UNIVERSITY of NICOSIA

Course Syllabus

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

Course Objectives:

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 Content:

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 / Readings:

Title	Author(s)	Publisher	Year	ISBN
Elements of Information Theory	Thomas M. Cover and Joy A. Thomas	John Wiley	2006	0471241954

Recommended Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Applied Coding & Information Theory for Engineers	Richard B. Wells	Prentice Hall	1999	0139613277