University of the West of England
BRISTOL

MODULAR PROGRAMME

COURSEWORK ASSESSMENT SPECIFICATION

Module Details

Module Code UFMFKN-15-3	**Run** Oct 2018	**Module Title** Mobile and Wireless Communication
Module Leader Muhammad Irfan Memon	**Module Coordinator**	**Module Tutors** Muhammad Irfan Memon
Component and Element Number CW1		**Weighting: (% of the Module's assessment)** 50%
Element Description Coursework Assignment (Lab/Research)		**Total Assignment time** 22 Hours

Dates

Date Issued to Students	**Date to be Returned to Students**
Submission Place **Level P Academic Support Office**	**Submission Date** 25th Dec, 2018
	Submission Time 1630 (04:30 PM)

Deliverables

A report of maximum 15 pages (excluding appendices, references, and any additional material)

Module Leader Signature

COURSEWORK INDIVIDUAL ASSIGNMENT
Mobile and Wireless Communications (UFMFKN-15-3)

Purpose of the Assignment

This is a semester assignment and it has two parts. In the first part, students need to do the scientific literature survey and in the second part, they are required to design, plan and manage a cellular network and analyze its performance. They are required to compare the results. Thus, this assignment is a blend of research and current industry trends. It provides an opportunity for students to:

1. Apply concepts of cell design under technical constraints
2. Demonstrate the use of advanced knowledge to solve basic and advance wireless link design problems in the modern telecommunication system
3. Become familiar with Matlab and related simulation techniques.
4. Understanding the commercial, economic, ethical and security risks in the cellular networks

Introduction

The coursework is divided into two parts. The first part is an individual task, each students is required to carryout the literature review on the evolution of cellular networks. However, Part 2 is a group task (4 students in a group). It is related to design and model wireless communication system using MATLAB.

For any discussion on the topic or further information you may write to **Dr Irfan Memon** on his e-mail address: m.memon@gcet.edu.om

The hand-in date of the CW assignment is on **25th December 2018.**

Resources

Matlab Communications Tool Box and Communication & RF Block set available on PCs in Laboratory 1.2

Individual Task:

Each student is required to conduct up to date research survey on the evolution of mobile communication systems. The candidates are required to investigate the effects of risks (such as health and safety, commercial, and security) due to this evolution of mobile communication system.

This task aims to encourage students to study the current state of the art developments in the modern mobile and wireless telecommunication systems and risks such as security, ethical, and health and safety issues involved in such systems.

[Marks 40]

Group Task

Design and Implement a Mobile/Wireless Communication System for Poor Quality Mobile/Wireless Communication Channels using MATLAB

This is a group task aims to model, simulate and evaluate the performance of mobile and wireless communications system for noisy Channels using Matlab. The sources of noise in the channel can be: multipath propagation, ambient noise and propagation delay. A large part of the work is related to performance comparisons of cell-design among various generations of the cellular mobile communication systems. The performance metrics to be utilized include outage probability, through put, bit-error rate and capacity. The goal is to achieve the high performance and reliable transmission.

The candidates have full control over using the different components and parameters in their design.

[Marks 60]

Important points:

- Your implementation will be at the level of MATLAB Communications Toolbox and Communications Block set (i.e. NO hardware design is required).
- Assume that the data is already digitized.
- You are *not* required to use data compression or error correction.

Useful Scientific web portals

Students may take a technical focus of a particular technology and survey scientific web portals such as:

- Google Scholar (scholar.google.com)
- IEEE Explore (http://ieeexplore.ieee.org/Xplore/guesthome.jsp)
- Science Direct
- Other related web portals

Useful links to help getting started with MATLAB Communications:

https://uk.mathworks.com/products/communications.html

https://uk.mathworks.com/help/comm/

https://nl.mathworks.com/solutions/wireless-communications/wireless-communications-suite.html

http://faculty.nps.edu/rcristi/wimax/2009-08-20-wimax.pdf

Deliverables and Marking Scheme

It is required to combine both the tasks together in the form of a research of up to 15 pages. Marks will be given for the student demonstrating an understanding of the subject and using correct citation and referencing.

1. Marks will be given for:
   - Understanding the subject
   - Structure (sensible headings and sub-headings)
   - Correct Terminology
   - 3rd Person
   - References (must be peer reviewed journals)
   - Citations
   - Flow nicely **Marks [0-40]**

2. A detailed description of the design choices and calculations for each component and for the system as a whole. This section should also include results (e.g. graphical or numerical results of simulations) obtained while investigating and refining your design. This might, for example, include a discussion of trade-offs in your design, based on measured performance etc. **Marks [0-20]**
3. Simulations in MATLAB should include performance evaluation and optimization of the proposed system. **Marks [0-20]**
4. Discussion on comparison of results with the state of the art **Marks [0-10]**
5. Demonstration of a final working cellular mobile communication system. **Marks [0-10]**