(DIGITAL 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

9 / 5 / 2006

A- Basic Information

Title	**Digital Networks**			**Code**	**IT462**	
Credit Hours	**Lecture**	**3**	**Tutorial**	**3**	**Practical**	**-**
	Total				**6**	

B- Professional Information

1 – Overall aims of course

- Learn the terminology of Digital Networks.
- Understand the fundamental concepts of Digital Networks.
- Understand the structure of ATM Networks.
- Analysis and design of Digital Networks.
- Exposure students to planning process and implementation Digital Network.

2 – Intended learning outcomes of course (ILOs)

a- Knowledge and understanding:

a1	Students will demonstrate knowledge and understanding of the essential core content of the discipline of Information technology, and demonstrate the ability to apply content-knowledge in the specification, analysis, design, implementation and testing of a software solution.
a4	Students will exhibit and demonstrate abilities in the fields of computer networks, Multimedia, and computer processing.
a6	The student will know and understand the basic definitions and components of computer networks, network evaluation, and security.
a7	The student will be able to explain the fundamentals of digital networks and telecommunications systems.
a8	Understanding the principles of multimedia, signal and image processing and applications.

b- Intellectual skills

b2	Analyze different information technology problems and be able to implement algorithms to

	solve the problems.
b3	Be able to implement computer networks solutions, analyze the network traffic, explain different protocols used in the network, capable of describing the network services, and analysis of computer security problems
b6	will demonstrate creative thinking in preprocessing the data, analysis, generalize and summarize the data, analyze and contrast different mining association rules, able to mine complex types of data, data and information retrieval.
b7	demonstrates clear understanding of digital networks and wireless communications systems and their future evolution.

c- Professional and practical skills

c1	Students will demonstrate the ability to effectively manage Information technology problems and solutions and apply content-knowledge in the specification, analysis, design, implementation and testing of a software solution.
c2	Promote new uses of information technology within the institution through the support for exploratory and innovative applications.
c5	Develop, enhance, and manage computer networks to provide high speed, transparent, and highly functional connectivity among all information resources, implement programs to evaluate network traffic and security.
c6	Facilitate the collection, storage, security and integrity of electronic, apply a data mining methodology to real data, ability to retrieve and presenting information, programming Intelligence Searching techniques.
c7	Grasp key technical issues of current digital and wireless communications systems, Specify and design key parts of a communication system operating within an existing standard

d- General and transferable skills

d1	Explain the IT problems and their solutions, and effective skills in management of IT projects. Demonstrate a range of basic skills required to work effectively in communications and IT industry, understand the need for continuing professional development and lifelong learning in order to cope with rapidly changing communications technology
d2	Provide effective technology explanations for audio/visual, computer, multimedia, voice, video, and web based applications and services to all areas of the college,
d3	Explain the use of mathematical modeling to predict the behavior of a physical system, develop an analytical approach to understanding complex systems
d6	Describe the computer network structures, protocols and services, traffic analysis,
d7	Describe the explain the digital network structure and services,
d8	Describe and explain how parameters of statistical data are calculated and tested, the methods of statistical data analysis, solving problems associated with statistical data.
d9	Group working to apply data mining techniques to simple and complex problems, Use of technological tool to preprocess and prepare data for knowledge discovery, Use of technological tool to clean, integrate, transform, and reduce data, Use of technological tool to design graphical user interfaces based on a data mining query language
d10	Demonstrate and explain concepts of Artificial Intelligence, analysis of searching techniques , basic knowledge of genetic algorithms and neural networks basic idea.

3- Content

Topic	No of hours	Lecture	Tutorial/ Practical
1 **Telecommunications Network, Overview** • User services • Standards • Switching and switch control • Transmission techniques • Trunk and access networks • Network intelligence and value-added services • Signalling • Network management	**12**	**6**	**6**
2 Packet mode (X.25) • Switching in the X.25 network • Voice coding • Coding methods Pulse code modulation New coding methods Differential PCM Adaptive DPCM High-quality telephony	**12**	**6**	**6**
3 Network hierarchy • Network hierarchy in the telephone network • Network hierarchy in other networks .	**6**	**3**	**3**
4 Transmission techniques • Transmission media • Transmission parameters • Efficient use of transmission media • TCP/IP protocol suite • Survey of the Internet Internet protocol Transmission control protocol.	**12**	**6**	**6**
5 Trunk and access networks • Demands on the transport network • The development of trunk networks • The development of access networks • Subscriber categories	**12**	**6**	**6**

• Technical definition of the access network - Modularisation • Transfer modes in the access network • Concentration in the access network • Multiplexing in the access network • Access transport • Radio access, access, Copper • Business in the access network			
6 Network intelligence and value-added services • Reference model • Introduction • Network intelligence • Value-added services	**6**	**3**	**3**
7 Signalling • Control of interactive telecommunication • Basic signalling • Signalling methods • Interexchange signalling in circuit-switched networks • Signalling information in the different networks • Signalling between switching and network intelligence modes	**6**	**3**	**3**
8 Network management • Operation and maintenance • Telecommunications management network • Management of circuit-switched networks • Network management - Transport networks	**6**	**3**	**3**
9 Dial-up Technology • Introduction • A Short Dialup Technology Background • Dialup Connectivity Technology • Plain Old Telephone Service Modems	**6**	**3**	**3**
10 Voice Over IP (VoIP) • Overview of VoIP Applications and Services • Applications	**6**	**3**	**3**

• Implementation Considerations • VoIP Technologies and QoS Issues • Speech Quality and Characteristics • VoIP Equipment, Protocols and Standards • H.323			
Total sum	**84**	**42**	**42**

4– Teaching and learning methods

4.1	Research assignment
4.2	Lecture
4.3	Class activities
4.4	Sections.

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 5	17^{th} -18^{th} weeks *(final written exam*

5-c- Weighting of assessments

Final-term examination	70%
Mid-term examination	20%
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] Behrouz Behrouz , Data communication and networking

6-c- Recommended books

[1] Curt M. White , Data Communication and Computer Networks

6-d- Periodicals, Web sites, … etc

It is recommended for students to search for similar courses in other universities.

7- Facilities required for teaching and learning

- Software program.
- White board and colored pens.
- Datashow, screen, and laptop computer.

Course coordinator:

Prof. Mohiy Mohamed Hadhoud

Head of Department:

Prof. Mohiy Mohamed Hadhoud

Date: