1.	Title of the course	Information Theory and Coding
2.	Course number	EE511L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To EE5025/6
6.	To be offered by	Department of Electrical Engineering
7.	To take effect from	July 2022
8.	Prerequisite	CoT
9.	**Course Objective(s):** The course aims at providing students a foundation in information theory- the theory that provides quantitative measure of information and allows us to analyse and characterise the fundamental limits of communication system. It not only helps to obtain fundamental limits on communication but also provided basic guidelines for designing practical systems that come close to the fundamental limits. The knowledge of measures of information and uncertainty such as entropy, mutual information and relative entropy finds applications in various fields ranging from neuroscience to machine learning.	
10.	**Course Content:** Measures of Information: Entropy, conditional entropy, mutual information, and their properties; Asymptotic Equipartition Property (AEP): Weak law of large numbers, Typical Sequences, AEP and its properties; Source Coding: Coding for discrete memoryless sources, prefix codes, Kraft inequality, Huffman coding; Channel Coding: Examples of channels, jointly typical sequences, the channel coding theorem; Differential Entropy: Continuous random variables, AEP for continuous random variables, relative entropy and mutual information, Properties of differential entropy, relative entropy and mutual information; Gaussian Channel: Definiton, Converse and Achievability for the Gaussian channel; Rate distortion theory: Distortion function, rate distortion theory and lossy compression.	
11.	**Textbook(s):** 1. Robert Ash, *Information Theory*, Dover Publications (2007). 2. Cover T, and Thomas J A, *Elements of Information Theory*, Wiley Student Edition (2006).	
12.	**Reference(s):** 1. Raymond W Yeung, *Information Theory and Network Coding*, Springer (2008). 2. Stefan M Moser, Po-Ning Chen, A Student's Guide to Coding and Information Theory, Cambridge University Press, (2012).	