



Module Specification

Wireless and Mobile Communications

Version: 2025-26, v5.0, Approved

Contents

Module Specification	1
Part 1: Information	2
Part 2: Description	2
Part 3: Teaching and learning methods	4
Part 4: Assessment.....	5
Part 5: Contributes towards	6

Part 1: Information

Module title: Wireless and Mobile Communications

Module code: UFMF9D-15-M

Level: Level 7

For implementation from: 2025-26

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: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: This module provides broad knowledge on Mobile and Wireless Communication Systems. 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 TACT 1G, GSM 2.5G, UMTS 3G, 4G, Cordless Home Wireless Telephones (CT2, DECT) and many other short-range 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 such as MATLAB and NS2 are used to implement the design concepts and evaluate the performance aspects of the above systems. The module also provides challenges, constraints and problems faced by the designers in designing and operating these systems.

Features: Successful completion of this module equip learners with various skills such as design and operational performance evaluation, estimating co-channel/adjacent channel interferences, improving system capacity in peak tele-traffic hours, BER and data rate of wireless/mobile systems.

Educational aims: This is an M-level core module which embed wireless and mobile cellular engineering design and operational principles considered essential to the practice of electronic and telecommunication engineering within the curriculum of MSc degree course.

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 includes:

INFORMATION THEORY:

Transmission of information, Shannon's Law and its applications.

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 system, Operation of the GSM system, Security in GSM, Others Cordless Communications systems.

Universal Mobile Telecommunications System (UMTS), Comparison with GSM and others second generation systems, CDMA principle, WCDMA air interface-physical layer, Modulation techniques and spread spectrum, UMTS networks and network management. Transition from 3G to 4G networks, Features of 4G system, Data rates targets of 4G

Part 3: Teaching and learning methods

Teaching and learning methods: A combination of lectures, guest lectures, tutorials and demonstrations are used to present core topics from the syllabus. Laboratory sessions are used for team meetings, design and development work and familiarisation with specialist software.

Independent learning includes hours engaged with essential reading, further team meetings and laboratory based development work undertaken outside the scheduled classes. Students will be expected to maintain the management of the group project.

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

MO1 Demonstrate the design principles, operations, management, network hierarchies and planning of 2.5G, 3G and 4G cellular mobile communications systems.

MO2 Designing a cell in cellular system under technical constraints and evaluate a mobile/wireless communication system performance to present orally as well as in a written technical report.

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 126 hours

Face-to-face learning = 24 hours

Reading list: The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://uwe.rl.talis.com/modules/ufmf9d-15-m.html) via the following link <https://uwe.rl.talis.com/modules/ufmf9d-15-m.html>

Part 4: Assessment

Assessment strategy: The module will be assessed by one task as follows:

The overall assessment is a report through a team based design, software implementation work and also include individual understanding by answering a numerical from a pool of the questions. The formal assessment for this module is as follows:

A group project report submission that includes a group technical report (8000 words, typical group size 4), answer to the individual question and documentation that provides evidence of how the group has managed the project.

Students will work on the design and implementation part in their own time (outside contact hours). Each student will obtain an individual mark based on answering an analytical question.

Resit is the same as the first sit

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

Assessment tasks:

Report (First Sit)

Description: A group project report submission that includes a group technical report (8000 words, typical group size 4), answer to the individual question and documentation that provides evidence of how the group has managed the project.

Weighting: 100 %

Final assessment: Yes

Group work: Yes

Learning outcomes tested: MO1, MO2

Report (Resit)

Description: A group project report submission that includes a group technical report (8000 words, typical group size 4), answer to the individual question and documentation that provides evidence of how the group has managed the project

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

Weighting: 100 %

Final assessment: Yes

Group work: Yes

Learning outcomes tested: MO1, MO2

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Electronics and Telecommunication Engineering [GCET] MSc 2025-26

Electronics and Telecommunication Engineering [GCET] MSc 2025-26

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