B31XM Information Theory and Communications

COURSE DETAILS
Course Code: B31XM
Full Course Title: Information Theory and Communications
SCQF Level: 11
SCAF Credits: 15
Available as Elective: No

DELIVERY LEVEL
Undergraduate: No  Postgraduate Taught: Yes  Postgraduate Research: Yes
Additional Information:

COURSE AIMS
To develop a knowledge of advanced and important information theory concepts.

To develop a critical understanding of wireless communications, coding and its connection to data science

To develop a critical understanding of information theory concepts for data science applications

LEARNING OUTCOMES – SUBJECT MASTERY
Critical understanding of advanced information theory concepts applied to communications and data science.

Practical knowledge of advantages and limitations of techniques to accompany detailed theoretical knowledge.

Knowledge of current research in application of information theory to data science and communications

LEARNING OUTCOMES – PERSONAL ABILITIES
Ability to critically review, evaluate and implement a range of advanced techniques in information theory, communications and data science.

SYLLABUS
1. Fundamentals of Information Theory and Communications

*Introduction, Probability, Entropy, and Inference
*Data Compression and Source Coding
*Data Communication Noisy-Channel Coding

*Error-Correcting Codes

2. Information Theory in Data Science

*Hypothesis Testing

*Fano’s Inequality

*Concentration of measure and large deviations theory

3. Applications of information theory to data science and to various emerging communications problems