



INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI

भारतीय प्रौद्योगिकी संस्थान तिरुपति

Yerpedu-Venkatagiri Road, Yerpedu Post, Tirupati District, Andhra Pradesh - 517 619

1.	Title of the course	Quantum Information Theory
2.	Course number	EE563L
3.	Structure of credits (L-T-P-C)	3-0-0-3
4.	New course/modification to	New
5.	To be offered by	Electrical Engineering
6.	Prerequisite	CoT
7.	Course Objective(s): To derive the fundamental limits of information processing in case of quantum systems. To explore the connections between classical information theory and quantum information theory.	
8.	Course Content: Introduction: quantum states, density matrix formalism, measurement operators, positive operator valued measures, quantum channels, multipartite quantum systems, entanglement; Quantum data compression: Shannon entropy, classical lossless source coding theorem, von Neumann entropy and its properties, quantum data compression, Schumacher's noiseless quantum coding theorem; Entanglement assisted communication: accessible information and Holevo bound, classical noisy channel coding theorem, quantum mutual information, entanglement assisted capacity theorem, quantum capacity theorem, examples of capacity of quantum channels.	
9.	Textbook(s): 1. Wilde M M, Quantum Information Theory, 2nd Edition, Cambridge University Press (2017). 2. Nielsen M A and Chuang I L, Quantum Computation and Quantum Information, 10th Edition, Cambridge University Press (2010).	
10.	Reference(s): 1. Parthasarathy K R, Coding Theorems of Classical and Quantum Information Theory, 2nd Edition, Hindustan Book Agency (2013). 2. Cover T M and Thomas J A, Elements of Information Theory, 2nd Edition, Wiley (2013).	