for the students as the final grade of the subject. This grade can be accepted or improved at an oral exam in the exam period. Thus the mid-term performance accounts for ***100*** % OR the performance at the exam accounts for ***100*** % 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, e-book, Neptun/Teams
[2] Dr. Tukora Balázs: Robot control, lecture notes for Robotic systems, PTE, MIK, Neptun/Teams
[3] Dr. Tukora Balázs: Mobile robotics, lecture notes for Robotics 1, PTE, MIK, Neptun/Teams

RECOMMENDED LITERATURE AND AVAILABILITY