



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / SUBJECT SPECIFICATION

Predmet:	Robotika
Subject Title:	Robotics

Študijski program Study programme	Študijska smer Study field	Letnik Year	Semester Semester
Tehnika – področje izobraževanja		2	letni
		ali	
Education in Engineering		3	zimski
		2	Summer
		or	
		3	winter

Univerzitetna koda predmeta / University subject code:

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Labor work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
10	5				75	3

Nosilec predmeta / Lecturer:

Karl Gotlih

Jeziki /

Languages:

Predavanja / Lecture:

Vaje / Tutorial:

Slovenščina / Slovene

Pogoji za opravljanje študijskih obveznosti:

Ni posebnih pogojev

Prerequisites:

No prerequisites

Vsebina:

Predmet Robotika podaja znanja, ki so potrebna pri razumevanju, načrtovanju in konstrukciji elementov robotskih sistemov in robotiziranih tehnoloških sistemov v celoti. Obravnavane bodo osnovne teme, kot so geometrija, kinematika in dinamika sistemov, direktna in inverzna kinematika in dinamika, singularnost, robotski elementi, prijemala, orodja, periferija. V vseh navedenih primerih so ob teoretičnih osnovah podani tudi praktični primeri. Obravnavane so tudi osnove krmilij, načini programiranja, servisiranja ali vzdrževanja.

Content (Syllabus outline):

The subject Robotics gives the knowledge, which is important for understanding, planning and designing of elements of a robotic technological system. Given are basic chapters of geometry, kinematics and dynamics of systems, direct and inverse kinematics and dynamics, singularities; robot elements, grippers, tools, outer devices. Parallel to the theoretical background are presented practical exercises for illustration. Included in the subject are also basics in control theory, programming and maintenance.

Temeljni literatura in viri / Textbooks:

- T. Bajd, A. Kralj: Robotika, ULJ, Fakulteta za elektrotehniko, 1997
- J. Lenarčič, T. Bajd: Robotski mehanizmi, ULJ, Fakulteta za elektrotehniko, 2003
- J. Angeles: Fundamentals of robotic mechanical systems, 2003
- K. Desoyer, I. Troch, P. Kopacek: Industrieroboter und Handhabungsgerate, Oldenbourg 1985
- ISO 8373 2012
- ISO 10218-1 2011
- ISO 10218-2 2011

Cilji:

Namen predmeta je pridobiti znanja iz področja robotov, robotizacije in implementacije le-teh v industrijske in neindustrijske sisteme.

Objectives:

The subject gives the knowledge about robots, robotisation and its implementation in industrial and non-industrial applications.

Predvideni študijski rezultati:

Znanje in razumevanje:

S prejetim znanjem bo študent:

- razumel delovanje robotov, znal osnovno programirati robote v proizvodni celici.

Prenesljive/ključne spretnosti in drugi atributi:

Spretnosti komuniciranja: ustni zagovor laboratorijskih vaj, pisno izražanje pri pisnem izpitu.

Uporaba informacijske tehnologije: uporaba programskih orodij za programiranje robotov.

Reševanje problemov: načrtovanje nalog za robota.

Delo v skupini: skupinsko delo pri laboratorijskih vajah.

Intended learning outcomes:

Knowledge and understanding:

Student with absolved knowledge will:

- understand the robots
- have the knowledge for basic programming of a robot in a production cell.

Transferable/Key Skills and other attributes:

Communication skills: oral lab work defence, manner of expression at written examination.

Use of information technology: use of programming tools for robot programming.

Problem solving: design of robot tasks.

Working in a group: group work at the lab work.

Metode poučevanja in učenja:

- predavanja
- dialog
- praktično delo na vajah

Teaching and learning methods:

- lectures
- dialogue
- practical laboratory work

Načini ocenjevanja:

Način (pisni izpit, ustno izpraševanje, naloge, projekt):

- pisni izpit,
- ustni izpit.

Delež (v %) /
Weight (in %)

50
50

Assessment methods:

Type (examination, oral, coursework, project):

- written examination,
- oral examination.

Materialni pogoji za izvedbo predmeta:

- Predavalnica,
- Laboratorij za robotizacijo

Material conditions for subject realization:

- Classroom
- Laboratory for robotisation

Obveznosti študentov:

Pisni izpit, ustni izpit, domače naloge, projekti:
pisni in ustni izpit.

Student's commitments:

Written examination, oral examination, coursework, proje
Written and oral exam.

Reference nosilca / Lecturer's references:

BREZOVNIK, Simon, GOTLIH, Karl, BALIČ, Jože, BREZOČNIK, Miran. On the design of workspaces of serial mechanisms. V: IFToMM 2011. The 13th World Congress in Mechanism and Machine Science, June 19 -23, Guanajuato, Mexico Universidad de Guanajuato (UCEA), Mexico. IFToMM, cop. 2011, 8 str.
GOTLIH, Karl, BREZOVNIK, Simon, BALIČ, Jože, BREZOČNIK, Miran. A reverse engineering technique and

its possibilities in robotics. V: IFToMM 2011. The 13th World Congress in Mechanism and Machine Science, June 19 -23, Guanajuato, Mexico Universidad de Guanajuato (UCEA), Mexico. IFToMM, cop. 2011, 6 str.

GOTLIH, Karl, KOVAČ, Denis, VUHERER, Tomaž, BREZOVNIK, Simon, BREZOČNIK, Miran, ZVER, Andrejka. Velocity anisotropy of an industrial robot. Robot. comput.-integr. manuf.. [Print ed.], Feb. 2011, vol. 27, iss. 1, str. 205-211, doi: 10.1016/j.rcim.2010.07.010. [COBISS.SI-ID 14359318], [JCR, WoS do 6. 2. 2011

RAJH, Matej, GLODEŽ, Srečko, FLAŠKER, Jože, GOTLIH, Karl, KOSTANJEVEC, Tomaž. Design and analysis of an fMRI compatible haptic robot. Robot. comput.-integr. manuf.. [Print ed.], Apr. 2011, vol. 27, iss. 2, str. 267-275, doi: 10.1016/j.rcim.2010.06.007.