

University of Technology
Computer Engineering Department
Academic Year 2023 - 2024

Second Year – Second Semester - Information Technology Branch



CE-IT234	Information Theory	2 Hours/Week	2 Units
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Contents of Syllabus	Hours
1. Concept of Information: info source, memory and memoryless source, probability of event, measure of info.	2
2. Entropy: average of info, maximum entropy	2
3. Rate of Information	2
4. Discrete Memoryless Channel: conditional probability, joint probability, channel matrix.	2
5. Joint Entropy and Conditional Entropy	2
6. Relations between the different entropies	2
7. Mutual Information	2
8. Channel Types: lossless, deterministic, noiseless, BSC	2
9. Channel Capacity	2
10. Additive White Gaussian Noise Channel	2
11. Code length, code efficiency and redundancy	2
12. Kraft Inequality	2
13. Source coding theorem: Prefix coding, Shannon-Fano coding, Huffmann coding	6
14. Error detection and correction: single parity check, hamming code, block coding, parity check matrix	4

References

- [1]. "Information Coding Techniques", J.S. Chitode, 1st edition, 2008
 [2]. "Essentials of error-control coding", J.C. Moreira, 2006

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