DEREE COLLEGE SYLLABUS FOR:

ITC 3523 MOBILE TELECOMMUNICATIONS AND NETWORKING – LEVEL 6 (12 UK CREDITS)

(Updated Spring 2010)

Level 6
12 UK Credits

Compulsory as part of the IT Networks and Telecommunications emphasis

PREREQUISITES:
- CS 1070 Introduction to Information Systems
- CS 2188 Introduction to Programming
- ITC 2293 Operating Systems Concepts
- CS 3275 Communications and Networking Essentials
- ITC 3421 Telecommunications Essentials

CATALOG DESCRIPTION:

RATIONALE:
The course is a continuation of CS34XX (Telecommunications Essentials) and is intended for students following the Networks and Telecommunications emphasis of the IT major. It focuses on mobile telecommunications technologies through the study of UMTS and LTE, and the analysis of the architecture and the functionality of 3G and 4G networks.

The course is suitable for students, who aim for a career or graduate studies in Information Technology, Computer Science, and Communications and Networking.

OBJECTIVES:
As a result of taking this course the student should be able to:
1. Demonstrate knowledge and understanding of 3G networks.
2. Demonstrate knowledge and understanding of 4G networks.
3. Describe the evolution process from GSM to UMTS.
4. Compare UMTS with LTE.
5. Analyse and compare architectures.
6. Analyse radio and cellular radio communication.
7. Evaluate access techniques.
8. Analyse the UMTS core network operation.
9. Analyse the UMTS terminal operation.
10. Demonstrate knowledge of the available services.
11. Critically discuss security aspects.
12. Evaluate security alternatives.
13. Describe protocols and make a proper choice.
14. Evaluate needs and select an appropriate mobile telecommunications solution.

LEARNING ACTIVITIES:
1. Classroom lectures.
2. Laboratory sessions.
3. Homework assignments.
4. A research project involving the study of the implementation of the latest mobile technologies.
5. Office hours held by the instructor to provide further assistance to students.
6. Use of the Blackboard Learning platform to further facilitate communication, by posting lecture notes, assignment instruction, announcements, and online submission.

EVALUATION:
- A midterm examination 30%
- Homework assignments 10%
- A programming project 20%
- A comprehensive final examination 40%

REQUIRED MATERIAL:
- Instructor’s notes.

OTHER REFERENCES:
COMMUNICATION REQUIREMENTS: Daily access to the course’s site on the College’s Blackboard CMS. Use of word processing and/or presentation graphics software for documentation of assignments.

SOFTWARE REQUIREMENTS: Microsoft Windows Server 200x, latest
Microsoft Windows 200x Professional, latest
Microsoft TechNet Library

WWW RESOURCES: 3G4G Wireless Resource Center (http://www.3g4g.co.uk/)
Mobile News (http://www.zdnet.com/topics/mobile?tag=mantle_skin;content)
Telecom Resources (http://www.answerconnect.com/articles/telecom-resources)

CONTENT OUTLINE:
1. Specification process for 3G
2. Introduction to 3G network architecture
   2.1. Conceptual network model
   2.2. Structural network architecture
   2.3. Resource management architecture
   2.4. UMTS Service and Bearer architecture
3. Evolution from GSM to UMTS
4. Radio communication
   4.1. Radio communication essentials
   4.2. Cellular radio communication
   4.3. Multiple access techniques
   4.4. Regulation
   4.5. The 3G Radio Path
5. UMTS Radio Access Network (UTRAN)
   5.1. Architecture
   5.2. Base station
   5.3. Radio network controller
6. Core network
   6.1. Architectures in 3GPP
   6.2. Mobility management
   6.3. Communication management
7. Terminal
   7.1. Architecture and differentiation of terminals
   7.2. Capabilities
   7.3. User interface
8. Services in the UMTS environment
9. Security in the UMTS environment
10. Protocols
10.1. Protocol reference architecture in 3GPP
10.2. UMTS protocol interworking architecture
10.3. Transport network aspects
10.4. Radio network protocols
10.5. System network protocols

11. LTE and 4G Wireless