

Certificate in Telecommunications Policy, Regulation & Management (TPRM)

Module 1 ICT Technologies and Markets



Convenor: Luci Abrahams

9 – 13 May 2011

MODULE OUTLINE			
	Time	Topic	Lecturer
Monday 9 May	09h00 – 09h30	Welcome, introduction and course overview	Luci Abrahams
	09h30 – 10h30	Session 1: e-development in South Africa/Africa: Information infrastructure sophistication and diffusion	Luci Abrahams
	11h00 – 13h00	Session 1: e-development in South Africa/Africa: Economic value creation through ICT – markets, trends and drivers	Luci Abrahams
	14h00 – 14h30	Session 2: Syndicate group formation	Luci Abrahams
	14h30 – 15h00	Session 2: Computer lab visit	Dino Gavrieledes
	15h30 – 16h00	Session 2: Library visit: access to reading material on Wits electronic library	Hilbre Revington
Tuesday 10 May	09h00 – 13h00	Session 3: The evolution of basic telecommunications technologies: the PSTN and its underlying technologies	Charley Lewis
	14h00 – 17h00	Session 4: (i) Wireless communications: fixed & mobile wireless, WLL, GSM, 3G, CDMA, satellite, WiFi, WiMax, mobile broadband Session 4: (ii) Framework for Mobility: Convergence, multimedia, the NGN & the future of communications	Prof Rex van Olst
Wednesday 11 May	09h00 – 10h30	Session 5: Internet, VoIP, VANS & the NGN: an introduction	Charley Lewis
	11h00 – 13h00	Session 6: Undersea cable market and business models	Dr Abi Jagun
	14h00 – 17h00	Session 7: Internet and broadband market trends, developments and drivers	Luci Abrahams
Thursday 12 May	09h00 – 13h00	Session 8: (i) Signal distribution and digital & analogue broadcasting technologies Session 8: (ii) Broadcasting market trends and the migration to digital broadcasting	Nadia Bulbulia
	14h00 – 17h00	Session 9: Spectrum: planning and management and the assignment of frequency	Peter Zimri
Friday 13 May	09h00 – 10h30	Session 10: Numbering and numbering plans, number portability, carrier pre-select, eNum	Charley Lewis
	11h00 – 13h00	Session 11: Assignment writing and referencing: preparation for Module 3 assignment	Luci Abrahams
	14h00 – 16h00	Session 12: Group Dynamics Exercise: Analysing ICT technologies and markets	Luci Abrahams

1 Content overview

This first module gives a non-technical overview of the technologies that comprise the ICT sector, their evolution and the principles and parameters governing their operation. It further reviews the evolution of ICT markets, trends and drivers for e-development. It aims to give policy makers and regulators in the sector a conceptual grasp of the dynamics, trends and developments intrinsic to the ICT technology environment in order to grasp the implications of this for policy formulation and regulation. The course is presented within an overall framework for the convergence of technologies across the sector.

2 Course Outcomes

On completion of the module, participants will be able to:

- describe the development of the technologies and infrastructure underpinning the delivery of telecommunications, broadcasting and Internet services;
- discuss the evolution of telecommunications and ICT markets;
- assess the implications of ICT technologies and market development for policy and regulation.

3 Core Readings

The following readings are recommended for the course and are available in electronic format:

- Abrahams, L & Goldstuck, A (2010) The state of e-development in South Africa: a view from the end of the first decade of the 21st century, LINK Public Policy Paper No 11, July 2010, available at <http://link.wits.ac.za/papers/Abrahams-Goldstuck-2010-eDevelopment-SA.pdf>
- Hernandez, J, Leza, D & Ballot-Lena, K (2010) Regulation for the digital economy, International Telecommunication Union (ITU) 10th Global Symposium for Regulators (GSR10), 10 – 12 November 2010, available at <http://www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR10/documents/GSR10-paper2.pdf>
- ICT Regulation Toolkit Module 7: New Technologies and their Impacts on Regulation, Executive Summary, prepared by Technical University of Denmark, infoDev & ITU, March 2007, available at <http://icctoolkit.infodev.org/Mod7ExecSummary>
- Ofcom (nd) 'Technology Research Overview', Office of Communications, London, at <http://www.ofcom.org.uk/research/technology/overview/>
- Ofcom (2009) 'Converged Communications in Tomorrow's World: Ofcom's Technology Research Programme 2008/09', Office of Communications, London, available online at <http://www.ofcom.org.uk/research/technology/overview/randd0809/Report0809Final.pdf>

4 Required Readings

One or more readings are **required** to be completed for each session. A number of these are distributed by e-mail. They are usually sent out using APA referencing format, and you may locate each reading via a search engine (such as Google or Google Scholar). Only one or two readings per session will be reprinted for the course pack.

Lecturers who use teaching aids or provide additional material, will distribute these notes to you as they become available. These notes should be added to your course file and included as part of your course materials.

5 Additional Readings

Additional readings for each session are listed in this course outline. They are intended to provide a starting point (but far from the last word) for exploring each of the topic areas in greater depth and detail and are offered to you as supplementary material to consult in the course of your day-to-day work operations. Should you choose to submit your final examined assignment on one of these topic areas, you should track down and read these additional readings as a matter of course. Note that many of these readings are presented in Acrobat Reader format, which will require you to have Acrobat Reader installed on your computer.

6 Preparation Requirements

Your preparation work – mainly reading - should be done individually before you come on the course. Please note that there may be tasks to prepare for specific sessions. These will assist you to work through the conceptual and theoretical understandings in each of the readings and begin to apply these to cases and issues. Read through each session outline carefully to ensure that you understand the content to be covered.

We assume that for every 1 hour that you spend in the classroom, 30 in total, you will need to spend approximately 4 additional hours in preparation, both before and after the module. This includes reading and writing assignments.

7 Syndicates and Group Learning


An interactive and intensive learning methodology is utilised, which involves a combination of lectures, case studies, group and individual projects. Given that many participants are active in shaping the telecommunications sector, the University endorses the “syndicate method” of teaching, which requires that some of the learning will be done in groups. This approach is designed to enable course participants to contribute to the course, bringing in their own practical experience, knowledge and expertise together with those of their peers to create a rich learning environment. Each participant will be assigned to a syndicate group. Syndicates and group work are a vital component of the learning process and attendance at all syndicate meetings is required and compulsory. Syndicate meetings will be organised by the group members at a time and place suitable to them in accordance with the programme’s schedule. Problems within syndicate groups are to be reported timeously to the Academic Convenor of this course, so that steps may be taken to resolve them. Syndicates will only be able to change their syndicate group composition under exceptional circumstances, and at the sole discretion of the Academic Convenor.

8 Course Assessment

There are two components to the assessment for the certificate course, viz:


- Group assignment Module 1: 10%
- Group assignment Module 2: 10%
- Group assignment Module 3: 10%
- Final examined individual written assignment: 70%


The group assignment, which is done in syndicate groups during the week, will be distributed on the first day of the course, and is due for completion and presentation on the final day of the module.

1 e-Development in South Africa/Africa: Information infrastructure, markets, trends and drivers	
Presenter	Luci Abrahams, LINK Centre
Outcomes	<p>Participants will be able to:</p> <ul style="list-style-type: none"> • construct a framework for thinking about e-development; • discuss the factors that influence e-development in any particular country; • consider the implications for ICT policy and regulation from the perspective of e-development.
Content	<ul style="list-style-type: none"> • e-Development concept and framework, laying the foundation for the module sessions and for the course as a whole • Infrastructure for e-development – sophistication and diffusion • Value creation: e-business, e-society, e-governance • ICT integrating the African economy • ICT markets, trends and drivers • Regulatory issues and challenges for policy-makers and regulators
Core Readings	<ul style="list-style-type: none"> • Abrahams, L & Goldstuck, A (2010) The state of e-development in South Africa: a view from the end of the first decade of the 21st century, LINK Public Policy Paper No 11, July 2010, available at http://link.wits.ac.za/papers/Abrahams-Goldstuck-2010-eDevelopment-SA.pdf • Cieslikowski, D, Halewood, N, Kimura, K & Qiang, C (2009) 'Key Trends in ICT Development', in World Bank (2009) Information and Communications for Development 2009: Extending Reach and Increasing Impact, World Bank, Washington DC, available at http://siteresources.worldbank.org/EXTIC4D/Resources/5870635-1242066347456/IC4D_2009_Key_Trends_in_ICT_Development.pdf • Hernandez, J, Leza, D & Ballot-Lena, K (2010) Regulation for the digital economy, International Telecommunication Union (ITU) 10th Global Symposium for Regulators (GSR10), 10 – 12 November 2010, available at http://www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR10/documents/GSR10-paper2.pdf
Additional readings	<ul style="list-style-type: none"> • Kew, J & Herrington, M (2009) ICT & Entrepreneurship, Research report presented to the Small Enterprise Development Agency, Graduate School of Business, University of Cape Town, Cape Town • ITU (2010) Measuring the Information Society 2010, International Telecommunication Union (ITU-D), Geneva, available at http://www.itu.int/dms_pub/itu-d/opb/ind/D-IND-ICTOI-2010-SUM-PDF-E.pdf • Intven, H, Oliver, J & Sepúlveda, E (2000) 'Overview of Telecommunications Regulation', in Telecommunications Regulation Handbook, Intven, H (ed), World Bank, Washington DC, pages 1-1 to 1-26, available online at http://rru.worldbank.org/Documents/Toolkits/telecom_mod1.pdf
About your Lecturer	<p>Luci Abrahams is a Senior Lecturer and Director of the LINK Centre. She has led and conducted a number of research projects and has written up the results for research publications, including academic journal articles and book chapters, on topics spanning the information society, e-government, innovation systems, e-development and open access to knowledge. She leads the Saturday research writing seminars for the Masters of Management (ICT Policy and Regulation). She has held senior management positions in government and served on many boards of public sector institutions, including the Development Bank of Southern Africa (1997-2007), the National Advisory Council on Innovation (1999-2009) and the National Research Foundation (2005 – 2008). She currently serves on the Financial and Fiscal Commission.</p> 

2 Syndicate Group Formation & Group Dynamics Exercise	
Presenter	Luci Abrahams
Outcomes	Participants will be able to: <ul style="list-style-type: none"> • function effectively in their syndicate groups.
Content	<ul style="list-style-type: none"> • Formation of syndicate groups • Roles and responsibilities of syndicate group members
Core Readings	<ul style="list-style-type: none"> • Blair, G (nd) 'Groups that Work', University of Edinburgh, Edinburgh, available online at http://www.see.ed.ac.uk/~gerard/Management/art0.html • Alice Project (2001) 'Tips for Working Successfully in a Group', Alice Project, http://www.alice.org/bvw2001/tips.html
Activity	Preparation for group dynamics exercise. Draft and agree code of conduct for syndicate group.
About your Lecturer	See above.

2 Computer lab visit	
Presenter	Dino Gavrielides
Outcomes	Participants will be able to: <ul style="list-style-type: none"> • Log on to the computer in the Computer Lab; • Access the network resources such as the Internet, network printer and Local Shared Directories; • Make use of a spectrum of software (e.g. Microsoft Office) installed on the computers for assignments.
Content	<ul style="list-style-type: none"> • Introduction to the Computer Lab Support Staff • Computer Lab Operating & Support Hours • Rules to adhere to when use the Computer Lab • Introduction to the Parktown LAN • Information about the hardware and software available for students
Core Readings	<ul style="list-style-type: none"> • An Introduction Manual to the Computer Lab (compiled by Dino Gavrielides) • University of the Witwatersrand (and) 'Information and Communication Technology Policies and Standards', University of the Witwatersrand, Johannesburg, available online at http://share.ds.wits.ac.za/DeptCNSIntranetPublihed/SPP-AcceptableUsePolicy.pdf
About your Lecturer	Dino is responsible for managing the Computer Lab and offering IT support to the students studying at the Parktown Campus. He also does part-time lecturing on computer basics and various software packages. Dino is a registered Co-Ordinator and Tester for ICDL (International Computer Driving License).

3 The evolution of basic telecommunications technologies: the PSTN and its underlying technologies	
Presenter	Charley Lewis, LINK Centre
Outcomes	<p>Participants will be able to:</p> <ul style="list-style-type: none"> • describe the evolution of the technologies underpinning the public switched telecommunications network; • distinguish between digital and analogue technologies and services; • identify the principles of operation of key telecommunications technologies; • describe basic and advanced communications technologies and services.
Content	<ul style="list-style-type: none"> • Evolution of ICTs: telegraph, radio, telephone, TV, computer, PC, Internet; • Typology of technologies: fixed, wireless, satellite, Internet; • Analogue vs digital technologies; • ICT services - PSTN, mobile, broadcasting, signal distribution, ISP, VANS, IT; • Next generation technologies: xDSL, broadband, CDMA, WiFi, Bluetooth
Core Readings	<ul style="list-style-type: none"> • InfoDev (2007) 'ICT Regulation Toolkit - Module 7: New Technologies and their Impacts on Regulation, Executive Summary', prepared by Technical University of Denmark, infoDev, Washington DC & ITU, Geneva, March 2007, available online at http://icttoolkit.infodev.org/Mod7ExecSummary • Souter, D (2009) 'Information and Communications technologies', in Souter, D (ed) (2009) <i>The APC ICT Policy Handbook</i>, chapters 18 -21, The Association for Progressive Communications, Johannesburg, available online at http://www.apc.org/en/system/files/APCHandbookWeb_EN.pdf
Additional References	<ul style="list-style-type: none"> • Dodd, A (2005) <i>The Essential Guide to Telecommunications</i>, 4th Edition, Prentice Hall, New Jersey • Jones, S, Kovac, R & Groom, F (2008) <i>Introduction to Communications Technologies: A Guide for Non-Engineers</i>, 2nd Edition, Auerbach Publications, New York • Khumalo, L & Sibanda, J (1998) <i>Telecommunications Made Easy</i>, Ravan Press, Randburg • Shepherd, S (2005) <i>Telecom Crash Course</i>, Mcgraw Hill, New York
About your Lecturer	<p>Charley Lewis works as a senior lecturer, researcher and consultant at the LINK Centre of the School of Public and Development Management at the University of the Witwatersrand. His research interests include: labour, work and ICT; ICT sector policy & regulation; universal service and access; the Internet, and consumer protection. He has lectured and presented widely, on a range of ICT policy, regulation and development issues. He has undertaken research in a number of areas, including the Internet, call centres, e-learning and universal access and service. He holds a degree of Master of Commerce in the Management of Information Systems from the University of the Witwatersrand.</p> 


4 Wireless communications and framework for mobility	
Presenter	Rex van Olst, Wits School of Electrical and Information Engineering
Outcomes	<p>Participants will be able to:</p> <ul style="list-style-type: none"> • Describe the principles of wireless communications; • Explain the principles of satellite communications; • Identify the principles of mobile communications systems, and GSM in particular; • Discuss key market drivers for mobile communications systems.
Content	<ul style="list-style-type: none"> • Wireless and satellite communications • Mobile cellular communications – GSM & CDMA • Next Generation Networks including WiFi, Wimax & wireless broadband • Next Generation Internet and Multimedia: Evolution of the Internet and web applications; multimedia systems (Video, VoIP ...) • Market drivers • Conceptual framework for thinking about complex, evolving networks • Regulatory implications for Africa, 2011 & the future
Core Readings	<ul style="list-style-type: none"> • The Economist (2007) 'A world of connections', <i>The Economist</i>, 26 April 2007, available online via http://www.economist.com/specialreports/displayStory.cfm?story_id=9032088 • Goel, L (2005) 'ISRC Technical Briefing: Wireless Communications', C.T. Bauer School of Business, University of Houston, Houston, available online at http://www.uhsrc.com/FTB/Wireless%20Communication/WirelessTechBrief%202_Lakshmi_05.doc • IEC (2007) 'Global System for Mobile Communication (GSM)', International Engineering Consortium, Chicago, available online at http://www.iec.org/online/tutorials/gsm/index.asp • JISC (2009) 'Basics of satellite communications', Joint Information Systems Committee, London, available online at http://www.jisc.ac.uk/whatwedo/themes/network/sat/report3.aspx
Additional References	<ul style="list-style-type: none"> • Ballon, P (2007) 'Changing business models for Europe's mobile telecommunications industry: The impact of alternative wireless technologies', <i>Telematics and Informatics</i>, No 24, pp 192–205 • Bedell, P (2005) <i>Wireless crash course</i>, McGraw-Hill / Osborne, New York • Intelsat (2002) 'A Practical Introductory Guide on Using Satellite Technology for Communications', Intelsat, Ltd, Washington, DC, available online at http://www.intelsatgeneral.com/docs/SatellitePrimer.pdf • Lehr, W & McKnight, L (2002) 'Wireless Internet Access: 3G vs. WiFi?', <i>Telecommunications Policy</i>, Vol 27, Issues 5- 6, June-July 2003, pp 351-370
Activity	
About your Lecturer	<p>Rex Rex van Olst is an Associate Professor in the School of Electrical and Information Engineering at Wits. He holds an MSc (Eng) and a BSc (Elec Eng) from Wits and an MBL from UNISA. Rex is a Fellow of the Computer Society of South Africa and of the SA Institute of Electrical Engineers, having worked as an executive in the ICT sector prior to coming to Wits.</p> 

5 Internet, VoIP, VANS & the NGN: an introduction	
Presenter	Charley Lewis
Outcomes	Participants will be able to: <ul style="list-style-type: none"> • describe the infrastructure and functioning of the Internet; • articulate significant past and present trends in the development of the Internet; • discuss the technologies and applications of the Internet Protocol, with special reference to VoIP and IPTV; • understand the importance of broadband in use of the Internet.
Content	<ul style="list-style-type: none"> • The evolution of the Internet • The Internet: infrastructure, architecture & topology • TCP / IP • VoIP, VoI & Internet telephony • IPTV and other applications of the data stream
Core Readings	<ul style="list-style-type: none"> • Dodd, S (2002) 'The Internet', chapter 8 in Dodd, S (2002) <i>The Essential Guide to Telecommunications</i>, 3rd edition, Prentice Hall, Upper Saddle River, NJ, 2002 • Souter, D (ed) (2009) <i>The APC ICT Policy Handbook</i>, chapters 18 -21, The Association for Progressive Communications, Johannesburg, available online at http://www.apc.org/en/system/files/APCHandbookWeb_EN.pdf • Srivastava, L , Kelly, T, Lu, C and Yu, L (2006) 'digital.life: ITU Internet Report 2006', International Telecommunication Union, Geneva
Additional References	<ul style="list-style-type: none"> • Economist (2010) 'A world of connections: A special report on social networking', <i>The Economist</i>, 30 January 2010, available online at http://www.economist.com/surveys/downloadSurveyPDF.cfm?id=15383450&surveyCode=%2555%254b&submit=View+PDF • Kapur, A (2005) 'Internet Governance: A Primer', United Nations Development Programme–Asia-Pacific Development Information Programme, Bangkok, available online at http://www.apdip.net/publications/iespprimers/eprimer-igov.pdf • Klein, H (2005) 'ICANN Reform: Establishing the Rule of Law', policy analysis prepared for the World Summit on the Information Society (WSIS), Tunis, 16 - 18 November 2005, Georgia Institute of Technology Atlanta, available online at http://www.prism.gatech.edu/~hk28/ICANN_Rule-of-Law.pdf • OFCOM (2006) 'Regulation of VoIP Services: Statement and further consultation, Office of Communications, London, available online at http://www.telecomweb.com/Assets/readingroom/Ofcom_VoIP_Regulation_Proposal_Feb_2006.pdf • Shuler, R (2002) 'How Does the Internet Work?', The Shulers, available online at http://www.theshulers.com/whitepapers/internet_whitepaper/index.html • Srivastava, L et al (2004) 'ITU Internet Reports: The Portable Internet', International Telecommunication Union, Geneva
Activity	
About your Lecturer	See above.

6 Undersea cable market and business models	
Presenter	Dr Abi Jagun
Outcomes	<p>Participants will be able to:</p> <ul style="list-style-type: none"> • Discuss the technologies and geographic distribution of undersea cables • Articulate the purpose and value of undersea cables of international connectivity • Understand the importance of the undersea cable market and business models to Internet usage and economic development
Content	<ul style="list-style-type: none"> • Technology overview • The evolution of the undersea cable market in Africa • Business models in the undersea cable market • Implications for policy and regulation
Core Readings	<ul style="list-style-type: none"> • Jagun, A (xxxx). •
Activity	
About your Lecturer	<p>Dr Abi Jagun is a Lecturer at the Graduate School of Public and Development Management. Dr Jagun was previously a Research Fellow in the Department of Management Science at the University of Strathclyde, Glasgow. She holds an MSc in Operations Research and a PhD from the University of Strathclyde, an MBA from Cardiff University, UK and a BSc Hon in Botany from the University of Lagos, Nigeria. She taught post-graduate classes at the University of Strathclyde – The Communications Environment, Technology and Market Interaction, Research Methods; and at the University of Manchester – ICTs and socio-economic development, Research skills for development. Abi has conducted research and published on subjects in the field of ICT policy and development, including publication under the banner of the Association for Progressive Communications (APC).</p>

7 Internet and broadband market trends, developments and drivers	
Presenter	Luci Abrahams
Outcomes	Participants will be able to: <ul style="list-style-type: none"> • identify significant trends in the growth of Internet and broadband markets; • articulate significant current factors affecting the growth and development of the Internet; • understand the role played by experience in uptake of Internet applications.
Content	<ul style="list-style-type: none"> • Internet market trends and growth patterns • Broadband market trends and growth patterns • Online media, mobile and Internet usage • Factors influencing Internet diffusion and broadband uptake
Core Readings	<ul style="list-style-type: none"> • Goldstuck (2010) 'Internet Access in South Africa 2010', World Wide Worx, Johannesburg • Goldstuck (2009) 'Online Media in South Africa 2009', World Wide Worx, Johannesburg
Additional References	<ul style="list-style-type: none"> • Goldstuck, A (2007) <i>The Hitchhiker's Guide to Going Mobile</i>, Double Storey, Cape Town, 2007
Activity	
About your Lecturer	As above.

8 Signal distribution, broadcasting technologies, market trends and digital migration	
Presenter	Nadia Bulbulia, Independent telecoms and broadcasting consultant
Outcomes	<p>Participants will be able to:</p> <ul style="list-style-type: none"> • describe the basic components, systems and functions of a broadcast network, as well as the relative strengths and weaknesses of the various broadcast systems and technologies; • outline the features of digital broadcast systems and the challenges of introducing digital broadcasting; • describe the broad policy/legislative/regulatory paradigms affecting the shape of the South African (SA) broadcasting market and the main institutions/stakeholders; • describe the interrelationships between financing, content and audiences in the SA broadcasting market; • discuss the application public interest principles such as diversity, nation-building, access, citizen empowerment, economic development in the broadcasting market; • evaluate the potential impact of digital migration, new delivery platforms and new subscription services on the broadcasting market and audiences.
Content	<ul style="list-style-type: none"> • Introduction to analogue broadcasting, modulation techniques, propagation, RF spectrum planning • Overview of signal distribution networks: coverage planning, high-site establishment and management, shared infrastructure • Digital broadcasting systems: features, challenges, frameworks • Policy/legislative/regulatory paradigms affecting the shape of SA broadcasting market and "the public interest" in broadcasting • Broadcasting sectors (national, regional, local; public, public commercial, commercial, community) • Broadcasting platforms (terrestrial free-to-air, terrestrial subscription, satellite free-to-air, satellite subscription) • Broadcasting institutions & stakeholders • Financing mechanisms (state funds, licence fees, advertising), content and audiences
Core Readings	<ul style="list-style-type: none"> • Koenderman, T (2010) 'South Africa & SADC: Media Facts 2010', OMD South Africa Johannesburg, http://mars.biz-community.com/c/article/50100_1.pdf • da Costa, P (2009) 'Broadcasting Technology and Networks', in Souter, D (ed) (2009) <i>The APC ICT Policy Handbook</i>, chapters 18 -21, The Association for Progressive Communications, Johannesburg, available http://www.apc.org/en/system/files/APCHandbookWeb_EN.pdf • DoC (2009) PSB Discussion Paper, Department of Communications, Pretoria, 20 July 2009, available http://www.doc.gov.za/index.php?option=com_content&task=view&id=332&Itemid=457 • FCC (2003) 'Radio Pioneers & Core Technologies', Federal Communications Commission, Washington DC, available online at http://www.fcc.gov/omd/history/radio/
Additional References	<ul style="list-style-type: none"> • Armstrong, C & Collins, R (2004) Digital Dilemmas for South African TV, Policy Research Paper No 6, LINK Centre, University of the Witwatersrand, Johannesburg, available http://link.wits.ac.za/papers/ddtvcarc.pdf •

	<ul style="list-style-type: none"> • DoC (2007) 'Broadcasting Digital Migration: Implementation Plan for South Africa', Department of Communications, Pretoria, available online at http://www.doc.gov.za/digitalm/images/stories/Digital_Migration/Misc_Docs/draft%20digital%20migration%20implementation%20plan%20v1.pdf • SADIBA (nd) Recommendations on Terrestrial Digital Radio for South Africa, Southern African Digital Broadcasting Association, Johannesburg, available online at http://www.sadiba.co.za/PDFfiles/dr_recommendation.pdf • SADIBA (nd) Recommendations on a South African standard for Digital Terrestrial Television (DTT), minimum receiver functionality and acceptable quality of service, Southern African Digital Broadcasting Association, Johannesburg, available online at http://www.sadiba.co.za/PDFfiles/dtt_standards_recommendation.pdf • SADIBA (nd) Recommendations on the management of Service Information (SI) for Digital Terrestrial Television (DTT), Southern African Digital Broadcasting Association, Johannesburg, available online at http://www.sadiba.co.za/PDFfiles/dtt_si_recommendation.pdf • SADIBA (nd) Analogue to digital television broadcast migration strategy for South Africa, Southern African Digital Broadcasting Association, Johannesburg, available online at http://www.sadiba.co.za/PDFfiles/dtt_migration_recommendation.pdf <p>Web sites:</p> <ul style="list-style-type: none"> • SenTech - http://www.sentech.co.za/ • WorldDAB - http://www.worlddab.org • Digital Video Broadcasting Project - http://www.dvb.org • NTL - http://www.ntl.co.uk
Activity	<p>Take a radio and scan through the band (If possible FM/MW and SW). Record the number of stations you receive, the respective frequency used, as well as your impression of the quality</p>
About your Lecturer	<p>Nadia Bulbulia has been instrumental in policy and regulation of broadcasting and telecommunications since 1994. She joined the IBA and worked on the Triple Inquiry and the licensing of community and commercial broadcasting services. As an IBA Councillor Nadia chaired several inquiries, including local content, broadcasting standards, advertising and sponsorship rules. In 2002 Nadia was appointed as an ICASA Councillor, where she led the mobile number portability regulatory process and was responsible for the licensing of the second network operator, subscription broadcasting regulation, sports rights and the re-licensing of the SABC. Nadia was on the board of NEMISA, the SABC and the World Summit on Media for Children Foundation. She spent three years heading Cell C's Regulatory Affairs division. Nadia is an alumni of both the LINK Centre and the University of Witwatersrand. She obtained her MA (Arts) at Wits University focusing on television policy for children.</p> 

9 Spectrum planning and management, and the assignment of frequency	
Presenter	Peter Zimri, Regulatory Division, Neotel
Outcomes	<p>Participants will be able to:</p> <ul style="list-style-type: none"> • Describe the nature and uses of the electromagnetic spectrum; • Articulate the role and importance of spectrum management in telecommunications and broadcasting; • Discuss key issues and challenges affecting frequency planning and assignment; • Analyse the structures, processes and issues governing the planning of spectrum utilisation at national and international level.
Content	<ul style="list-style-type: none"> • Introduction to electromagnetic spectrum • Technological trends and emerging technologies • Spectrum Management - Definition, needs and terminologies • Technological trends and emerging technologies • Key drivers of spectrum demand • Spectrum management structures • Table of Frequency Allocations • Band planning • Spectrum pricing
Core Readings	<ul style="list-style-type: none"> • ICASA (2011). Radio Frequency Spectrum Regulations, Government Gazette No. 34172, Independent Communications Authority of South Africa, Johannesburg, 31 March 2011 • Song, S (2010). • McLean Foster (2007) 'ICT Regulation Toolkit: Radio Spectrum Management - Executive Summary', McLean Foster & Co, in collaboration with Martin Cave and Robert W. Jones, InfoDev, Washington & International Telecommunication Union, Geneva, http://icttoolkit.infodev.org/admin/www.ictregulationtoolkit.org/Mod5ExecSum
Additional References	<ul style="list-style-type: none"> • Arnbak, A (1997) 'Managing the Radio Spectrum in the New Environment', in Melody, W (ed) Telecom Reform: Principles, Policies and Regulatory Practices, Den Private Ingeniørfond, Technical University of Denmark, Lyngby, available online at http://lirne.net/2003/resources/tr/chapter11.pdf • Cave, M (2002) <i>Review of Radio Spectrum Management: An independent review for Department of Trade and Industry and HM Treasury</i>, available online at http://www.cochrane.org.uk/inside/uk-radio-spectrum-management.pdf • Cave, M (2002) 'Spectrum Allocation Controversies', in Mansell, R, Samarajiva, R & Mahan, A (eds) Networking Knowledge for Information Societies: Institutions & Intervention, Delft University Press, 2002 • ICASA (2004) 'South African Frequency Allocations', Independent Communications Authority of South Africa, Johannesburg • ITU (2002) 'Handbook on Spectrum Monitoring', International Telecommunication Union, Geneva, available for sale from http://www.itu.int/publ/R-HDB-23-2002/en • ITU (1998) 'Design Guidelines for Developing Advanced Automated Spectrum Management Systems (ASMS)', International Telecommunication Union, Geneva • Lewis, S (1996) 'Radio Frequency Spectrum Management from the Perspective of a Major Network Operator', <i>IEEE Africon 4th Conference</i>, Volume 1, 24 - 27 September 1996, Institute of Electrical and Electronics Engineers • Melody, W (2001) 'Spectrum Auctions and Efficient Resource Allocation: Learning From The 3g Experience In Europe', Telecom Reform, Vol 1 No 1, Delft University of Technology, April 2001 • Sutherland, E (2007) 'European Spectrum Management: Successes, Failures & Lessons', Document no MMSM/03, prepared for ITU Workshop on Market Mechanisms for Spectrum Management, Geneva, 22 - 23 January 2007, International Telecommunication Union, Geneva, available online at http://www.itu.int/osg/spu/stn/spectrum/workshop_proceedings/Background_Papers_Final/Ewan%20Sutherland%20-%20itu_spectrum_revised.pdf
About your Lecturer	Peter Zimri works in the regulatory section at Neotel. He has extensive experience in the ICT sector, including periods at the Department of Communications and ICASA.

10 Numbering and numbering plans, number portability, carrier pre-select, eNum	
Presenter	Charley Lewis
Outcomes	<p>Participants will be able to:</p> <ul style="list-style-type: none"> • Recognise numbers as a finite resource; • Understand numbering terminology; • Describe international best practice in numbering and number planning; • Recognise the relevance of numbering for the various stakeholders; • Discuss the regulatory issues relating to numbering; • Analyse the approach to numbering regulation in South Africa.
Content	<ul style="list-style-type: none"> • Importance of numbering • Numbering terminology • ITU standards • Perspectives on numbers • Number portability, carrier pre-select & e-num • Number planning • ICASA & the SA numbering plan
Core Readings	<ul style="list-style-type: none"> • Milne, C (2005) 'World numbering developments', Antelope Consulting, London, available online at http://www.antelope.org.uk/numbering/World_numbering_developments.pdf
Additional References	<ul style="list-style-type: none"> • Horrocks, J, Lewin, D & Milne, C (2000) 'A strategic numbering review: report to the Dutch Government', Antelope Consulting, London, available online at http://www.antelope.org.uk/numbering/DGTP_report.pdf • ICASA (2001) 'Telecommunications Numbering Plan 2001', Notice 1424 of 2001, Independent Communications Authority of South Africa, Sandton • ICASA (2004) 'Draft Functional Specification for Mobile Number Portability under the Number Portability Regulations', Government Gazette No 27062, Independent Communications Authority of South Africa, Sandton • ICASA (2005) 'Number Portability Regulations', Regulation Gazette No 8320, Government Gazette No 28091, Independent Communications Authority of South Africa, Sandton, 30 September 2005 • ICASA (2005) 'Regulations on Carrier Pre-Selection', Notice 975 of 2005, Government Gazette No 27717, Independent Communications Authority of South Africa, Sandton • ICASA (2006) 'Numbering Plan Regulations', Regulation Gazette No 8470, Government Gazette No 28839, Independent Communications Authority of South Africa, Sandton, 15 May 2006 • ITU (1997) 'E.164 - The International Public telecommunication Numbering Plan', International Telecommunication Union, Geneva • Milne, C (1997) 'The Design and Management of Numbering', in Melody, W (ed) <i>Telecom Reform: Principles, Policies and Regulatory Practices</i>, Den Private Ingeniørfond, Technical University of Denmark, Lyngby, available online at http://lrne.net/2003/resources/tr/chapter12.pdf • Milne, C (2002) Numbering harmonisation in the SADC region: a draft discussion paper, Antelope Consulting, London • Milne, C (2002) 'Numbering trends: A global overview', executive summary, USAID, Gaborone, available online at http://www.antelope.org.uk/numbering/Global_numbering_trends.pdf • Obermier, T (2001) 'The Crucial Role of Local Number Portability in Today's Telecommunications Industry', <i>The Journal of Technology Studies</i>, Volume XXVII, No 1, Winter/Spring 2001, available online at http://scholar.lib.vt.edu/ejournals/JOTS/Winter-Spring-2001/pdf/obermier.pdf • Rogerson, D, Holland, M, & Griffiths, N (2005) 'Mobile Number Portability – an international benchmark', A report to MTN, Ovum, London, available online at http://www.icasa.org.za/Repository/resources/Events&%20Publications/Publications/2.Ovum%20FinalReport.doc • Strålmark, J (2001) 'Summary - ENUM - functions that maps telephone numbers to Internet based addresses: A description and the possible introduction to Sweden, National Post and Telecom Agency, Stockholm, available online at http://www.ero.dk/67447693-A83F-4AFD-A48C-32BE4049F60B
About your Lecturer	See above.