



**NATIONAL UNIVERSITY OF ENGINEERING**  
**COLLEGE OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**TELECOMMUNICATIONS ENGINEERING PROGRAM**

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**IT515 – TELECOMMUNICATIONS III**

**I. GENERAL INFORMATION**

<b>CODE</b>	: IT515 – Telecommunications III
<b>SEMESTER</b>	: 8
<b>CREDITS</b>	: 03
<b>HOURS PER WEEK</b>	: 04 (Theory – Practice)
<b>PREREQUISITES</b>	: IT514 – Telecommunications II
<b>CONDITION</b>	: Mandatory

**II. COURSE DESCRIPTION**

The course allows the student to acquire adequate knowledge about the different telecommunication transmission systems using wired, wireless (radio) and optical (fiber optic cables). Emphasis will be placed on the study of digital information transmission systems, time-multiplexing technique, applications for telephony, data and video, in integrated digital networks.

**III. COURSE OUTCOMES**

At the end of the course the student will:

- Know the different information sources and means of transmission for analog or digital transmission systems.
- Recognize the importance of the transmission systems for different applications in the field of telecommunications engineering.

**IV. LEARNING UNITS**

**1. INTRODUCTION TO TRANSMISSION SYSTEMS**

Basic definitions and model of transmission system. Description of some transmission systems. Evolution of transmission systems. Standardization of transmission systems.

**2. INFORMATION SOURCES**

Characteristics of analog and digital sources. Digital coding of analog signals. Audio signal Video signal

**3. MEANS OF TRANSMISSION**

Introduction. Transmission system characteristics. Metallic transmission lines Optical fibers. Radio transmission: Measurement units used in transmission systems.

**4. ANALOG SIGNAL TRANSMISSION**

Model of analog transmission systems. Disturbances Duplex two-wire systems. Frequency multiplexed. Transmission chains.

## 5. DIGITAL TRANSMISSION OF INFORMATION

Model of digital transmission system. Time multiplexing of signals. Transmission chains.

## 6. STUDY OF THE MOST IMPORTANT TRANSMISSION SYSTEMS

Telephone networks. Television signal distribution networks. Data networks.

## V. METHODOLOGY

The course is developed in theory and practice sessions, in the theory sessions the professor presents the theory of analog and digital transmission systems in telecommunications, and in the practical sessions various problems are solved by analyzing their solution and indicating the real application of the telecommunications systems. In all the sessions, active participation of the student is promoted.

## 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

- "Principles of Digital Communication", Robert G. Gallager. Cambridge University Press, 2008.
- "Theory and Design of Digital Communication Systems", Tri T. Ha. Cambridge University Press, 2010.
- "Data Communications and Networking", Behrouz A. Forouzan, Sophia Chung. Huga Media, 2007.