



Fakulteta za naravoslovje  
in matematiko

### UČNI NAČRT PREDMETA / COURSE SYLLABUS

<b>Predmet:</b>	Razvoj in upravljanje programskih sistemov
<b>Course title:</b>	Software Systems Development and Management

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Izobraževalno računalništvo 2. stopnja		2.	zimski
Educational computer science 2nd level			Autumn

Vrsta predmeta / Course type

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
30		2	28		60	4

Nosilec predmeta / Lecturer:

Peter Kokol

Jeziki / Predavanja / Lectures: slovenski / Slovene

Languages: Vaje / Tutorial: slovenski / Slovene

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

Osnovno znanje programiranja.

Prerequisites:

Basics of computer programming.

Vsebina:

- Splošni model življenjskega cikla oblikovanja programske opreme (PO)
- Procesi oblikovanja programske opreme: definicija, kategorije, modeli, metode in procesi ocenjevanja, adaptacije in izboljšav PO
- Napredni pristopi modeliranja življenjskega cikla oblikovanja PO: principi modeliranja, tipi modelov (informacijski, model obnašanja, strukturni), analiza modelov
- Hevristični, formalni, prototipski in agilni modeli razvoja PO
- .
- Inženiring zahtev v kontekstu splošnega in posameznih modelov
- Oblikovanje PO v kontekstu splošnega in posameznih

Content (Syllabus outline):

- General life cycle model.
- Software development processes: definition, categories, models, methods, and processes of assessment, adaptation and improvement
- Advanced approach to software life cycle modelling: principles, types of models (information, behavioural, structured), analysis
- Heuristic, formal, prototyping and agile models
- Requirements analysis in the context of general and specific models .
- Architecture and implementation
- Software development in the context of general and specific models
- Implementation in the context of general and specific models.

- modelov.
- Implementacija PO v kontekstu splošnega in posameznih modelov.
- Verifikacija in validacija PO
- Vzdrževanje PO: evolucija PO, kategorije, tehnike, stroški.
- Procesni vidiki kvalitete programske opreme s stališča zrelostnih modelov
- Upravljanje konfiguracij PO
- Orodja za računalniško podprto programsko inženirstvo
- Ocena stroškov in "cost-benefit analiza" programskega sistema.
- .

- Verification, validation.
- Software maintenance: evolution of software, categories, techniques, cost
- Process aspects of software quality in the context of maturity models.
- .
- Tools for software development
- Software configuration management
- Cost benefit analysis and cost models.
- .

### Temeljni literatura in viri / Readings:

- Sommerville: Software Engineering, Addison-Wesley, Pearson Education Ltd, New York, 2015.
- R. S. Pressman: *Software Engineering - A Practitioner's Approach*, Sixth Edition, McGraw-Hill, New York, 2014.
- K. Pohl: *Requirements Engineering: Fundamentals, Principles, and Techniques*, Springer, Berlin, 2010
- D. Leffingwell: *Agile Software Requirements: Lean Requirements Practices for Teams, Programs, and the Enterprise*, Addison Wesley, Upper Saddle River, NJ, 2011
- .

### Cilji in kompetence:

Spoznavanje študentov s procesi, modeli, metodami in principi razvoja in upravljanja kompleksnejših programskih sistemov.

### Objectives and competences:

To introduce students to the process, models, methodologies and principles of the development and management of complex software systems .

### Predvideni študijski rezultati:

Znanje in razumevanje:

Po zaključku tega predmeta bo študent sposoben

- analizirati, načrtovati, oblikovati, i, verificirati in validirati ter vzdrževati večje programske sisteme.

Prenosljive/ključne spretnosti in drugi atributi:

- *Spretnosti komuniciranja:* z deležniki.
- *Uporaba informacijske tehnologije:* za pomoč pri upravljanju oblikovanja večjih programskih sistemov.
- *Organizacijske spretnosti:* Obvladati človeške dejavnike pri oblikovanju programske opreme.
- *Reševanje problemov:* ki nastajajo pri oblikovanju kompleksne programske opreme.

### Intended learning outcomes:

Knowledge and understanding:

On completion of this course the student will be able to

- analyse, plan, manage, verify and validate large software systems.

Transferable/Key skills and other attributes:

- *Communication skills:* communicating with clients and team members.
- *Use of information technology:* for managing the development of software systems.
- *Organisation skills:* management of human factors in software development.
- *Problem solving:* solving the problems emerging in software

development.

**Metode poučevanja in učenja:**

- predavanja,
- projekt.

**Learning and teaching methods:**

- lectures,
- project.

Delež (v %) /

Weight (in %)

**Načini ocenjevanja:**

- Laboratorijske vaje
- opravljeno seminarско delo
- 1. vmesni pisni izpit
- 2. vmesni pisni izpit
- 3. vmesni pisni izpit

50 %

14 %

12 %

12 %

12 %

**Assessment:**

- ab work
- completed seminar
- 1st midterm written exam
- 2nd midterm written exam
- midterm written exam

**Reference nosilca / Lecturer's references:**

- HROVAT, Goran, ŠTIGLIC, Gregor, KOKOL, Peter, OJSTERŠEK, Milan. Contrasting temporal trend discovery for large healthcare databases. *Computer methods and programs in biomedicine*, ISSN 0169-2607. [Print ed.], Jan. 2014, vol. 113, iss. 1, str. 251-257, doi: 10.1016/j.cmpb.2013.09.005. [COBISS.SI-ID 17171222]
- ŠTIGLIC, Gregor, KOKOL, Peter. Discovering subgroups using descriptive models of adverse outcomes in medical care. *Methods of information in medicine*, ISSN 0026-1270, 2012, vol. 51, no. 4, str. 348-352, doi: 10.3414/ME11-02-0040. [COBISS.SI-ID 1837988]
- ŠTIGLIC, Gregor, KOCBEK, Simon, PERNEK, Igor, KOKOL, Peter. Comprehensive decision tree models in bioinformatics. *PloS one*, ISSN 1932-6203, 2012, vol. 7, iss. 3, str. [1-14], e33812. <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0033812>, doi: 10.1371/journal.pone.0033812. [COBISS.SI-ID 1788068], [JCR, SNIP]
- KOKOL, Peter, POHOREC, Sandi, ŠTIGLIC, Gregor, PODGORELEC, Vili. Evolutionary design of decision trees for medical application. *Wiley interdisciplinary reviews, Data mining and knowledge discovery*. [Print ed.], May 2012, vol. 2, iss. 3, str. 237-254, doi: 10.1002/widm.1056. [COBISS.SI-ID 15997462], [JCR, SNIP]
- KOCBEK, Simon, SAETRE, Rune, ŠTIGLIC, Gregor, KIM, Jin-Dong, PERNEK, Igor, TSURUOKA, Yoshimasa, KOKOL, Peter, ANANIADOU, Sophia, TSUJII, Jun-ichi. AGRA: analysis of gene ranking algorithms. *Bioinformatics*, ISSN 1367-4803, 2011, vol. 27, no. 8, str. 1185-1186, ilustr. <http://bioinformatics.oxfordjournals.org/content/27/8/1185.full.pdf>, doi: 10.1093/bioinformatics/btr097. [COBISS.SI-ID 1676708], [JCR, SNIP]