Course specification

(3201 Computer Network)

Faculty	HICIT- **Higher Institute for Computers & Information Technology**
Programme(s) on which the course is given	Undergraduate program in Computer Science
Major or minor element of programme	Compulsory
Department offering the programme	Department of Computer Science
Department offering the course	Department of Computer Science
Year / Class	3rd Year – 2nd semester
Date of specification approval	1/8/2022

A- Basic Information

Title: Computer Network	Code: 3201		
Weekly Hours:			
Lecture : 3	**Exercise:**	**Practical: 3**	**Total: 6**

B- Professional Information

1- Course Objectives:
Upon successful completion of the course, students should be:
- understand the fundamental concepts of computer network
- understand the OSI and TCP/IP models
- understand Computer network architecture and its layers

2- Program ILOs Covered by Course

Program Intended Learning Outcomes			
Knowledge and understanding	**Intellectual Skills**	**Professional and practical skills**	**General and Transferable skills**
A18, A19, A21	**B1, B2, B4, B5, B13, B16**	**C6, C9, C10, C14**	**D5**

3 - **Intended Learning Outcomes of course (ILOs)**
a. Knowledge and Under-Standing:
a1. Define data communication and networking concepts. [A19]
a2. Explain the computer networks' standards, protocols (OSI and Internet reference models).[A18-A19]
a3. Clarify principles, concepts and protocols of computer network design and building. [A19-A21]

b.**Intellectual Skills:**
     b1. Interpret internetworking concepts, architecture, and protocols. [B1, B13]
     b2. Compare between alternative computer networks design approaches. [B2, B5]
     b3. Analyze network protocols designs. [B4, B13]
     b4. Illustrates the differences of protocols and architectures. [B1, B2, B4]
     b5. Discuss various network architectures and protocols. [B4, B5, B16]

  c- Professional and practical skills
    c1. Measure the values of protocol parameters and indicate their advantages and disadvantages.
      [C6, C9, C10, C12]

  d- General and transferable skills

  d1. Work effectively as an individual and as a member of a team. [D5]

d2. Write technical Report. [D5]

4- Contents and Course Outline

Topic	Hours	Lecture	Practical
Chapter 1. Computer Network Basics	**12**	6	**6**
1.1. Uses of Computer Networks			
1.2. Network Hardware			
1.3. Network Software			
1.4. Reference Models			
1.5. Example Networks			
1.6. Network Standardization			
Chapter 2: The Physical Layer	**12**	**6**	**6**
2.1. The Theoretical Basis for Data Communication			
2.2. Guided Transmission Media			
2.3. Wireless Transmission			
2.4. Communication Satellites			
2.5. The Public Switched Telephone Network			
2.6. The Mobile Telephone System			
2.7. Cable Television			
Chapter 3 The Data Link Layer	**12**	**6**	**6**
3.1. Data Link Layer Design Issues			
3.2. Error Detection and Correction			
3.3. Elementary Data Link Protocols			
3.4. Sliding Window Protocols			
3.5. Protocol Verification			
3.6. Example Data Link Protocols			
Chapter 4 The Medium Access Control Sub layer	**12**	**6**	**6**
4.1. The Channel Allocation Problem			
4.2. Multiple Access Protocols			
4.3. Ethernet			
4.4. Wireless LANs			
4.5. Broadband Wireless			
4.6. Bluetooth			
4.7. Data Link Layer Switching			
Chapter 5. The Network Layer	**12**	**6**	**6**
5.1. Network Layer Design Issues			
5.2. Routing Algorithms			
5.3. Congestion Control Algorithms			
5.4. Quality of Service			
5.5. Internetworking			
5.6. The Network Layer on the Internet			
Chapter 6. The Transport Layer	**6**	**3**	**3**
6.1. The Transport Service			
6.2. Elements of Transport Protocols			
6.3. A Simple Transport Protocol			
6.4. The Internet Transport Protocols: UDP			
6.5. The Internet Transport Protocols: TCP			
6.6. Performance Issues			
Chapter 7. The Application Layer	**6**	**3**	**3**
7.1. DNS—The Domain Name System			
7.2. Electronic Mail			
7.3. The World Wide Web			
7.4. Multimedia			
Selected Topic	**6**	**3**	**3**

5- Teaching and learning methods

Teaching and learning methods	Used
Active Learning	
Lectures (blending learning – online learning using virtual classroom)	√
Tutorial Exercises (hybrid learning – online learning)	√
Practical Lab (blending learning– online learning)	
Exercises	-
Discussions.	√
Self – Learning strategy	
Reading material	√
Websites search	√
Research and reporting	
Self-studies	
Experimental strategy	
Group work	√
Presentation	
Problem solving strategy	
Problem solving/problem solving learning based	
Case study	
Synchronous E-Learning	
Virtual lab	√
Virtual class	-
Chat Room	
Video lectures	√
Asynchronous E-Learning	
E-Learning	√

6 -Student assessment methods

Methods	Assessment	Used
Electronic Midterm Exam	To assess the knowledge and understanding achieved by the student during the previous weeks. (online on e-learning hub)	√
Pencil-to-Paper Final Exam	To evaluate what the student gain at the end of the course, and to assess: the knowledge and understanding, general skills, and intellectual skills.	√
Electronic Course Work & Quizzes	To keep the student always in the course, and to evaluate knowledge, understanding, intellectual, and transferable skills. (Online on e-learning hub)	√
Practical Exam	to measure the ability of students to design and implement a software program (FTF).	√
Participation	To assess the knowledge and understanding achieved by the student during the previous weeks.	√

Assessment Schedule

Assessment	Week #
Participation	**3-14**
Mid Term Exam	**8**
Final Exam	**16**
Course Work &Quizzes	**2-14**
Practical Exam	**15**

Assessment Weight

Assessment	Weight %
Participation	**5%**
Mid Term Exam	
Final Exam	**70%**
Course Work &Quizzes	**5%**
Practical Exam	**20%**
Total	**100**

Course Work &Quizzes: (Short Exams, Assignments, Researches, Reports, Presentations, Class/Project discussion)

7 -List of references

Essential books (text books)	Tanenbaum, Andrew S., and Nickolas Feamster. *Computer Networks.* 2020.
Course notes	• [https://ceng393.cankaya.edu.tr/course.php?page=Lecture%20Notes] • [https://mrcet.com/downloads/digital_notes/CSE/III%20Year/COMPUTER%20NETWORKS%20NOTES.pdf]
Recommended books	Peterson, Larry L., and Bruce S. Davie. *Computer Networks: A Systems Approach*. Morgan Kaufmann, 2021.
Periodicals,website	**PowerPoint presentations of all course materials** **All labs material** **[https://moodle.sha.edu.eg/course/view.php?id=2260]**

8- **Required Facilities**

- Networks laboratory.
- Data show and PC computer.
- Cisco Packet Tracer

a. Teaching facilities:

	Lecture	*class*	*Lab*
Whiteboard	used	-	used
Pc/laptop	used	-	used
Data show	used	-	used
Webinars	MS TEAMS	-	MS TEAMS
SocialMedia	Facebook Page for 3rd year,	-	Facebook Page for 3rd year, Massenger,whatsApp
ChatRoom	-	-	ChatTeams
Videos	-	-	-
Website	MOODLE	-	MOODLE

8-Course Matrices

8.1Course Content/ILOs Matrix

Course Contents	Knowledge & understanding			Intellectual skills					Professional and practical skills	General	
	a1	a2	a3	b1	b2	b3	b4	b5	c1	d1	d2
1 Computer Network Basics	√			√	√						
2 The Physical Layer	√	√		√			√	√			
3 The Data Link Layer	√	√		√			√	√			
4 The Medium Access Control Sub layer		√	√		√	√	√	√	√		
5 The Network Layer		√	√		√	√		√	√		
6 The Transport Layer			√	√	√	√		√	√		
7 The Application Layer			√	√	√	√		√	√		
Selected topics									√	√	√

8.2-Learning Method /ILOs Matrix

Learning Methods	Knowledge & understanding			Intellectual skills					Professional and practical skills	General	
	a1	a2	a3	b1	b2	b3	b4	b5	c1	d1	d2
Lectures (blending learning – online learning using virtual classroom)	√	√	√	√	√	√	√	√	√		
Tutorial Exercises (hybrid learning – online learning)				√	√	√	√	√	√		
Practical Lab(blending learning– online learning)				√	√	√	√	√	√		
Discussions.				√	√	√	√	√	√	√	√
Reading material	√	√	√								
Websites search											
Video lectures											
E-Learning	√	√	√	√	√	√	√	√			

8.3-Assessment Methods /ILOs Matrix

Assessment Methods	Knowledge & understanding			Intellectual skills					Professional and practical skills	General	
	a1	a2	a3	b1	b2	b3	b4	b5	c1	d1	d2
Electronic Mid Term Exam	√	√	√	√	√	√	√	√			
.Final Exam	√	√	√	√	√	√	√	√			
Course Work &Quizzes	√	√	√	√	√	√	√	√	√	√	√
Practical Exam				√	√	√	√	√	√		

9. Course ILOs Vs Program ILOs

Course ILOs	Prog ILOs	Knowledge & understanding			Intellectual skills						Professional and practical skills				General
		A18	A19	A21	B1	B2	B4	B5	B13	B16	C6	C9	**C10**	**C12**	D5
k&u	**a1**		√												
	a2	√	√												
	a3		√	√											
int.	**b1**				√				√						
	b2					√		√							
	b3						√		√						
	b4				√	√	√								
	b5						√	√		√					
p. &p.	**c1**										√	√	√	√	
general	**d1**														√
	d2														√

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Date: 1/8/2022