

| Communications Service Delivery Frameworks | | |
|--|---------------------|---|
| NFQ Level | ECTS Credits | Prerequisite/Co-requisite Requirements |
| 9 | 5 | |
| <p>Aims and Objectives</p> <p>This module will provide the learner with an introduction to the software frameworks, architectures and tools used to model, design, implement and deploy managed communications services. It will focus on approaches that are being deployed in current fixed and mobile Next Generation Networks to deliver rich communication services, including: IP Multimedia Subsystem (IMS), SIP Servlets, Web Services, and Service Oriented Architecture (SOA) based SDPs and related Application Programming Interfaces (APIs).</p> | | |
| <p>Learning Outcomes</p> <p>On successful completion of this module, students should be able to:</p> <ol style="list-style-type: none"> 1. Understand and describe the principles underlying the delivery of Next Generation Network communications services, including the current state of international standards governing NGN evolution; 2. Describe the operation of key NGN protocols SIP and Diameter and be experienced in their deployment and use; 3. Design, implement and deploy basic IMS applications, enablers and servlets using the Open IMS framework; 4. Compare and contrast Telco Service Delivery Platforms and APIs and have experience of the use of the Parlay X API; <p>Discuss the evolution of mobile Next Generation Networks, in particular EPC and IMS above EPC/LTE.</p> | | |
| <p>Indicative Syllabus</p> <ul style="list-style-type: none"> • Next Generation Network (NGN) • Session Initiation Protocol (SIP) • Diameter • IP Multimedia Subsystem (IMS) • Service Delivery Platform (SDP) • SIP/IMS Applications / SIP Servlets • Application Programming Interface (API) • Web Services / Parlay X • Evolved Packet Core (EPC) | | |
| <p>Assessment Methodology</p> <ul style="list-style-type: none"> • Fullfillment of laboratory exercises on days 1-4 (60%) • Class written test on the last day afternoon on lectures from day 1 – 5 (40%) | | |
| <p>Essential and Supplementary Reading/Resources</p> <p>Essential Texts:</p> <ul style="list-style-type: none"> • The slides provided for this course • SIP - http://sip-router.org/ (C), http://www.pjsip.org/ (C), http://imscommunicator.berlios.de/ (Java) • Diameter - http://www.openimscore.org/project/jdp (Java) • IMS - http://www.openimscore.org/ for CSCFs (C) and HSS (Java) | | |

- **AS - <http://www.cipango.org/> HTTP/SIP Servlets, Diameter for IMS (Java)**
- IETF RFC 3261 - SIP: Session Initiation Protocol - <http://tools.ietf.org/html/rfc3261>
- SIP Tutorial on iptel.org, Jiri Kuthan, Dorgham Sisalem - <http://www.iptel.org/tutorial>
- IETF RFC 3588 - Diameter Base Protocol - <http://tools.ietf.org/html/rfc3588>
- Introduction to Diameter, Jeffrey Liu &all - <http://www.ibm.com/developerworks/library/wi-diameter/index.html>
- 3GPP TS 23.228 IP Multimedia Subsystem (IMS); Stage 2 - <http://www.3gpp.org/ftp/Specs/html-info/23228.htm>
- 3GPP TS 24.229 IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3 - <http://www.3gpp.org/ftp/Specs/html-info/24229.htm>
- 3GPP TS 24.228 Signalling flows for the IP multimedia call control based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3 (Rel.5 only) - <http://www.3gpp.org/ftp/Specs/html-info/24228.htm>
- The 3G IP Multimedia Subsystem (IMS): Merging the Internet and the Cellular Worlds ("The yellow IMS book"), Gonzalo Camarillo, Miguel-Angel Garcia-Martin, Publisher: Wiley; 3 edition (November 4, 2008), ISBN-10: 0470516623, ISBN-13: 978-0470516621
- Java Community Process. JSR 289: SIP Servlet v1.1., <http://jcp.org/en/jsr/detail?id=289>
- Java Community Process. JSR 22: JAIN SLEE API Specification, <http://jcp.org/en/jsr/detail?id=22>
- Open Mobile Alliance (OMA). Architecture Document OMA Service Environment. Approved Version 1.0.4 - 01 Feb 2007. 2007.
- Open Mobile Alliance (OMA). Enabler Release Definition for Next Generation Service Interfaces. Candidate Version 1.0 - 18 Nov 2009.
- Open Mobile Alliance (OMA). Presence SIMPLE Architecture Document. Approved Version 1.0.1 – 28 Nov 2006.
- Open Mobile Alliance (OMA). XML Document Management Architecture. Candidate Version 2.0 – 24 Jul 2007.
- Open Mobile Alliance (OMA). Instant Messaging using SIMPLE Architecture Candidate Version 1.0 – 03 Sep 2008

Recommended Texts:

- The Internet Protocol Journal - Volume 6, Number 1, The Session Initiation Protocol, William Stallings - http://www.cisco.com/web/about/ac123/ac147/archived_issues/ipj_6-1/sip.html
- SIP Demystified, Gonzalo Camarillo, Publisher: McGraw-Hill Professional; 1 edition (August 28, 2001), ISBN-10: 0071373403, ISBN-13: 978-0071373401
- The IMS: IP Multimedia Concepts and Services, Miikka Poikselka, Publisher: Wiley; 3rd edition (March 17, 2009), ISBN-10: 0470721960, ISBN-13: 978-0470721964
- 3GPP TS 24.229 IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Application usage of SIP
- ETSI. ETSI ES 282 002: Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); PSTN/ISDN Emulation Sub-system (PES); Functional architecture. 2009.
- ETSI. ETSI TS 182 028: Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IPTV Architecture; Dedicated subsystem for IPTV functions. 2009
- 3GPP TS 22.173 IMS MMTel Services and supplementary services
- RCS Specifications, <http://www.gsma.com/rcs-product-specifications-release-documents/>
- RCS-e Specifications, <http://www.gsma.com/rcs-product-specifications-rcs-e-specifications/>
- Java Community Process. JSR 281: IMS Services API
- Understanding SIP Servlets 1.1 (Artech House Telecommunications), Chris Boulton, Kristoffer

Gronowski, Publisher: Artech House Publishers; 1 edition (April 2009), ISBN-10: 159693428X, ISBN-13: 978-1596934283

- IP Multimedia Subsystem (IMS) Handbook, Mohammad Ilyas (Editor), Syed A. Ahson (Editor), Publisher: CRC Press (November 19, 2008), ISBN-10: 1420064592, ISBN-13: 978-1420064599
- IMS Application Developer's Handbook: Creating and Deploying Innovative IMS Applications
- Rogier Noldus et.al., Publisher: Academic Press; 1 edition (September 6, 2011), ISBN-10: 0123821924, ISBN-13: 978-0123821928
- Converging NGN Wireline and Mobile 3G Networks with IMS: Converging NGN and 3G Mobile, Rebecca Copeland, Publisher: Auerbach Publications; 1 edition (December 22, 2008), ISBN-10: 0849392500, ISBN-13: 978-0849392504
- Programming Converged Networks: Call Control in Java, XML, and Parlay/OSA, RAVI JAIN, JOHN-LUC BAKKER, FAROOQ ANJUM, Publisher: Wiley-Interscience; 1 edition (November 18, 2003), ISBN-10: 0471268011, ISBN-13: 978-0471268017
- Parlay/OSA: From Standards to Reality, [Musa Unmehopa](#), [Kumar Vemuri](#), [Andy Bennett](#), Publisher: Wiley; 1 edition (March 22, 2006), ISBN-10: 0470025956, ISBN-13: 978-0470025956
- Implementing Value-Added Telecom Services, Johan Zuidweg, Publisher: Artech House (November 30, 2006), ISBN-10: 1580539785, ISBN-13: 978-1580539784
- The Open Mobile Alliance: Delivering Service Enablers for Next-Generation Applications, Michael Brenner, Musa Unmehopa, Publisher: Wiley; 1 edition (April 8, 2008), ISBN-10: 0470519185, ISBN-13: 978-0470519189
- Service Delivery Platforms: Developing and Deploying Converged Multimedia Services, Syed A. Ahson (Editor), Mohammad Ilyas (Editor), Publisher: Auerbach Publications; 1 edition (2011), ISBN-10: 1439800898, ISBN-13: 978-1439800898
- T. Magedanz, N. Blum, S. Dutkowski. Evolution of SOA Concepts in Telecommunications - A Déjà vu?. IEEE Computer Special Issue on Service Oriented Architectures. Nov. 2007. ISSN 0018-9162
- L. Lin and P. Lin. "Orchestration in Web Services and real-time communications". IEEE Commun. Mag. vol. 45. Jul. 2007. pp. 44-50
- Niklas Blum, Lajos Lange, Thomas Magedanz, Tiziana Margaria, "Assessing Workflow Languages for Composition of Real-time Communication Services", In Proc. of 14th International Conference on Intelligence in Next Generation Networks (ICIN), Berlin, 11. – 14. October, 2010, ISBN: 978-1-4244-7445-5
- Open Service Oriented Architecture collaboration. Service Component Architecture Specifications. <http://www.osoa.org/display/Main/Service+Component+Architecture+Specifications>. April 2009.
- SAE and the Evolved Packet Core: Driving the Mobile Broadband Revolution, Catherine Mulligan, Publisher: Academic Press; 1 edition (October 7, 2009), ISBN-10: 0123748267, ISBN-13: 978-0123748263
- Evolved Packet System (EPS): The LTE and SAE Evolution of 3G UMTS, Pierre Lescuyer, Thierry Lucidarme, Publisher: Wiley; 1 edition (March 11, 2008), ISBN-10: 0470059761, ISBN-13: 978-0470059760

Also look at:

- www.icin.biz for conference proceedings
- Informa IMS World Forum and SDP Summit series
- www.open-ims.org

Weekly Contact Hours:

25 hours preparatory reading (specifically the essential texts listed above).

20 hours lectures, 20 hours laboratory sessions, and 10 hours nighttime reading/revision within a single week.

25 hours follow-up reading and revision.