Module Code	**EEU33C05**
Module Name	Telecommunications
ECTS Weighting[1]	5 ECTS
Semester taught	Semester 2
Module Coordinator/s	Dr. Aleksandra Kaszubowska-Anandarajah
Module Learning Outcomes with reference to the Graduate Attributes and how they are developed in discipline	On successful completion of this module, students should be able to: LO1. Explain the key concepts of random processes and how they relate to the telecommunication process. LO2. Explain key concepts in information theory and calculate the entropy of the source, efficiency of a source code, channel capacity etc. LO3. Apply different compression techniques to data and explain the advantages and disadvantages of the different options. LO4. Apply different channel coding techniques to data and demonstrate the types of error that can be corrected. LO5. Describe and explain a number of analog modulation schemes and calculate bandwidth and power consumption of the different schemes. LO6. Describe and explain a number of digital modulation schemes and calculate BER performance under different conditions. LO7. Design a simple simulation model of an analogue and digital transmitter and receiver. LO8. Describe the basics properties of the wireless and optical telecommunication channel. LO9. Describe the operation principle of the basic components of telecommunication systems LO10. Explain the trade-offs that can be made in the design of communication system. LO11. Explain the main differences between the different mobile telecommunication standards. LO12. Explain the economic, environmental and social impact of telecommunication. LO13. Describe the health risks associated with the use of technology and how to minimise them. LO14. Work efficiently as a team to solve engineering problems. LO15. Perform experimental evaluation of telecommunication system performance, write technical report describing the work and findings.

[1] TEP Glossary

LO16. Explain the social and environmental responsibilities of an individual and the impact of personal lifestyle choices on the wider society.

Graduate Attributes: levels of attainment
To act responsibly - Introduced
To think independently - Enhanced
To develop continuously - Enhanced
To communicate effectively - Enhanced

Module Content

The aim of the module is to introduce students to the theory and applications of telecommunication systems. Topics covered in this module include an introduction to random processes, information theory, data compression, error control coding algorithms and modulation schemes.

Teaching and Learning Methods

Teaching Strategies
The module is taught using a combination of lectures, tutorials and laboratories.
Assessment Mode(s): summative

Assessment Details[2]
Please include the following:

- **Assessment Component**
- **Assessment description**
- **Learning Outcome(s) addressed**
- **% of total**
- **Assessment due date**

Assessment Component	Assessment Description	LO Addressed	% of total	Week due
written exam	Open-book written exam	Ability to apply knowledge, problem solving	70	36
In Class test (1)	In Class test (1)	Assessment of material covered in first half of module	7	27
In Class test (2)	In Class test (2)	Assessment of material covered in second half of module	7	32
Multiple choice tests – average of best 2/3 of test scores	In class tests	Assessment of the material covered in a previous lecture	6	3 times a week
Lab	Lab	Lab skills, analogue and digital modulation	10	22-32

Reassessment Requirements

[2] TEP Guidelines on Workload and Assessment

Contact Hours and Indicative Student Workload[2]	**Contact hours:** 4h/week **Independent Study (preparation for course and review of materials):** 3h/week **Independent Study (preparation for assessment, incl. completion of assessment):** 90h
Recommended Reading List	**Probability, Random Variables and Random Processes:** 1. Leon Garcia, Probability, Statistics, and Random Processes for Electrical Engineering 2. https://newonlinecourses.science.psu.edu/stat414/node/3/ **Modulation:** 1. Haykin, Communication Systems 2. B. Sklar, Digital Communications, Fundamentals and Applications, Prentice Hall 2001 **Information Theory:** 1. Cover and Thomas, Elements of Information Theory 2. James V. Stone, Information Theory. A tutorial introduction
Module Pre-requisite	
Module Co-requisite	
Module Website	
Are other Schools/Departments involved in the delivery of this module? If yes, please provide details.	No
Module Approval Date	
Approved by	Prof. Naomi Harte
Academic Start Year	September 2025
Academic Year of Date	2025/2026