



Course Code ECE-550	Course Title Information Theory	ECTS Credits 8
Department Engineering	Semester Fall or Spring	Prerequisites ECE-332
Type of Course Elective	Field Engineering	Language of Instruction English
Level of Course 2 st Cycle	Year of Study 1 st	Lecturer(s) Dr Ioannis Kyriakides
Mode of Delivery Face-to-face	Work Placement N/A	Co-requisites None

Objectives of the Course:

The main objectives of the course are to:

- identify the concept of entropy and mutual information with relation to communication theory
- explain the concept of source coding and its various implementations
- identify different channel models and explain the concept of channel capacity
- explain channel coding and explain its various implementations

Learning Outcomes:

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

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

Course Contents:

- Entropy, relative entropy, mutual information
- Asymptotic equipartition property, data compression
- Data compression
- Channel capacity
- The Gaussian channel

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