



NATIONAL UNIVERSITY OF ENGINEERING
COLLEGE OF ELECTRICAL AND ELECTRONICS ENGINEERING

TELECOMMUNICATIONS ENGINEERING PROGRAM

IT525 – COMMUNICATION PROTOCOLS

I. GENERAL INFORMATION

CODE	: IT525 – Communication Protocols
SEMESTER	: 9
CREDITS	: 03
HOURS PER WEEK	: 04 (Theory – Practice)
PREREQUISITES	: IT524 – Telecommunications Networks
CONDITION	: Mandatory

II. COURSE DESCRIPTION

The course allows the student to acquire adequate knowledge about communication levels and the 7-layer OSI reference model (application, presentation, session, transport, network, data-link, and physical layers). Emphasis will be placed on the study of specific protocols such as routing, transport and Internet protocols used in most common data networks.

III. COURSE OUTCOMES

At the end of the course the student will:

- Know the communication protocols following the OSI model that allow you to communicate to computer systems through communications networks.
- Know the state of the art of current protocols used in data networks.
- Understand how the different layers following the OSI model interact to establish a communication between parties.

IV. LEARNING UNITS

1. INTRODUCTION

The concepts behind a protocol. Features of protocols. Functions of a protocol: encapsulation, connection control, orderly delivery, flow control, error control, addressing, multiplexing, transmission services

2. THE LEVELS OF A COMMUNICATION AND THE OSI REFERENCE MODEL.

Servers Blocking. Economy of scale. Examples. The OSI model. Standardization within the OSI framework. Service primitives and parameters. OSI layers: physical layer, data link layer, network layer, transport layer, session layer, presentation layer, application layer.

3. APPLICATION LAYER

Objectives and characteristics of the application layer.

4. PRESENTATION LAYER

Goals and characteristics of the presentation layer. Presentation layer services.

5. SESSION LAYER

Goals and characteristics of the session layer. Phases, services and operations of the session layer. Session layer Protocol.

6. TRANSPORT LAYER

Goals and characteristics of the transport layer. Phases, services and operations of the transport layer.

7. NETWORK LAYER

Introduction. Data communications networks. Network topology. Features and applications of the network layer: Routing, congestion, network interconnection. The CCITT X.25 recommendation. Input of character terminals in the X.25 network. Recommendations 3X (X.28, X.29 and X.3). Recommendation X.32

8. DATA LINK LAYER

Introduction. Data link protocols. Functions of a protocol at the data link layer. Phases of a protocol at the data link layer. Character oriented protocols.

9. PHYSICAL LAYER

Introduction. Interface and physical protocol. The CCITT V.24 interface. The CCITT V.35 Interface. The interfaces X.21, X.21bis and G.703. Normalization of modems.

10. THE INTERNET PROTOCOL

Historic context. Integration. Nameservices. Synergy infrastructure. Residential Star Fiber. Regulations.

11. ROUTING PROTOCOLS

Examples of routing protocols used in data networks: RIP, IGRP, EIGRP, OSPF, and BGP.

12. TRANSPORT PROTOCOLS

Transport protocols used in the Internet Protocol (IP): User Datagram Protocol (UDP) and the Transport Control Protocol (TCP).

V. METHODOLOGY

The course takes place in theory and practice sessions. In the theory sessions the professor presents the concepts of protocols, performing an analysis of communication protocols following the OSI model. In the practical sessions different protocols problems are presented and solved. In all classes the active participation of the student is promoted both in the analysis and in the solution of problems.

VI. EVALUATION FORMULA

The learning will be evaluated through the "G" system.

- Midterm Exam (ME): weights as 1
- Final Exam (FE): weights as 1
- Average of Quizzes (Q): weights as 1

The final grade (FG) is obtained as follows:

$$FG = \frac{ME + FE + Q}{3}$$

VII. BIBLIOGRAPHY

- “Networking Protocols”, Geng Liang. Nova Science Publishers, 2012.
- “The OSI Model: Simply Explained”, Ronald Schlager. Createspace Independent Pub, 2013.
- “Computer Networks”, A.S. Tayenbann, Prentice Hall 1997.