



MODULE SPECIFICATION

Part 1: Information			
Module Title	Satellite Communications		
Module Code	UFMFLN-15-3	Level	Level 6
For implementation from	2019-20		
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		
Module type:	Standard		
Pre-requisites	Mathematics for Signals and Control 2019-20		
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; Radio Interface: Link Budget Design from basic transmission theory to advanced link calculations; Regulatory Issues;</p>

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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
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Examination - Component A	✓	50 %	Examination 2 hours

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Part 4: Teaching and Learning Methods																	
Learning Outcomes	<p>On successful completion of this module students will achieve the following learning outcomes:</p> <table border="1"> <thead> <tr> <th style="text-align: left;">Module Learning Outcomes</th> <th style="text-align: left;">Reference</th> </tr> </thead> <tbody> <tr> <td>Apply concepts of satellite communication systems associated with the operation of satellite communications networks</td> <td>MO1</td> </tr> <tr> <td>Demonstrate the use of advanced knowledge to solve basic and advance radio link design problems associated with satellite communication systems</td> <td>MO2</td> </tr> <tr> <td>Apply skills required to design an end-to-end satellite communications link budget, based on standard engineering practices</td> <td>MO3</td> </tr> <tr> <td>Compare the satellite systems based on multiple access systems</td> <td>MO4</td> </tr> <tr> <td>Identify the commercial, economic and social context of communication engineering applications that are affected by satellite communication systems</td> <td>MO5</td> </tr> <tr> <td>Demonstrate the independent learning ability required for continuing professional development</td> <td>MO6</td> </tr> </tbody> </table>	Module Learning Outcomes	Reference	Apply concepts of satellite communication systems associated with the operation of satellite communications networks	MO1	Demonstrate the use of advanced knowledge to solve basic and advance radio link design problems associated with satellite communication systems	MO2	Apply skills required to design an end-to-end satellite communications link budget, based on standard engineering practices	MO3	Compare the satellite systems based on multiple access systems	MO4	Identify the commercial, economic and social context of communication engineering applications that are affected by satellite communication systems	MO5	Demonstrate the independent learning ability required for continuing professional development	MO6		
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Reading List	<p><i>The reading list for this module can be accessed via the following link:</i></p> <p>https://uwe.rl.talis.com/modules/ufmfln-15-3.html</p>																

Part 5: Contributes Towards
This module contributes towards the following programmes of study: