اعتماد
NCAAA

T4

2020

# Course Specifications

| Course Title: | Fundamentals of Networks |
|---|---|
| Course Code: | 502482-3 |
| Program: | Bachelor in Information Technology |
| Department: | Department of Information Technology |
| College: | College of Computers and Information Technology |
| Institution: | Taif University |

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## A. Course Identification

| | |
|---|---|
| **1. Credit hours:** <br> **3** | |
| **2. Course type** <br> **a.**      University ☐    College ☐        Department √        Others ☐ <br> **b.**          Required √      Elective ☐ | |
| **3. Level/year at which this course is offered: 10/4** | |
| **4. Pre-requisites for this course** (if any)**: Fundamentals of Operating System (502321-3)** | |
| **5. Co-requisites for this course** (if any)**: NAN** | |

### 6. Mode of Instruction (mark all that apply)

| No | Mode of Instruction | Contact Hours | Percentage |
|---|---|---|---|
| 1 | **Traditional classroom** | 7 | 100% |
| 2 | **Blended** | 0 | 0 |
| 3 | **E-learning** | 0 | 0 |
| 4 | **Distance learning** | 0 | 0 |
| 5 | **Other** | 0 | 0 |

### 7. Contact Hours (based on academic semester)

| No | Activity | Contact Hours |
|---|---|---|
| 1 | **Lecture** | 40 |
| 2 | **Laboratory/Studio** | 30 |
| 3 | **Tutorial** | 0 |
| 4 | **Others** (specify) | 0 |
| | **Total** | 70 |

## B. Course Objectives and Learning Outcomes

### 1. Course Description

The aim of this course is to present the basic concepts of computer networks: Motivations, topologies, network hardware, types, and applications. The Open System Interconnection (OSI) reference model and TCP/IP protocol suite will be demonstrated. Moreover, the data link layer that contains Data framing, Error control, flow control, MAC protocols (ALOHA, CSMA/CD, Token Passing, etc.). In addition, an overview about Local Area Networks (LANs) such as standards (IEEE 802.x), Ethernet technology, and Wireless LANs will be present. Furthermore, the network layer that comprises IP protocol in addition to routing protocols will be introduced. The two famous transport layer protocols, Transmission Control Protocol (TCP) and User Datagram Protocol will be recognized. Finally, the application layer protocols such as Simple Network Management Protocol (SNMP), Simple Mail Transport Protocol (SMTP), and File Transport Protocol (FTP) will be presented.

### 2. Course Main Objective

The main objective of this course is to provide a good understanding of the basic concepts of computer networks: introduction, types, topologies, architectures, etc., explain the functions of each layer in OSI and TCP/IP, and describe how data is moved across network, investigate the Data link layer: Architecture (MAC, LLC), LLC sub-layer: services, functionalities (Data framing, Error control, flow control), MAC sub-layer: MAC protocols

(ALOHA, CSMA/CD, CSMA/CA, Token Passing, etc.), present an overview about LANs: Motivations, Standards (IEEE802.x), Ethernet technology, and Wireless LANs, demonstrate briefly network and transport layers: IP, routing, TCP, UDP, etc., and demonstrate briefly application layer: SMTP, HTTP, SNMP, etc.

## 3. Course Learning Outcomes

| | CLOs | Aligned PLOs |
|---|---|---|
| 1 | **Knowledge and Understanding** | |
| 1.1 | Understand the basic concepts of computer networks. | K1 |
| 1.2 | Outline the concept of OSI and TCP/IP models. | K1 |
| **2** | **Skills :** | |
| 2.1 | Demonstrate an overview about LANs. | S1 |
| 2.2 | Recognize network, transport, and application layers. | S2 |
| **3** | **Values:** | |
| 3.1 | | |
| 3.2 | | |
| 3.3 | | |
| 3... | | |

## C. Course Content

| No | List of Topics | Contact Hours |
|---|---|---|
| 1 | Introduction: motivations, definitions, network classification, etc. | 6 |
| 2 | Network Models: OSI and TCP/IP models. | 6 |
| 3 | Data link layer: functionalities (Data framing, Error control, and flow control), MAC techniques (Token based, CSMA/CD, and CSMA/CA). | 12 |
| 4 | Network devices | 6 |
| 5 | Network Layer Concepts: IP protocol characteristics. | 10 |
| 6 | Network Layer: Routing concept. | 10 |
| 7 | Transport Layer: TCP and UDP characteristics | 10 |
| 8 | Application Layer: SMTP, HTTP, FTP, and SNMP characteristics | 10 |
| | **Total** | 70 |

## D. Teaching and Assessment

**1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods**

| Code | Course Learning Outcomes | Teaching Strategies | Assessment Methods |
|---|---|---|---|
| **1.0** | **Knowledge and Understanding** | | |
| 1.1 | Understand the basic concepts of computer networks. | Lecture Discussion Lab work | Written Exams Assignments Practical Exam |
| 1.2 | Outline the concept of OSI and TCP/IP models. | Lecture Discussion Lab work | Written Exams Assignments Practical Exam |
| **2.0** | **Skills** | | |
| 2.1 | Demonstrate an overview about LANs. | Lecture Discussion Lab work | Written Exams Assignments Practical Exam |
| 2.2 | | Lecture | Written Exams |

| Code | Course Learning Outcomes | Teaching Strategies | Assessment Methods |
|------|--------------------------|---------------------|--------------------|
|      | Recognize network, transport, and application layers. | Discussion Lab work | Assignments Practical Exam |
| 3.0  | Values |  |  |
| 3.1  |  |  |  |
| 3.2  |  |  |  |
| …    |  |  |  |

## 2. Assessment Tasks for Students

| # | Assessment task* | Week Due | Percentage of Total Assessment Score |
|---|------------------|----------|--------------------------------------|
| 1 | Assignments (4 assignments) | 8 | 10% |
| 2 | Mid Exam | 6 | 20% |
| 3 | Attendance/ class activities | weekly | 10% |
| 4 | Labs | 11 | 10% |
| 5 | Final Exam | 12 | 50% |

**\*Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

## E. Student Academic Counseling and Support

**Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :**

Academic advising and counseling of students is an important component of teaching; student academic advising is a mandatory requirement of College of Computers and Information Technology (CCIT). Appropriate student advising provides support needed for the student during times of difficulty. In addition, it helps the student to build a close relationship with his/her advisor and to provide student motivation and involvement with the institution.

In addition, since faculty are usually the first to recognize that a student is having difficulty, faculty members play a key role in developing solutions for the students or referring them to appropriate services. Faculty members also participate in the formal student-mentoring program.

Additional counseling is provided by course directors, who provide students with academic reinforcement and assistance and refer "at risk" students to the Vice Dean for Academic Affairs and the Vice Dean for female section.

## F. Learning Resources and Facilities

### 1.Learning Resources

| Required Textbooks | Behrouz Forouzan; Data Communications and Networking – $5^{th}$ edition, the McGraw-Hill Companies. |
|--------------------|-----------------------------------------------------------------------------------------------------|
| Essential References Materials | Andrew Tanenbaum and David Wetherall; Computer Networks, Prentice Hall, Pearson. |
| Electronic Materials | Presentations and recorded lectures |
| Other Learning Materials | NON |

## 2. Facilities Required

| Item | Resources |
|---|---|
| **Accommodation**<br>(Classrooms, laboratories, demonstration rooms/labs, etc.) | ● A Lecture room appropriate for maximum 25 students with a personal computer, a data show and a smart board.<br>● A Lab room appropriate for maximum 15 students with a personal computer, a data show and a smart board. |
| **Technology Resources**<br>(AV, data show, Smart Board, software, etc.) | ● Lab materials and required software & hardware |
| **Other Resources**<br>(Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list) | NON |

# G. Course Quality Evaluation

| Evaluation Areas/Issues | Evaluators | Evaluation Methods |
|---|---|---|
| Effectiveness of Teaching | Students | Students surveys and Students course evaluation |
| Improvement of Teaching | Course Coordinator | Deficiencies based on the student Evaluation, faculty input, course file, and program assessment |
| Verifying Standards of Student Achievement | Curriculum Committee | ● Review CAF (Course assessment file)<br>● Alumni surveys.<br>● Periodic exchange and remarking of tests or a sample of assignments with staff at another |

**Evaluation areas** (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
**Evaluators** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
**Assessment Methods** (Direct, Indirect)

# H. Specification Approval Data

| Council / Committee | IT Department Council/ Executive program committee |
|---|---|
| Reference No. | 11 |
| Date | 23/10/21443 |