



MODULE SPECIFICATION

Part 1: Information			
Module Title	Satellite Communications		
Module Code	UFMFLN-15-3	Level	Level 6
For implementation from	2018-19		
UWE Credit Rating	15	ECTS Credit Rating	7.5
Faculty	Faculty of Environment & Technology	Field	Engineering, Design and Mathematics
Department	FET Dept of Engin Design & Mathematics		
Contributes towards			
Module type:	Standard		
Pre-requisites	Mathematics for Signals and Control 2018-19		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description
<p>Educational Aims: Study of Satellite Communications provides you opportunities and poses problems, in communication methods. The large area of access (footprint) allows a single transmission to cover an enormous number of receivers, thus allowing broadcast signals to be transmitted simultaneously to large numbers of people. However, this feature itself creates difficulties, partly political and partly economic. National boundaries are no barrier whatsoever, the charging mechanism required to allow the satellite operators to recover the cost of development and provide continuous support requires a novel solutions.</p> <p>Outline Syllabus: The syllabus outline includes:</p> <p>Introduction of communication satellite systems; Constellations: Orbital Dynamics from Copernicus to Newton; Satellite Orbital Design, Basics on Geosynchronous orbit (GEO), low-earth orbit (LEO) and Medium-earth orbit (MEO), detailed theory on Geostationary orbits, Angle from satellite to earth station;</p>

STUDENT AND ACADEMIC SERVICES

Radio Interface: Link Budget Design from basic transmission theory to advanced link calculations;
 Regulatory Issues;
 Path loss including Mobile and Fixed Propagation Environment;
 Fixed Earth Station Design;
 Network Architectures;
 Antennas;
 Error coding: Types of errors;
 Interference and noise: Atmospheric attenuation, attenuation, depolarisation;
 Multiaccess: CDMA, FDMA, TDMA, Random Access and Speech interpolation.

Teaching and Learning Methods: You will understand the principles of satellite communications (using lectures and tutorials) and you will be able to analyse the performance of the different orbital systems. A set of laboratories using simulation packages (Matlab) will be carried out to study the performances of satellite communication systems.

Part 3: Assessment

The assessment consists of an end of module examination and an individual assignment.

The strategy has been chosen to ensure that the satellite engineering principles are assessed under controlled conditions, while a more open ended research based assignment is used to encourage wider engagement and reflection on this topic. In component B, the students will design a simple satellite communication link and will implement it by simulating using a given simulation package.

First Sit Components	Final Assessment	Element weighting	Description
Report - Component B		50 %	Report: maximum words limit 4000 words (excluding appendices, references and any additional material)
Examination - Component A	✓	50 %	Examination 2 hours
Resit Components	Final Assessment	Element weighting	Description
Report - Component B		50 %	Report: maximum words limit 4000 words (excluding appendices, references and any additional material)
Examination - Component A	✓	50 %	Examination 2 hours

Part 4: Teaching and Learning Methods

Learning Outcomes	On successful completion of this module students will be able to:	
		Module Learning Outcomes
	MO1	Apply concepts of satellite communication systems associated with the operation of satellite communications networks
	MO2	Demonstrate the use of advanced knowledge to solve basic and advance radio link design problems associated with satellite communication systems
	MO3	Apply skills required to design an end-to-end satellite communications link budget, based on standard engineering practices
	MO4	Compare the satellite systems based on multiple access systems

STUDENT AND ACADEMIC SERVICES

	MO5	Identify the commercial, economic and social context of communication engineering applications that are affected by satellite communication systems
	MO6	Demonstrate the independent learning ability required for continuing professional development
Contact Hours	Contact Hours	
	Independent Study Hours:	
	Independent study/self-guided study	114
	Total Independent Study Hours:	114
	Scheduled Learning and Teaching Hours:	
	Face-to-face learning	36
	Total Scheduled Learning and Teaching Hours:	36
	Hours to be allocated	150
	Allocated Hours	150
Reading List	<p>The reading list for this module can be accessed via the following link:</p> <p>https://uwe.rl.talis.com/modules/ufmfln-15-3.html</p>	