Fakulteta za industrijski inženiring
Faculty of Industrial Engineering

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	Mikroprocesorski sistemi v vozilih
Course title:	Microprocessor systems in vehicles

Študijski program Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Inženiring in avtomobilska industrija	Program nima smeri	drugi	prvi
Engineering and Automotive Industry	The program has no study fields	second	first

Vrsta predmeta / Course type Izbirni/optional

Univerzitetna koda predmeta / University course code: **MAG_21018**

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
45	**-**	**45**		**-**	**150**	**8**

Nosilec predmeta / Lecturer: **dr. Mario Žganec**

Jeziki / Languages:	
Predavanja / Lectures:	Slovenski /slovenian
Vaje / Tutorial:	Slovenski / slovenian

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

- vpis v drugi letnik študija
- osnovna znanja iz računalništva in elektrotehnike

Prerequisites:

- Enrolment in the second year of study
- Basic knowledge of computer science and electrical engineering

Vsebina:

Predavanja:

- Zgodovina mikroprocesorskih sistemov
- Struktura mikroračunalnikov
- Centralne procesne enote
- Pomnilniki
- Vhodno-izhodne enote
- Komunikacijski vmesniki
- Programiranje in programski jeziki
- Operacijski sistemi

Content (Syllabus outline):

Lectures:

- History of microprocessor systems
- Structure of microcomputers
- CPUs
- Memory
- Input-output units
- Communication interfaces
- Programming and programming languages

– Delovanje v realnem času – Načrtovanje mikroprocesorskih sistemov *Vaje in samostojno delo:* Poglobitev teoretičnih znanj iz mikroprocesorskih sistemov na praktičnih primerih	– Operating systems – Operation in real time – Design of microprocessor systems *Exercises and independent work:* Application of theoretical knowledge of microprocessor systems on practical examples

Temeljni literatura in viri / Readings:

- Peter Marwedel, Embedded System Design, Springer 2006, ISBN-10 1-4020-7690-8 (HB) (http://dlia.ir/Scientific/e_book/Technology/Electrical_Nuclear_Engine_Electronics/TK_7885_7895_Computer_(Engineering_Hardware)_/023590.pdf)
- Tom Denton, Automobile Electrical and Electronic Systems, Elsevier 2004, ISBN 0 7506 62190 (http://rsconnect.com/academy/resources/fact-sheets/automobile%20electrical%20electronic%20systems%20urgent.pdf).
- E. A. Lee and S. A. Seshia, Introduction to Embedded Systems - A Cyber-Physical Systems Approach, Second Edition, LeeSeshia.org, 2015, ISBN 978-1-312-42740-2. (http://leeseshia.org/releases/LeeSeshia_DigitalV2_0.pdf)

Priporočljiva literatura / Recommended Textbooks

- J Puhan, T Tuma, Uvod v mikrokrmilniške sisteme – zgradba in programiranje, Založba FE in FRI, Ljubljana 2011, (http://fides.fe.uni-lj.si/~jernejo/files/uvod_v_mikrokrmilniske_sisteme_2_dopolnjena_izdaja.pdf)
- Embedded, Everywhere: A Research Agenda for Networked Systems of Embedded Computers," National Research Council. http://www.nap.edu/books/0309075688/html/
- Embedded.com: http://www.embedded.com/
- EE Times Magazine: http://www.eet.com/
- Bruce Land @ Cornell University ECE 4760 Designing with Microcontrollers: http://people.ece.cornell.edu/land/courses/ece4760/
- Windows simulation and debug program for the Motorola 68HC11 microcontroller - THRSim11: http://www.hc11.demon.nl/thrsim11/thrsim11.htm

Cilji in kompetence:	**Objectives and competences:**
Cilji Predmet je namenjen pridobitvi teoretičnih in praktičnih znanj iz mikroprocesorskih sistemov: arhitekture in načina delovanja mikroprocesorskih sistemov, programiranja mikroprocesorskih sistemov in uporabe pri avtomatizaciji merilnih postopkov v tehniki ter nadzornih in krmilnih procesih. ***Kompetence*** *Učna enota prispeva k razvoju naslednjih splošnih in specifičnih kompetenc:*	***Objectives*** The course provides acquisition of theoretical and practical knowledge about architecture and operation of microprocessor systems, microprocessor programming in assembly language and use of microprocessors in automation, measurement and control processes. ***Competences***

– sposobnost uporabe pridobljenega teoretičnega znanja v praksi, – sposobnost načrtovanja mikroprocesorskih sistemov, – sposobnost programiranja mikroprocesorjev v zbirnem jeziku, – usposobljenost za implementacijo mikroprocesorskih sistemov pri avtomatizaciji merilnih in nadzornih postopkov ter avtomatskemu krmiljenju procesov.	*Learning Unit contributes to the development of generic and specific competences:* – ability to apply theoretical knowledge in practice, – ability to design microprocessor systems, – ability to program microprocessors in assembly language, – ability to implement microprocessor systems in automation, measurement and control processes.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: *Študent/študentka:* – pozna zgradbo in način delovanja mikroprocesorjev – obvlada osnove programiranja mikroprocesorjev – pozna komponente vgrajenih sistemov in njihove povezave – zna implementirati mikroprocesorske sisteme v avtomatizaciji meritev in krmiljenju procesov – zna uporabljati strokovno literaturo o mikroprocesorskih sistemih	Knowledge and understanding: *Student:* – is familiar with the structure and operation of microprocessors – masters the basics of microprocessor programming – understands the components of embedded systems and their interconnections – is able to implement microprocessor systems for automation, measurement and processes control – is familiar with scientific literature on microprocessor systems

Metode poučevanja in učenja:	**Learning and teaching methods:**
– predavanja z aktivno udeležbo študentov, ki vsebujejo razprave, diskusije, odgovore na vprašanja in prikaz praktičnih, – avditorne vaje za poglabljanje teoretičnih osnov in pridobitev praktičnih izkušenj, – individualno in skupinsko delo s študenti v obliki konzultacij, – seminarska naloga s praktičnim primerom implementacije mikroprocesorskega sistema	– lectures with active participation of students, including discussions, debates, answers to questions and practical examples – tutorial for deepening the theoretical knowledge and the acquisition of practical experience – individual and group work with students in the form of consultations, – seminar with practical examples of the implementation of the microprocessor system

Načini ocenjevanja:	**Delež (v %) / Weight (in%)**	**Assessment:**
– seminarska naloga – teoretični del izpita	(50%) (50%)	– seminar project – theoretical examination

Reference nosilca / Lecturer's references:

Ključne reference nosilca:

- KRAVANJA, Jaka, ŽGANEC, Mario, ŽGANEC GROS, Jerneja, DOBRIŠEK, Simon, ŠTRUC, Vitomir. Exploiting spatio-temporal information for light-plane labeling in depth-image sensors using probabilistic graphical models. Informatica, ISSN 0868-4952, 2016, vol. 27, no. 1, str. 67-84
- VOLKOV, Alexey, ŽGANEC GROS, Jerneja, ŽGANEC, Mario, JAVORNIK, Tomaž, ŠVIGELJ, Aleš. Design of spreading-codes-assisted active imaging system. International journal of advanced robotic systems, ISSN 1729-8814, 2015, vol. 12, str. 80-1-80-8
- VOLKOV, Alexey, ŽGANEC GROS, Jerneja, ŽGANEC, Mario, JAVORNIK, Tomaž, ŠVIGELJ, Aleš. Modulated acquisition of spatial distortion maps. Sensors, ISSN 1424-8220, 2013, vol. 13, no. 8, str. 11069-11084,
- GOLOB, Žiga, ŽGANEC GROS, Jerneja, ŽGANEC, Mario, VESNICER, Boštjan, DOBRIŠEK, Simon. FST-based pronunciation lexicon compression for speech engines. International journal of advanced robotic systems, ISSN 1729-8814, 2012, vol. 9, no. 211, str. 1-9
- ŽGANEC, Mario, ČERNE, Tomaž, ŽGANEC GROS, Jerneja. SmartPARK - sistem za samodejno prepoznavo vozil. V: MOHORČIČ, Mihael (ur.), ROBNIK, Ana (ur.), BAŠKOVČ, Dalibor (ur.). Delavnica Pametna mesta in skupnosti kot razvojna priložnost Slovenije : zbornik 18. mednarodne multikonference Informacijska družba - IS 2015, 12. oktober 2015, Ljubljana, Slovenia: Institut Jožef Stefan, 2015, str. 113-114,
- ŽGANEC, Mario, LAVRENČAK, Jaka, BABIĆ, Ankica, US-KRAŠOVEC, Marija. Detection of compact low-chromation areas in cell nuclei images. V: CESNIK, Branko (ur.), MCCRAY, Alexa (ur.), SCHERRER, Jean-Raoul (ur.). MEDINFO '98 : proceedings of the Ninth World Congress on Medical Informatics, (Studies in health technology and informatics, vol. 52). Amsterdam [etc.]: IOS Press, cop. 1998, part 2, str. 1017-1021
- ŽGANEC, Mario, BABIĆ, Ankica, US-KRAŠOVEC, Marija, PALČIČ, Branko. 3D presentation of the nuclear cell features in quantitative cytometry. V: CIMINO, James J. (ur.). Beyond the superhighway: exploiting the Internet with medical informatics : proceedings, 1996 AMIA Annual Fall Symposium, October 26-30, 1996, Washington, DC, (Journal of the American Medical Informatics Association, ISSN 1067-5027, Symposium supplement). Philadelphia: Hanley & Belfus, cop. 1996, str. 679-683
- PAVEŠIĆ, Nikola, KOVAČIČ, Stanislav, ŽGANEC, Mario. Laboratory stereoscopic system : calibration, matching and error analysis. V: HORVAT, Bogomir (ur.), KAČIČ, Zdravko (ur.). Modern modes of man-machine communication : proceedings. Maribor: Univerza Maribor, 1994, str. 9-1 - 9-15
- KOVAČIČ, Stanislav, PAVEŠIĆ, Nikola, GYERGYÉK, Ludvik, ŽGANEC, Mario. Stereo-matching by deformation. V: PAVEŠIĆ, Nikola (ur.), NIEMANN, Heinrich (ur.), PAULUS, Dietrich (ur.). Image processing and stereo analysis : proceedings of the Slovenian-German workshop, Erlangen, December 3, 1992, (Arbeitsberichte des Instituts für Mathematische Maschinen und Datenverarbeitung (Informatik), ISSN 0344-3515, Bd. 26, Nr. 1). Erlangen: Institut für Mathematische Maschinen und Datenverarbeitung (Informatik), 1993, str. 23-36
- ŽGANEC, Mario, PAVEŠIĆ, Nikola, KOVAČIČ, Stanislav. Stereo-matching by dynamic programming. V: PAVEŠIĆ, Nikola (ur.), NIEMANN, Heinrich (ur.), PAULUS, Dietrich (ur.). Image processing and stereo analysis : proceedings of the Slovenian-German workshop, Erlangen, December 3, 1992, (Arbeitsberichte des Instituts für Mathematische Maschinen und Datenverarbeitung (Informatik), ISSN 0344-3515, Bd. 26, Nr. 1). Erlangen: Institut für Mathematische Maschinen und Datenverarbeitung (Informatik), 1993, str. 37-51
- ŽGANEC, Mario, KRIŽAJ, Janez, ŽGANEC GROS, Jerneja, ŠTRUC, Vitomir. Method and device for depth imaging : SI24755 (A) - 2015-12-31. Ljubljana: Urad RS za intelektualno lastnino, 2015.
- ŽGANEC, Mario, ŽGANEC GROS, Jerneja. Postopek in oprema za nadziranje ustreznosti geometrije cevastega predmeta : SI24725 (A) - 2015-11-30. Ljubljana: Urad RS za intelektualno lastnino, 2015. 14 str

- ŽGANEC, Mario, ŽGANEC GROS, Jerneja. Active 3D triangulation-based imaging method and device : patent : EP 1997322 (B1), 2011-12-28. Munich; Hague; Vienna: European Patent Office, 2011.
- MACAULAY, Calum E., GARNER, David, US-KRAŠOVEC, Marija, STROJAN FLEŽAR, Margareta, ŽGANEC, Mario, LAVRENČAK, Jaka, PALČIČ, Branko, FERGUSON, Gary William. A method and a system for detection of malignancy-associated changes : EP 1532573 (B1), 2008-10-15. Münich: European Patent Office, 2008.
- FERGUSON, Gary William, US-KRAŠOVEC, Marija, STROJAN FLEŽAR, Margareta, ŽGANEC, Mario, LAVRENČAK, Jaka, PALČIČ, Branko. Filter devices for depositing material and density gradients of material from sample suspension : US 7211225 (B2), 2007-05-01 : appl. no. 10/228,353, filed Aug. 26, 2002. Alexandria: United States Patent and Trademark Office, 2007.
- ŽGANEC, Mario, ŽGANEC GROS, Jerneja. Postopek komuniciranja v sistemu za telefonijo po internetnem protokolu (IP) z IP - telefoni in sistem za takšno telefonijo : patent : 20499 (A), 2001-08-31. Ljubljana: Urad RS za intelektualno lastnino, 2001
- ŽGANEC, Mario. Modul periferne enote večnivojskega procesnega sistema : delo je pripravljeno po razpisu odbora za Prešernove nagrade študentom za leto 1989, št. teme 25, pod mentorstvom prof. dr. Petra Šuhla dipl. ing. in komentorstvom asistenta Romana Blenkuša dipl. ing.. Ljubljana: [M. Žganec], 1989.