



## **Module Specification**

### **Communications**

Version: 2024-25, v3.0, 17 Jul 2024

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## Part 1: Information

**Module title:** Communications

**Module code:** UFMFS7-15-3

**Level:** Level 6

**For implementation from:** 2024-25

**UWE credit rating:** 15

**ECTS credit rating:** 7.5

**College:** College of Arts, Technology and Environment

**School:** CATE School of Engineering

**Partner institutions:** None

**Field:** Engineering, Design and Mathematics

**Module type:** Module

**Pre-requisites:** Mathematical Modelling for Electronics and Robotics 2023-24

**Excluded combinations:** None

**Co-requisites:** None

**Continuing professional development:** No

**Professional, statutory or regulatory body requirements:** None

## Part 2: Description

**Overview:** This module delivers advanced material on analogue and digital communication systems building on foundations laid at level 4 and level 5 of the programme in electronic and digital systems.

The module enables analysis of existing telecommunication systems in the presence of the noise. In so doing, students will learn to apply a variety of analytical methods and simulation tools to design communication systems.

**Features:** Not applicable

**Educational aims:** This module equips students with the necessary skills for them to be able to design, analyse and evaluate communications systems using suitable analytical methods.

**Outline syllabus:** A list of content coverage is given in the following:

Information content of signals, Transmission of information, and Hartley and Shannon's Law and its applications.

Analogue CW modulation techniques: DSB, AM, SSB, VSB, Angle Modulation, generation, demodulation and applications, Comparison including SNR performance, Super-heterodyne principle for reception.

PCM: A/D conversion, sampling (anti-aliasing filter) and encoding, quantisation noise, linear and non-linear noise, D/A conversion.

Baseband data signals: bit rate/bandwidth relationship, ISI and I diagram, error probability estimation, source, error and line coding, regeneration.

Digital CW modulation: forms, spectra and bandwidth in terms of bit rate, modems, applications.

### **Part 3: Teaching and learning methods**

**Teaching and learning methods:** The delivery is intended to ensure that students have opportunity to develop practical lab-based skills alongside theoretical understanding of analogue and digital design communications systems. Relevant ethical issues will be highlighted and students will be encouraged to consider these further through directed reading.

The delivery model is a 2 hour laboratory based session where students will apply the theoretical concepts gained from the 1 hour weekly lectures.

**Module Learning outcomes:** On successful completion of this module students will achieve the following learning outcomes.

**MO1** Analyse analogue and digital telecommunications modulation systems in the presence of noise

**MO2** Design a valid simulation model of a telecommunication system

**MO3** Evaluate and analyse given telecommunication systems for the purposes of identifying optimal solutions for specific scenarios

**MO4** Apply commonly used modulation techniques to communications engineering problems for requirements analysis

**Hours to be allocated:** 150

**Contact hours:**

Independent study/self-guided study = 114 hours

Face-to-face learning = 12 hours

Total = 0

**Reading list:** The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://uwe.rl.talis.com/modules/ufmfs7-15-3.html) via the following link <https://uwe.rl.talis.com/modules/ufmfs7-15-3.html>

## Part 4: Assessment

**Assessment strategy:** The assessment of this module is as follows:

A group report where students apply numerical techniques to communications problems followed by a design exercise to simulate a communication system. This allows students to apply the knowledge they have gained throughout the module.

A written examination at the end of the semester to evaluate individual level of achievement. The theoretical and practical work will help students to confidently solve examination questions.

Resit strategy) same as first sit

Resit deliverable(s) will be scaled appropriately to group size and task complexity

**Assessment tasks:**

**Examination (First Sit)**

Description: Exam (2 hours)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO3, MO4

**Written Assignment (First Sit)**

Description: Coursework assignment (2500 words)

Weighting: 50 %

Final assessment: No

Group work: Yes

Learning outcomes tested: MO1, MO2, MO4

**Examination (Resit)**

Description: Exam (2 hours)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO3, MO4

**Written Assignment (Resit)**

Description: Coursework assignment (2500 words)

Resit deliverable(s) will be scaled appropriately to group size and task complexity

Weighting: 50 %

Final assessment: No

Group work: Yes

Learning outcomes tested: MO1, MO2, MO4

## Part 5: Contributes towards

This module contributes towards the following programmes of study:

Electronics and Telecommunication Engineering {Foundation}

[Oct][SW][GCET][5yrs] BEng (Hons) 2020-21

Electronics and Telecommunication Engineering {Foundation}

[Feb][SW][GCET][5yrs] BEng (Hons) 2020-21

Electronic Engineering [Sep][PT][Frenchay][6yrs] - Not Running BEng (Hons) 2020-21

Electronics and Telecommunication Engineering {Foundation} [Feb][FT][GCET][4yrs] BEng (Hons) 2021-22

Electronics and Telecommunication Engineering {Foundation} [Oct][FT][GCET][4yrs] BEng (Hons) 2021-22

Electronic Engineering {Apprenticeship-UCW} {Top-Up} [Frenchay] BEng (Hons) 2023-24

Electronic Engineering {Apprenticeship-UCW} {Top-Up} [Frenchay] BEng (Hons) 2023-24

Electronic Engineering {Foundation} [Sep][SW][Frenchay][5yrs] BEng (Hons) 2020-21

Electronic Engineering {Apprenticeship-GLOSCOLL} [Sep][FT][GlosColl][5yrs] - Withdrawn BEng (Hons) 2020-21

Electronic and Computer Engineering [Sep][PT][GlosColl][5yrs] BEng (Hons) 2020-21

Electronic and Computer Engineering {Apprenticeship-GLOSCOLL} [Sep][FT][GlosColl][5yrs] BEng (Hons) 2020-21

Electronic Engineering {Foundation} [Sep][FT][Frenchay][4yrs] BEng (Hons) 2021-22

Electronic Engineering [Sep][SW][Frenchay][4yrs] BEng (Hons) 2021-22

Electronic Engineering [Sep][SW][Frenchay][5yrs] - Withdrawn MEng 2021-22

Electronic and Computer Engineering [Sep][SW][Frenchay][4yrs] BEng (Hons) 2021-22

Electronic Engineering {Foundation} [Sep][SW][Frenchay][5yrs] - Not Running BEng (Hons) 2020-21

Instrumentation and Control Engineering {Foundation} [Feb][FT][GCET][4yrs] BEng (Hons) 2021-22

Instrumentation and Control Engineering {Foundation} [Oct][FT][GCET][4yrs] BEng (Hons) 2021-22

Electronic Engineering [Frenchay] BEng (Hons) 2022-23

Electronic and Computer Engineering [Frenchay] BEng (Hons) 2022-23