



DEPARTMENT OF ELECTRICAL ENGINEERING

University of Cape Town
Room 4.33, 4th Level, Menzies Building
Library Road, Upper Campus
Private Bag X3, RONDEBOSCH, 7701
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The Department of Electrical Engineering and the Centre for Broadband Networks cordially invite you to attend a five day course entitled:

MODERN NETWORKING

BY PROF. Dr. THOMAS MAGEDANZ

**VISITING PROFESSOR AT THE UNIVERSITY OF CAPE TOWN AND FULL
PROFESSOR AT THE TECHNICAL UNIVERSITY OF BERLIN, GERMANY**

Motivation and Overview

Enterprises are faced with demands that focus their attention on the need to design, evaluate, manage and maintain networks infrastructures to:

- (a) Process large quantities of data within tolerable time periods; big data need distributed file systems, distributed databases, cloud computing platforms, internet storage and other scalable storage technologies.
- (b) Move a substantial portion of the information technology operation to a cloud computing infrastructure.
- (c) Have large number of objects providing services to end users. Billions of such devices will be interconnected in industrial, business and government networks providing interactions between the physical world, applications and services.
- (d) Have mobile devices as an indispensable part of an enterprise generating unique demands on network planning and management.

This five day lecture course will address four key innovation areas in Modern Networking, which are closely related but nevertheless represent different research domains, namely:

- Network of the Future (NoF) driven by Mobile Broadband evolution towards high bandwidth heterogeneous access networks, single core network architectures, and the notion of Software Defined Networks (SDN) and the Openflow protocol;
- Traditional concepts of virtual networks and the modern approach to network virtualization; the concept of software defined infrastructure.
- Cloud-based Networks and Service Delivery Platforms (SDP), enabling much more scalable and cost efficient realizations and roll outs of networks and innovative applications.
- Internet of Things (IoT) and unified Machine to Machine (M2M) communications enabling the convergence of a broad spectrum of monitoring and control applications;
- The 5G infrastructure which is expected to become the core of the digital society and economy. Anything as a service (XaaS) everywhere is envisioned as among the primary drivers for global adoption. 5G will support mission-critical machine communications and massive machine type of traffic. As a result the key performance metrics that 5G is expected to improve are in terms of latency, reliability, capacity, spectrum and network agility.



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DETAILED LECTURE PLAN:

DATES: December 10 – December 17, 2015

VENUE: SEMINAR ROOM 6.01.7 , 6th Floor, Menzies Building, Department of Electrical Engineering, University of Cape Town

TIME: 09h00 to 13h00

TARGET AUDIENCE:

This UNIFI course is offered to M.Eng students in the Telecommunications programme. Invites will be extended to a score of postgraduate students in the Department of Electrical Engineering at UCT and to a limited number of staff/students associated with other Telkom Centres of Excellence in South Africa, invited technical staff of selected Industry and Operators in South Africa.

Invitees may choose to attend selected areas of interest. Attendance is compulsory for all M.Eng students.

FEES:

For invited postgraduates and guests there are no fees associated with the course.

REGISTRATION:

Please contact:

Mr. Keagan Jarvis

Email: keaganjarvis@crg.ee.uct.ac.za to request bookings by e-mail; acceptance to be confirmed by email.

SHORT BIOGRAPHY:

Thomas Magedanz (PhD) is full professor in the electrical engineering and computer sciences faculty at the Technical University of Berlin, Germany, leading since ten years the chair for next generation networks (www.av.tu-berlin.de). In addition, he is director of the "next generation network infrastructures" division of the Fraunhofer Institute FOKUS (www.fokus.fraunhofer.de/go/NGNI), which also provides various well recognised software toolkits, namely the OpenXXX series, and testbeds to industry and academia around the globe. He has been working for over 25 years in the convergence field of fixed and mobile telecommunications, the internet and information technologies, which resulted in many industry driven R&D projects centred on Next Generation Service Delivery and control platforms. In the course of his research activities he published more than 350 technical papers/articles and guided more than 15 PhDs. In addition, Prof Magedanz is a senior member of the IEEE and editorial board member of several journals.

Contact:

Prof Dr Thomas Magedanz

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PROGRAMME

DAY 1 – December 10, 2015: Software Defined Networks

9h00 – 13h00:

1. Provides an overview of modern networking
2. A survey of the elements that make up the networking ecosystem, i.e. network technologies, network architecture, services and applications.
3. Examine the requirements that have evolved for the current network environment and provide a preview of the key technologies for modern networking.
4. Software Defined Networks (SDN) concepts, technology and applications. What is the SDN approach and why it is needed. An overview of the SDN architecture
5. Organizations that are issuing specifications and standards for SDN
6. The SDN data plane, how they interact and how they are managed.

DAY 2 – December 11, 2015: Software Defined Networks

9h00 – 13h00:

1. OpenFlow: a data plane technology and an interface to the control plane.
2. The SDN control plane
3. OpenDaylight: An Open Source implementation of the Control Plane
4. The SDN Application Plane
5. Major Application Areas supported by SDN
6. Examples of SDN applications
7. OpenFlow Laboratory: Developing a Network Application with Mininet

DAY 3 – December 14, 2015: Network Function Virtualization (NFV)

9h00 – 13h00:

1. Understanding the differences and Synergies: SDN vs. NFV
2. Motivation for NFV – Bitrualising IMS, EPC and End User Systems (vIMS, vEPC, vAnything)
3. ETSI NFV Industry Standardization Group Overview
4. Key NFV Architectural principles and Terminology
5. Understanding the importance of MANO
6. Available Open Source Tools
7. Introduction to the FOKUS Open Baton Open Source Toolkit



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DAY 4 – December 15, 2015: Machine to Machine (M2M)/Internet of Things (IoT) **9h00 – 13h00:**

1. Understanding the M2M/IOT Universe – Smart Cities as a driver for M2M/IOT
2. Example M2M Applications and the Motivation for common M2M Platforms
3. ETSI/OneM2M Standards Overview
4. Overview of the FOKUS OpenMTC toolkit
5. Towards the Industrial Internet as a specific M2M/IOT application domain

DAY 5 – December 17, 2015: The Ultimate Convergence Platform **9h00 – 13h00:**

1. Overview of Global 5G initiatives and 5G Architectural Foundations
2. The Role of SDN/NFV in 5G
3. SDN-based Core Net Evolution (EPC and OpenFlow)
4. Key 5G Application Domains (IOT/M2M)
5. EMERGING 5G Business Models - VNO enablement and Network Slicing Concepts
6. Mobile Edge Computing for IOT/ Industrial Internet
7. Overview of the FOKUS 5G Playground
8. From OpenMTC towards 5GMTC
9. Outlook: M2M and SDN research at UCT