MODULE SPECIFICATION

Part 1: Information			
Module Title	Radio Frequency and Microwaves Circuit Design		
Module Code	UFMFJN-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

Educational Aims: This module is designed to introduce Radio Frequency (RF) and microwave design theory, techniques and measurements. It gives an overview of the fundamental concepts involved with RF/Microwave design and presents design methodologies for both passive and active RF and microwave circuits and antenna design. Common and also detailed RF/Microwave measurements will be studied. Students will use an industry standard CAD package to gain an understanding of the role of CAD in RF and microwave circuit design.

In addition, the educational experience may develop through practice but not formally discretely assess self-management skills and working with others.

Outline Syllabus: The syllabus outline includes:

Transmission line: Circuit analysis, linear and non-linear analysis, the use of optimisation and its limitations, evaluation of circuit sensitivity and yield analysis. Noise, gain and stability circle generation.

Microwave Circuits: Basic Superhetrodyne receiver. Discussion of block diagram components as used in practical communications systems.

Microwave Transmission Lines: Characteristic impedance and phase velocity of micro strip. Qualitative description of suspended substrate, micro strip, coplanar waveguide and fin-line.

S Parameters: Theory of two-port scattering matrix and relationship to measured performance of microwave networks.

Impedance charts: Theory of Smith Chart. Use of Smith Chart for matching networks.

General Microwave Circuits: Review of filters, mixers and oscillators. Discussion of phase noise and systems aspects of non-linearity.

Teaching and Learning Methods: See educational aims and assessment.

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 RF and Microwaves 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 microwave communication circuit and will implement it by simulating using a given simulation package. The output from this group work activity will be a 3000 word group report and a 500 word individual reflection.

The resit assignment will be based on the 1st sit assignment and result in a 1500 word individual report.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Written Assignment - Component B		10 %	Individual reflection (500 words)
Report - Component B		40 %	Group report (3000 words)
Examination - Component A	✓	50 %	Examination (2 hours)
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Report - Component B		50 %	Individual report: maximum words limit 1500 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 achieve the following learning outcomes:

Module Learning Outcomes	Reference
Apply concepts underlying the design of RF and microwave circuits	MO1
Apply engineering and scientific principles of other disciplines to support real-world implementation of RF circuits design	MO2
Identify, compare and describe the performance of microwave systems	MO3
Evaluate performance of transmission lines using simulation software	MO4
Investigate constraints including ethical, health, safety, security and risk issues and code of practice and standards	MO5
Accurately present and interpret data	MO6

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

The reading list for this module can be accessed via the following link:

https://uwe.rl.talis.com/index.html

Part 5: Contributes Towards

This module contributes towards the following programmes of study: