(INFORMATION NETWORKS)

Programme(s) on which the course is given	Information Technology
Major or Minor element of programs	Major
Department offering the program	Information Technology
Department offering the course	Information Technology
Academic year / Level	4th year / 2nd semester
	9 / 5 / 2007

A- Basic Information

Title	**Information Networks**			**Code**	**IT461**	
Credit Hours	**Lecture**	**3**	**Tutorial**	**1**	**Practical**	**2**
	Total				**6**	

B- Professional Information

1 – Overall aims of course

- Understand the principles of Mobile Communication Systems
- Understand the different Multiple Access Technologies for Mobile communication systems
- Understand the Satellite systems
- Understand Mobile network and transport layers
- Understand the design and operation of Telecommunication systems GSM/DECT/TETRA/GPS./UTMS

2 – Intended learning outcomes of course (ILOs)

- **Knowledge and understanding:**

a1- The fundamentals of mobile communication systems
a2- The limitations imposed by wireless systems
a3- Basic modulation and transmission techniques
a4- Practical channel coding schemes
a5- The architectures of mobile communication systems
a6- Some standards of mobile systems such as GSM

- **Intellectual skills**

b1- Develop essential analytical skills for understanding wireless communications systems and their future evolution

b2- Critically analyze and evaluate the performance of a mobile communications system, taking into account of the design trade-offs, capacity and limitations of the technology adopted

- **Professional and practical skills**

c1- Grasp key technical issues of current wireless communications systems

c2- Specify and design key parts of a communication system operating within an existing standard

- **General and transferable skills**

d1- Demonstrate a range of basic skills required to work effectively in communications and IT industry

d2- Understand the need for continuing professional development and lifelong learning in order to cope with rapidly changing communications technology

3- Content

Topic	No of hours	Lecture	Tutorial/Practical
1 Introduction • Challenges of wireless and mobile networking. • Essential backgrounds.	6	3	3
2 Characteristics of Wireless Transmissions • Signal propagation. • Path loss and fading. • Multiplexing. • Modulation. • Cellular systems • Spread spectrum	15	7.5	7.5
3 Medium Access Control (MAC) • Medium Access Control (MAC). • Notions of SDMA, FDMA, TDMA. • Pure random access protocols -- Aloha and related protocols. • CSMA-based protocols.	15	7.5	7.5
4 Telecommunication systems • GSM: System architecture, protocols, Security • DECT: System architecture, protocols • UMTS and IMT 2000	12	6	6
5 Wireless LAN • Infrared vs. radio transmission • Infrastructure and ad hoc networks • IEEE 802.11 • HIPERLAN • Bluetooth	12	6	6
6 Mobile network layer • Mobile IP. • Dynamic host configuration protocols. • Ad hoc networks.	12	6	6

7 Mobile transport layer • Traditional TCP 292. • Indirect TCP. • Snooping TCP. • Mobile TCP. • Fast transmit/fast recovery. • Transmission oriented TCP.	12	6	6
Total sum	**84**	**42**	**42**

4– Teaching and learning methods

4.1	Information collection
4.2	Research assignment
4.3	Lecture
4.4	Class activities
4.5	Practical training / lab
4.6	Exercises and tutorials

5- Student assessment methods

5-a- Methods

5.a.1	Class test (1) ……. ***to assess*** …Understanding...
5.a.2	Class test (2) ……. ***to assess*** …Understanding...
5.a.3	Reports …… …. ***to assess*** Problem Solving
5.a.4	Mid term exam … ***to assess*** gains of completed topics….

5-b- Assessment schedule

Assessment 1	5th week.
Assessment 2	8th week.
Assessment 3	10th week.
Assessment 4	16th week (Oral and practical)
Assessment 5	17^{th} -18^{th} weeks *(final written exam)*

5-c- Weighting of assessments

Mid-term examination	10%
Final-term examination	60%
Oral examination	10%
Practical examination	10%
Semester work	10%
Other types of assessment	-
Total	100%

6- List of references

6-a- Course notes

There are lectures notes prepared in the form of a book authorized by the department

6-b- Essential books (text books)

[1] J. Schiller, Mobile Communications, Addison-Wesley, 2003.

6-c- Recommended books

[1] Lin Jason yi-bing , Wireless and mobile network architectures

6-d- Periodicals, Web sites, … etc

IEEE transactions on computers, software, networks
http://www.cs.albany.edu/~maniattb/teaching/networks
http://eeclass.stanford.edu/ee384a/
http://www.acm.org/
http://www.ieee.org/portal/index.jsp
http://www.isi.edu/nsnam/ns/

7- Facilities required for teaching and learning

- Network laboratory.
- Software for networks simulation.
- Datashow, screen, and laptop computer.

Course coordinator:

Dr Wail Shaoky El Kelany

Head of Department:

Prof. Mohiy M. Hadhoud

Date: