

Planning and Quality Assurance Affairs

Form (A)

Course Specifications

General Information

Course name	Computer Networks
Course number	ITCS4316
Faculty	
Department	
Course type	Major Needs
Course level	4
Credit hours (theoretical)	3
Credit hours (practical)	0
Course Prerequisites	

Course Objectives

- 1 - Learning basic concepts of computer networks and their components
- 2 - Understanding Internet and different layer protocols (TCP/IP- OSI)
- 3 - Programming simple network applications
- 4 - Understanding of how existing and next-generation communication networks work

## Intended Learning Outcomes

<b>Knowledge and Understanding</b>	<ul style="list-style-type: none"><li>* a1. Identify different general techniques for networking tasks, such as error control, flow control, switching and routing</li><li>* a2. Describe network application architecture and key application layer protocols</li><li>* a3. Define the concepts of reliable data transfer and how TCP and UDP implement these concepts</li><li>* a4. Define the principles of congestion control and trade-offs in fairness and efficiency</li><li>* a5. Explain the principles of multiple access in local area networks</li><li>* a6. Discuss layered communication architectures (OSI and TCP/IP)</li><li>* a7. Explain the principles of Information communication</li><li>* a8. Describe fundamental principles of computer communications and networks and how these support IT-based applications</li><li>* a9. Interpret the essential mathematics relevant to computer science</li><li>* a10. Describe the current and underlying technologies that support computer processing and inter-computer communication</li></ul>
<b>Intellectual Skills</b>	<ul style="list-style-type: none"><li>* b1. Define traditional and nontraditional information technology systems problems, set goals towards solving them, observe results, reason and apply judgment</li><li>* b2. Perform comparisons between (methods, techniques...etc)</li><li>* b3. Identify attributes, components, relationships, patterns, main ideas, and errors</li><li>* b4. Summarize the proposed solutions and their results in computer networks</li><li>* b5. Solve computer network problems with pressing commercial or industrial constraints</li></ul>
<b>Professional Skills</b>	<ul style="list-style-type: none"><li>* c1. Apply sockets programming and implement client/server programs</li><li>* c2. Evaluate systems in terms of general quality attributes and possible tradeoffs presented within the given problem</li><li>* c3. Identify any risks or safety aspects that may be involved in the operation of computing equipment within a given context</li><li>* c4. Evaluate systems in terms of their quality and possible trade-offs, evaluate appropriate hardware and software solutions for given scenarios</li><li>* c5. Operate computing equipment efficiently, taking into account its logical and physical properties</li><li>* c6. Show an in-depth knowledge of appropriate aspects of Information Technology</li><li>* c7. Identify different protocols available in TCP/IP model</li></ul>
<b>General Skill</b>	<ul style="list-style-type: none"><li>* d1. Write a Report</li><li>* d2. Use email system</li><li>* d3. Use digital libraries and/or eLearning Systems</li></ul>

## Course Contents

<ol style="list-style-type: none"><li>1 - The principles and practice of computer networking, with emphasis on the Internet.</li><li>2 - The structure and components of computer networks, packet switching, layered architectures, OSI 7 layer model</li><li>3 - TCP/IP layers, physical layer, error control, window flow control, local area networks (Ethernet, Token Ring; FDDI), network layer, congestion control, quality of service, multicast</li></ol>
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## Teaching and Learning Methods

- 1 - Tutorial Exercises
- 2 - Project and/or Assignments
- 3 - Lectures

## Students Assessment

<u>Assessment Method</u>	<u>TIME</u>	<u>MARKS</u>
Mid-Term Exam I	6th week	20
Project & Presentation	12th week	20
Class Work	During the 16 weeks	10
Final Exam	16th week	50

## Books and References

Essential books	Kurose and Ross, "Computer Networking: A Top-down approach" 4th edition, Addison Wesley, 2007
Recommended books	Andrew Tanenbaum, "Computer Networks, " 4th edition, Prentice Hall, 2002 Brian Hall , "Beej's Guide to Network Programming Using Internet Sockets", Version 2.3.23,2005

## Knowledge and Skills Matrix

Main Course Contents	Study Week	Knowledge and Understanding	Intellectual Skills	Professional Skills	General Skill
The principles and practice of computer networking, with emphasis on the Internet	1-2	a7, a8, a10	b1, b3	c3, c4, c6, c7	d3
The structure and components of computer networks, packet switching, layered architectures, OSI 7 layer model	3-4	a2, a6-a10	b1-b3	c2, c3, c5-c7	d1-d3
TCP/IP layers, physical layer, error control, window flow control, local area networks (Ethernet, Token Ring; FDDI), network layer, congestion control, quality of service, multicast	5-15	a1-a8, a10	b1-b5	c1-c5, c7	d1-d3