University of Nicosia, Cyprus

Course Code	**Course Title**	**ECTS Credits**
ECE-450	Information Theory and Coding	6
Department	**Semester**	**Prerequisites**
Engineering	Fall or Spring	ECE-332
Type of Course	**Field**	**Language of Instruction**
Elective	Engineering	English
Level of Course	**Year of Study**	**Lecturer(s)**
1st Cycle	4th	Dr Ioannis Kyriakides
Mode of Delivery	**Work Placement**	**Co-requisites**
Face-to-face	N/A	None

Objectives of the Course:

The main objectives of the course are to:

- introduce the concept of entropy and mutual information with relation to communication theory
- explain the concept of source coding and its various implementations
- cover different channel models and explain the concept of channel capacity
- introduce channel coding for error detection and correction

Learning Outcomes:

After completion of the course students are expected to be able to:

1. associate entropy and probability
2. calculate the entropy of different types of messages to be communicated
3. define the relationship between the transmitted and received messages for different channels
4. use source coding as compact message representation
5. use Huffman and Shannon codes
6. identify different types of channels and derive the channel capacity
7. apply error detection and correction codes to improve communication performance

Course Contents:

1. Entropy, relative entropy, mutual information
2. Data processing inequality, sufficient statistics
3. Asymptotic equipartition property, data compression
4. Source coding
5. Huffman and Shannon codes
6. Channel capacity
7. Channel coding: error detection and correction
8. Block codes and convolutional codes

Learning Activities and Teaching Methods:

Lectures, in-class assignments.

Assessment Methods:

Homework, in-class assignments, projects, exams, final exam.

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Thomas M. Cover and Joy A. Thomas	Elements of Information Theory	John Wiley	2006	0471241954

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Richard B. Wells	Applied Coding & Information Theory for Engineers	Prentice Hall	1999	0139613277