### 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

### 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

COURSE RELATIONSHIPS
N/A

LOCATION AND ASSESSMENT METHODS

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