INSTITUT NATIONAL DES SCIENCES APPLIQUÉES LYON

DPT TELECOMMUNICATIONS SERVICES ET USAGES
TELECOMMUNICATIONS, SERVICES & USAGES
INSA Campus LyonTech - Bâtiment Hedy Lamarr
6 avenue des Arts - 69621 VILLEURBANNE
Phone 0472436060

Network

Mobile Network Architecture

IDENTIFICATION

CODE : TC-4-S1-EC-ARM
ECTS : 2.0

HOURS

Lectures :	12.0 h
Seminars :	4.0 h
Laboratory :	4.0 h
Project :	0.0 h
Teacher-student contact :	20.0 h
Personal work :	12.0 h
Total :	32.0 h

ASSESSMENT METHOD

2h examination and one short project dealing with 2G/3G radio interfaces monitoring.

TEACHING AIDS

Lectures are made on a global presentation of real cellular networks (GSM and 3G). An in-depth presentation is given

The lecture is completed by a study of another norm in seminars, pratical work on both GSM and 3G trame analysis and 3 working groups.

TEACHING LANGUAGE

French

CONTACT

M. STANICA Razvan
razvan.stanica@insa-lyon.fr
Phone : 0472437311
M. VALOIS Fabrice
fabrice.valois@insa-lyon.fr

AIMS

SKILLS:
Technical reading of normes
Understanding the basic concepts of cellular network
Monitoring radio interfaces using mobile tools (GSM Show for 2G, Nemo for 3G)
Radio ressources sharing and optimization
Mobility management (including roaming and handover)
Working in group

AIMS :

This course gives an overview of mobile communication network through their design, architecture and services. We consider both 2G (GSM) and 3G networks. A brief overview of 4G networks (LTE) is given. The course give an in-depth description of the radio interfaces, the logical channels, the radio sub-system and the network one.

CONTENT

General introduction to cellular networks
Keys market and business facts
GSM : global overview, archictecture, basic concepts, security issues
GSM : radio ressource sharing and logical channels
GSM : radio and network sub-system, OMC
GSM : Incoming call from fixed phone to mobile phone (theory, measurements)
From voice traffic to packets exchange: SMS, GPRS, EDGE
3G : introduction, migration strategies from 2G to 3G, architectures
3G : radio ressource sharing, dynamic ressources allocation
3G : radio & network sub-system
3G : services, QoS, HSxPA
Introduction to 4G network (LTE)

BIBLIOGRAPHY

[1] Normes et manuel de l'UIT - R.
[2] "Mobile radio networks", B. H. Walke, Ed : Wiley, 1999
[3] "Réseaux GSM-DCS (5ème édition)", X. Lagrange, P. Godlewski, S. Tabbane, Ed : Hermes
[4] "Réseaux Mobiles", S. Tabbane, Ed : Hermes, 1997
[5] "WCDMA for UMTS", Revised edition, Holma, Toskala, Ed. Wiley, 2001.
[6]"UMTS : Releases 6, 7, 8, HSUPA, MBMS et LTE/E-UTRA inclus", J. Sanchez, T. Mamadou, Ed. Hermès, 2007
[7] "LTE et les réseaux 4G", Y. Bouguen, E. Hardouin, F.-X. Wolff, Ed. Eyrolles, 2012

PRE-REQUISITE

Fundamentals of Networking and IP networks (3TC-NET), Signal processing for telecommunications (3TC-TSI), Wireless communication (4TC-WCO).