



Module Specification

Mobile and Wireless Communication

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Part 1: Information

Module title: Mobile and Wireless Communication

Module code: UFMFKN-15-3

Level: Level 6

For implementation from: 2023-24

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Environment & Technology

Department: FET Dept of Engineering Design & Mathematics

Partner institutions: None

Field: Engineering, Design and Mathematics

Module type: Module

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: This module is designed to provide broad knowledge on Mobile and Wireless Communication Systems.

Features: Not applicable

Educational aims: After having a detailed historical plus functional architectural preview of the many existing wireless and mobile cellular communication systems, it teaches the design concepts, operations and managements of these systems. Some

of the systems covered in the module are GSM 2.5G, UMTS 3G, 4G and Wi Fi Wireless and many other shortrange wireless systems. Full details of these systems such as standards (GMSK, FDMA, TDMA, and WCDMA), network structures, protocol architectures, operational problems (interferences, channel fading and maintaining QoS) and design constraints are taught. Simulation packages are used to implement the design concepts and evaluate the performance aspects of the above systems. The main aim of this module is to provide: a broad understanding of the principles of mobile and wireless communications.

In addition, the educational experience may explore, develop, and practise but not formally assess the following:

Problem formulation and decision making.

Self-management and project management skills.

Outline syllabus: The syllabus outline includes:

CELLULAR PRINCIPLES:

The cellular concept, Typical cell operation, System capacity, Frequency re-use distance, Determination of cell radius, Sectoring, Properties of the radio channel, Space wave propagation, Short-term fading (fast fading).

MOBILE COMMUNICATION SYSTEMS:

Global System Mobile Communication (GSM), GSM radio interface, Mapping of logical channels in GSM, GSM modulation, coding and error protection, Handoff in GSM, GSM handoff measurements, Features of the GSM 2.5G system, Operation of the GSM system, Security in GSM, Others Cordless Communications systems.

Universal Mobile Telecommunications System (UMTS), Comparison with GSM and others.

Fourth Generation Mobile Communications: Long Term Evolution (LTE).

Wireless communications; WiMAX (IEEE 802.16) and Wi Fi (IEEE 802.11).

Part 3: Teaching and learning methods

Teaching and learning methods: Concepts and the scope of the syllabus topics will be introduced in lectures, supported by directed reading and lab experiments/simulation based work. The tutorial exercises and labs sessions will enhance the understanding of students of real-world applications of the material delivered in the module.

Scheduled learning includes lecture and tutorials/practical classes.

Independent learning includes hours engaged with essential reading, assignment preparation and completion, etc. These sessions constitute an average time per level.

In addition to 36 hours of scheduled contact, students will be expected to spend (typically) 92 hours in independent study, preparation for classes, and assimilation of knowledge and skills development. The assessment strategy involving submitting a research based group assignment and end of module examination will require (typically) 22 hours.

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

MO1 Apply concepts of designing, managing and planning of 2.5G, 3G and 4G cellular mobile communications systems

MO2 Design a cell in cellular system under technical constraints

MO3 Evaluate a mobile/wireless communication system performance

MO4 Apply knowledge to analyse performance of system components and cell coverage areas in particular circumstances

MO5 Apply quality standards to the design of cellular and wireless systems

MO6 Understand the commercial, economic, ethical, security and risk issues

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

Total = 150

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

Part 4: Assessment

Assessment strategy: The assessment consists of an end of module examination and a group assignment.

The strategy has been chosen to ensure that the mobile and wireless communication principles are assessed under controlled conditions, while a more open-ended research based group assignment is used to encourage wider engagement and reflection on this topic. Students will model and implement a mobile/wireless communication link using a given simulation package.

The group work activity will result in the submission of a 3500 word group report with an individual reflection.

Resit is the same as the first sit.

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

Assessment tasks:

Examination (First Sit)

Description: Examination (2 hours)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO4, MO5

Report (First Sit)

Description: Group report with individual reflection (3500 words)

Weighting: 50 %

Final assessment: No

Group work: Yes

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5, MO6

Examination (Resit)

Description: Examination (2 hours)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested:

Report - Component B (Resit)

Description: Group report with individual reflection (3500 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:

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Electronics and Telecommunication Engineering {Foundation} [Feb][FT][GCET][4yrs]

BEng (Hons) 2020-21

Electronics and Telecommunication Engineering {Foundation} [Oct][FT][GCET][4yrs]

BEng (Hons) 2020-21