

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Heterogena telekomunikacijska omrežja
Course title:	Heterogeneous Telecommunication's Networks

Študijski program in stopnja Study programme and level	Modul Module	Letnik Academic year	Semester Semester
Informacijske in komunikacijske tehnologije, 3. stopnja	Komunikacijske tehnologije	1	1
Information and Communication Technologies, 3 rd cycle	Communication Technologies	1	1

Vrsta predmeta / Course type Izbirni / Elective

Univerzitetna koda predmeta / University course code: IKT3-644

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Druge oblike	Samost. delo Individ. work	ECTS
15	15			15	105	5

**Navedena porazdelitev ur velja, če je vpisanih vsaj 15 študentov. Drugače se obseg izvedbe kontaktnih ur sorazmerno zmanjša in prenese v samostojno delo. / This distribution of hours is valid if at least 15 students are enrolled. Otherwise the contact hours are linearly reduced and transferred to individual work.*

Nosilec predmeta / Lecturer: Prof. dr. Aleš Švigelj

Jeziki / Predavanja / Lectures: Slovenščina, angleščina / Slovenian, English
Languages: Vaje / Tutorial:

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

Zaključen študij druge stopnje s področja informacijskih ali komunikacijskih tehnologij ali zaključen študij druge stopnje na drugih področjih z znanjem osnov s področja predmeta. Potrebna so tudi osnovna znanja matematike, računalništva in informatike.

Prerequisites:

Completed second cycle studies in information or communication technologies or completed second cycle studies in other fields with knowledge of fundamentals in the field of this course. Basic knowledge of mathematics, computer science and informatics is also requested.

Vsebina:

Prihodnja heterogena omrežja
 Prenos govora prek IP (VoIP, VoLTE):
 SIP
 Multimedijški podsistem IP (IMS):
 Arhitektura in koncepti
 IMS v mobilnih okoljih
 IMS v fiksnih omrežjih
 Fiksno mobilna konvergenca:
 Konvergenca podjetij
 Konvergenca omrežij

Content (Syllabus outline):

Future heterogeneous networks
 Voice over IP (VoIP, VoLTE):
 SIP
 IMS (IP Multimedia Subsystem)
 Architecture and concepts
 IMS in the mobile environment
 IMS in the wire line environment
 FMC (Fixed Mobile Convergence):
 Industry convergence
 Network convergence

Konvergenca terminalov
Konvergenca storitev
Napredno upravljanje z mobilnostjo:
Horizontalna predaja zveze
Vertikalna predaja zveze
Integracija telekomunikacijskih in pametnih energetskih omrežij

Service convergence
Device convergence
Advanced mobility management:
Horizontal handover
Vertical handover
Integration of telecommunications and smart GRID networks

Temeljni literatura in viri / Readings:

Izbrana poglavja iz naslednjih knjig: / Selected chapters from the following books:

- T. Plevyak, V. Sahin, *Next Generation Telecommunications Networks, Services, and Management*, Wiley-IEEE Press, 2010. ISBN 978-0-470-57528-4
- D. Grace, M. Mohorcic, *Broadband Communications via High-Altitude Platforms*, Wiley, 2010. ISBN 978-0-470-69445-9
- J. H. Ortiz, J. Ed. *Telecommunications Networks - Current Status and Future Trends*. Rijeka: InTech, cop. 2012. ISBN 978-953-51-0341-7
- M. Poikselka, A. Niemi, H. Khartabil, G. Mayer, *The IMS: IP Multimedia Concepts and Services*, Willey, 2009. ISBN 978-0-470-72196-4
- A. B. Johnston, *SIP understanding the Session Initiation Protocol*, Artech House, 2009. ISBN ISBN-13: 978-1-607-83995-8

Cilji in kompetence:

Cilj predmeta je seznaniti študente z naprednimi koncepti prihodnjih heterogenih omrežij, ki bodo temeljila na IP protokolu. Podana bo arhitektura in značilnosti bodočih omrežij s poudarkom na uporabljenih protokolih in fiksno mobilni konvergenci.

Kompetence študenta bodo po uspešno opravljenem izpitu obsegale sposobnost načrtovanja arhitektur heterogenih telekomunikacijskih omrežij.

Objectives and competences:

The objective of this course is to acquaint students with advanced concepts of future heterogeneous networks, which will base on IP protocol. In particular the architecture and characteristics of future networks will be given with the emphasis on protocols and fixed mobile convergence.

The competencies of the students completing this course successfully will include the ability to design the architectures of heterogeneous telecommunication network.

Predvideni študijski rezultati:

Pridobitev znanja o značilnostih bodočih heterogenih omrežij in o sodobnih protokolih, ki se v teh omrežjih uporabljajo.

Študenti bodo z uspešno opravljenimi obveznostmi tega predmeta pridobili in razvili sposobnost načrtovanja arhitektur heterogenih omrežij s posebnim poudarkom na razumevanju protokolov za zagotavljanje večpredstavnostnih vsebin preko paketnih omrežij in poznavanju problematike konvergenca telekomunikacijskih omrežij.

Intended learning outcomes:

Acquisition of knowledge concerning the characteristics of future heterogeneous networks and advanced protocols, which are used in such networks.

Students successfully completing this course will acquire will develop the ability to design the architectures of heterogeneous network with emphasis on understanding the protocols for delivery of Multimedia Services over packet networks, and on understanding the convergence of telecommunications networks.

Metode poučevanja in učenja:

Predavanja, seminar, konzultacije, individualno delo
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Learning and teaching methods:

Lectures, seminar, consultancy, individual work

Delež (v %) /

Načini ocenjevanja:

Weight (in %)

Assessment:

Seminarska naloga	50 %	Seminar work
Ustni zagovor seminarske naloge	50 %	Oral defense of seminar work

Reference nosilca / Lecturer's references:

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| <ul style="list-style-type: none"> • A. Švigelj, R. Sernec, K. Alič., "Network-traffic modeling for load prediction: a user-centric approach", <i>IEEE Network Magazine</i>, IEEE Network, vol. 29, no. 4, pp. 88 - 96, 2015 • K. Alič, E. Pertovt, A. Švigelj, "Bearing-opportunistic network coding", <i>International Journal of Computers, Communications & Control</i>, vol. 10, no. 2, pp. 154-164, 2015 • R. Libnik, A. Švigelj, G. Kandus, "A novel SIP based procedure for congestion aware handover in heterogeneous networks Computer Communications", vol. 33, no. 18, pp. 2176-2184, 2010 • A. Švigelj, M. Mohorčič, L. Franck, G. Kandus, "Signalling analysis for traffic class dependent routing in packet switched ISL networks", <i>Space communications</i>, vol. 22, no. 2/4, pp. 191-203, 2013 • U. Kuhar M. Pantoš, G. Kosec, A. Švigelj, The impact of model and measurement uncertainties on a state estimation in three-phase distribution networks. <i>IEEE transactions on smart grid</i>, ISSN 1949-3053. [Print ed.], vol. , no. , str. 1-10, 2018 |
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