



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet: Interakcija človek-računalnik

Course title: Human-Computer Interaction

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Enovit magistrski študijski program druge stopnje Predmetni učitelj	/	2	Poletni/ Summer
Five-year master's degree program Subject Teacher	/		

Vrsta predmeta / Course type

Obvezni / Obligatory

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Lab. vaje Laboratory work	Terenske vaje Field work	Samost. delo Individ. work	ECTS
30		3	42		105	6

Nosilec predmeta / Lecturer:

Borut Žalik

Jeziki / Predavanja / Lectures: slovenski / slovene

Languages: Vaje / Tutorial: slovenski / slovene

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

Osnovno znanje programiranja.

Prerequisites:

Basic programming skills.

Vsebina:

- Uvod: zgodovinski pregled, definicija.
- Patologija vsakdanjih stvari: težave pri uporabi vsakodnevnih naprav, težave pri uporabi računalnikov, uporabniško-orientirano načrtovanje.
- Vrste interakcij pri grafičnem vmesniku: ukazna vrstica, izbira menujev, izpolnjevanje formularjev, neposredna manipulacija.
- Haptična komunikacija, razpoznavanje gest.
- Poznavanje uporabnikov: naivni uporabniki, uradniki, strokovnjaki brez računalniškega znanja, računalniški strokovnjaki brez aplikacijsko specifičnega znanja, posebne skupine uporabnikov (otroci, invalidi).
- Pomembne človeške lastnosti: zaznavanje, spomin, vizualna ostrina, hitrost branja, tipkanja, razumevanja audio posnetkov.
- Obdelava informacij, mentalni modeli, vodenje gibov, učenje, kognitivna obremenitev, kinematična obremenitev.
- Osnovni elementi vizualne komunikacije.
- Vizualne spremenljivke in njihovo zaznavanje.
- Osnovni principi vizualnega dizajna: jasnost, harmonija, kontrast, omejitve.
- Organizacija in vizualne strukture: grupiranje, hierarhija, sorodnost, uravnoteženost.
- Razumevanje principov dobrega dizajna vmesnika in zaslona. Organizacija elementov zaslona: konsistenca, začetna točka, urejanje podatkov in vsebine, navigacija, vizualno prijetna kompozicija, premikanje in menjavanje strani, gostota strani. Test dobrega dizajna zaslona.
- Tipografija: osnovni pojmi, vrste pisav, tekst, mreža.
- Izbira ustreznih barv: zaznavanje barv,

Content (Syllabus outline):

- Introduction: historical overview, definition.
- The psychopathology of everyday things: psychopathology of everyday devices, psychopathology of computers, user-centred design.
- Graphic interface interaction styles: command line, menu selection, form fill-in, direct manipulation.
- Haptic communication, gesture recognition.
- Understanding the user: naive users, clerks, experts without computer knowledge, computer experts, special groups of users (children, invalids).
- Important human characteristics: perception, memory, visual acuity, speed of reading, typing, perception of audio recordings.
- Information processing, mental models, movement control, learning, cognitive load, kinematic load.
- Basic elements of visual communication.
- Visual variables and their perception.
- Basic principles of visual design: clarity, harmony, contrast, restraint.
- Organization and visual structure: grouping, hierarchy, relationship, balance.
- Understanding the principles of good interface and screen design: Organization of screen elements: consistency, starting point, ordering of data and content, navigation, visually pleasing composition, scrolling and paging, screen density. The test of good screen design.
- Typography: basic elements, type families, text, grid.
- Choice of proper colors: perception of colors, color models, color connotations, choosing colors for textual graphic screens.

barvni modeli, konotacije barv, izbira barv za tekstualne grafične zaslone.

- Grafični elementi, ikone, slike, multimedija, karakteristike ikon, proces načrtovanja ikon, forografije/slike, video.
- Ciljno usmerjeno načrtovanje: postavitve ciljev in postopkov za uporabnike, prototipi.
- Uporabnostno testiranje: priprava uporabnostnih testov, postopki izvedbe uporabnostnih testov, analiza rezultatov uporabnostnega testiranja.

- Graphics, icons, images, multimedia, characteristics of icons, icon design process, photographs/pictures, video.
- Goal-oriented interaction design: defining goals for each persona, defining scenarios for each persona, prototyping.
- Usability testing: preparing usability tests, procedure for executing usability test, analysing results of usability test.

Temeljni literatura in viri / Readings:

- Wilbert O. Galitz: *The Essential Guide to User Interface Design: An Introduction to GUI Design Principles and Techniques*, Third Edition, Wiley, 2007.
- Sanjay J. Koyani, Robert W. Bailey, Janice R. Nall: *Research-Based Web Design & Usability Guidelines*, ISBN 0-16-076270-7, U.S. Government Printing Office, 2004.
- Tania Schlatte, Deborah Levinson: *Visual Usability: Principles and Practices for Designing Digital Applications*, Morgan Kaufmann Publishers, 2013.
- Philip Kortum: *HCI Beyond the GUI, Design for Haptic, Speech, Olfactory, and Other Nontraditional Interfaces*, Morgan Kaufmann Publishers, 2008.

Cilji in kompetence:

Cilj predmeta je seznaniti študente z osnovni principi interakcije človek-računalnik.

Objectives and competences:

The objective of this course is to acquaint students with the basic principles of human-computer interaction.

Predvideni študijski rezultati:

Znanje in razumevanje:

Po zaključku tega predmeta bo študent sposoben

- izkazati razumevanje karakteristik človekovih zaznav in njihov pomen pri interakciji človek stroj,
- izkazati razumevanje ciljno-usmerjenega

Intended learning outcomes:

Knowledge and understanding:

On completion of this course the student will be able to

- demonstrate knowledge of human senses and their role at human-computer interaction,
- demonstrate knowledge of goal-oriented design of user interface,

<p>načrtovanja uporabniškega vmesnika,</p> <ul style="list-style-type: none"> • prepoznati skupine uporabnikov in njihove karakteristike, • razložiti pojem uporabnost, • analizirati rezultate testa uporabnosti, • izkazati osnovno znanje načrtovanja uporabniških vmesnikov, • razložiti osnovne karakteristike spletnih uporabniških vmesnikov. <p>Prenosljive/ključne spretnosti in drugi atributi:</p> <ul style="list-style-type: none"> • Spretnosti komuniciranja: ustno izražanje pri ustnem izpitu, pisanje strokovnega poročila o opravljenih vajah, ustni zagovor laboratorijskih vaj. • Uporaba informacijske tehnologije: uporaba programskih orodij za hitro izdelavo uporabniških vmesnikov in testiranje uporabljivosti interakcije človek-računalnik, iskanje informacij na svetovnem spletu. • Reševanje problemov: ocenjevanje uporabnosti različnih uporabniških vmesnikov. • Delo v skupini: občasno delo v skupini pri laboratorijskih vajah.
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<ul style="list-style-type: none"> • recognise groups of users and their characteristic, • explain the term usability, • analyse results of usability test, • demonstrate basic knowledge of user interfaces design, • explain basic characteristics of WEB user interfaces. <p>Transferable/Key Skills and other attributes:</p> <ul style="list-style-type: none"> • Communication skills: oral examination, writing report about lab work, oral examination of lab work. • Use of information technology: the use of software tools for rapid prototyping of user interfaces and for testing usability of the human-computer interaction, searching information at WEB. • Problem solving: evaluation of usability of different user interfaces, • Working in a group: periodic group work in the lab.

Metode poučevanja in učenja:

Learning and teaching methods:

<ul style="list-style-type: none"> • Predavanja, • seminarske vaje, • laboratorijske vaje, • reševanje domačih nalog.

<ul style="list-style-type: none"> • Lectures, • tutorials, • lab work, • homework assignments.

Delež (v %) /

Načini ocenjevanja:

Weight (in %) Assessment:

<ul style="list-style-type: none"> • Opravljene domače naloge, • laboratorijske vaje, • 1. vmesni pisni izpit, • 2. vmesni pisni izpit, • 3. vmesni pisni izpit. 	<p>15 %</p> <p>35 %</p> <p>16 %</p> <p>17 %</p> <p>17 %</p>	<ul style="list-style-type: none"> • Completed homework, • lab work, • 1st midterm written exam, • 2nd midterm written exam, • 3rd midterm written exam.
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Opomba: Če študent ni uspešno opravil vseh treh vmesnih izpitov, jih nadomesti s pisnim izpitom v deležu 50 %.

Note: If a student has not completed all three midterm exams, he replaces them with a written exam in the weight of 50 %.

Reference nosilca / Lecturer's references:

- HORVAT, Denis, ŽALIK, Borut, RUPNIK, Marjan, MONGUS, Domen. Visualising the attributes of biological cells, based on human perception. V: Third International Workshop, HCI-KDD 2013, Held at SouthCHI 2013, Maribor, Slovenia, 2013. HOLZINGER, Andreas (ur.), PASI, Gabriella (ur.). *Human-computer interaction and knowledge discovery in complex, unstructured, big data : proceedings*, (Lecture notes in computer science, Lecture notes in artificial intelligence, vol. 7947). Berlin; Heidelberg: Springer, 2013, str. 386-399.
- PEČNIK, Sašo, MONGUS, Domen, ŽALIK, Borut. Evaluation of optimized visualization of LiDAR point clouds, based on visual perception. V: Third International Workshop, HCI-KDD 2013, Held at SouthCHI 2013, Maribor, Slovenia, 2013. HOLZINGER, Andreas (ur.), PASI, Gabriella (ur.). *Human-computer interaction and knowledge discovery in complex, unstructured, big data : proceedings*, (Lecture notes in computer science, Lecture notes in artificial intelligence, vol. 7947). Berlin; Heidelberg: Springer, 2013, str. 366-385.
- HOLZINGER, Andreas, JURIČ, Simon, ŽALIK, Borut, DEBEVC, Matjaž, et al. Mobile computing is not always advantageous : lessons learned from a real-world case study in a hospital. V: TEUFEL, Stephanie (ur.). *Availability, reliability, and security in information systems : proceedings*, (Lecture notes in computer science, ISSN 0302-9743, 8708). Heidelberg; Dordrecht; London; New York: Springer, cop. 2014, vol. 8708, str. 110-123.
- NOVAK, Franc, ŠPELIČ, Denis, ŽALIK, Borut. A website usability testing tool. V: GAMS, Matjaž (ur.), et al. *Zbornik 16. mednarodne multikonference Informacijska družba - IS 2013, 7.-11. oktober 2013 [Ljubljana, Slovenija] : zvezek A = Proceedings of the 16th International Multiconference Information Society - IS 2013, October 7th-11th, 2013, Ljubljana, Slovenia : volume A*. Ljubljana: Institut Jožef Stefan, 2013, str. 217-220.
- JURIČ, Simon, FLIS, Vojko, DEBEVC, Matjaž, HOLZINGER, Andreas, ŽALIK, Borut. Towards a low-cost mobile subcutaneous vein detection solution using near-infrared spectroscopy. *The scientific world journal*, 2014, vol. 2014,