Programme: MSc ME and Communications  
Module Code: EN0763  
Module Title: WIRELESS COMMUNICATION SYSTEMS  
Distributed on: 30 Sep. 2019  
Submission Time and Date: To be submitted by 1pm GMT on 09 Dec. 2019  
Word Limit: 5000 + 5 Figures and 4 Table  
Weighting: This coursework accounts for 20% of the total mark for this module  
Submission of Assessment: Hard Copy submission: All assignments must be submitted to Student central, Ground floor, Library  
Please note that assignments are subject to anonymous marking. Your name should only appear in the name box on the assignment submission cover sheet.

It is your responsibility to ensure that your assignment arrives before the submission deadline stated above. See the University policy on late submission of work.

Instructions on Assessment:

Comparative Study of 2G, 3G, 4G and future 5G Mobile Wireless Technology

Introduction

In the last few years we have seen an exponential growth in the wireless communication systems, both in terms of the mobile technology, services offered and the number of end users. There has been a clear shift from fixed communication networks to cellular wireless communications telephony, where offering services for the mobile user on the move has become the main challenge for the service providers. By the end of 2020, there were over six times more mobile cellular subscriptions than fixed telephone lines. With all the advances made in technology, and with the simultaneous existence of the second generation (2G), 2.5G, and 3G wireless networks, the impact of services offered on the overall network efficiency have become even more critical. 4G offer consumers an expanded range of mobile communications options beyond the advances made possible by the 2G and 3G. This will be further enhanced by the next generation 5G wireless systems.

You are required to write an individual report addressing the followings:

1. A brief overview of the Mobile Cellular Networks staring from 2G and 3G – Commenting on their technical features such as:
   a. System block diagram
   b. Frequencies used for both uplink and downlink
   c. Peak data rates
   d. Mobility
   e. Transmit power level
   f. Coverage area
   g. Latency
   – Not more than three pages + 3 figures and 1 Table

2. GSM – In which wireless generation has this been adopted and discuss its key features
   Not more than two pages + 1 figure and 1 Table
3. Key features of the 4G and 5G systems and to what extent it has been deployed at a global level focusing on:
   a. History
   b. System block diagram
   c. User experience and multi-service capacity
   d. Integration of all the mobile technologies that exist (e.g. GSM - Global System for Mobile Communications, GPRS - General Packet Radio Service, IMT-2000 – International Mobile Communications, Wi-Fi - Wireless Fidelity, Bluetooth)
   e. All-IP based platform
   f. Quality of services
   g. Frequencies used for both uplink and downlink
   h. Peak data rates
   i. Mobility
   j. Transmit power level
   k. Coverage area
   l. Latency

Methodology:

- The report must demonstrate your understanding of the topics and should be supported by equations, tables, figures, etc.
- You must carry out up to date literature search and the sources used must be from IEEE, IET etc. journals, recent books and quality web sites.
- All materials adopted from other sources must be properly acknowledge by means of references

Guideline for the report: The report should be 10 pages including 4 figures and 4 tables (one per technology) and should contain the following:

- Title
- Name and Student Number
- Abstract – 100 words
- Introduction – To the topic of wireless communications
- 2G and 3G Mobile systems
- GSM - Global System for Mobile Communications
- 4G Mobile system
- 5G Mobile system
- Conclusions – 200 words
- References – Not more than 10 and it must include at least 5 journal papers from IEEE, IET, Elsevier, OSA. Full details must be given
- Single line spacing, Font size 10-12, Font type Calibri

Mapping to Programme Goals and Objectives

- Introduce students to the fundamental concept of wireless communications.
- Critically analysis of the wireless technologies
- Applications and standards of modern mobile communications
- Literature review

Module Specific Assessment Criteria and Rubric

- Marks allocated: 10% for the introduction, 80% for content, 5% for conclusions, and 5% for references.

ASSESSMENT REGULATIONS

You are advised to read the guidance for students regarding assessment policies. They are available online here.

Late submission of work
Where coursework is submitted without approval, after the published hand-in deadline, the following penalties will apply.

For coursework submitted up to 1 working day (24 hours) after the published hand-in deadline without approval, **10% of the total marks available for the assessment** (i.e. 100%) shall be deducted from the assessment mark.

Coursework submitted more than 1 working day (24 hours) after the published hand-in deadline without approval will be regarded as not having been completed. **A mark of zero will be awarded for the assessment and the module will be failed**, irrespective of the overall module mark.

These provisions apply to all assessments, including those assessed on a Pass/Fail basis.

The full policy can be found [here](#).

**Word limits and penalties**

If the assignment is within +10% of the stated word limit no penalty will apply.

The word count is to be declared on the front page of your assignment and the assignment cover sheet. The word count does not include:

PLEASE CONFIRM WHAT THE WORD COUNT DOES NOT INCLUDE eg appendices, glossary, footnotes, tables

Please note, in text citations [e.g. (Smith, 2011)] and direct secondary quotations [e.g. "dib-dab nonsense analysis" (Smith, 2011 p.123)] are INCLUDED in the word count.

**Students must retain an electronic copy of this assignment (including ALL appendices) and it must be made available within 24 hours of them requesting it be submitted.**

The full Word Limit Policy is available [here](#).

**Group Work**

The group work policy can be found [here](#)

**Academic Misconduct**

The Assessment Regulations for Taught Awards (ARTA) contain the **Regulations and procedures applying to cheating, plagiarism and other forms of academic misconduct**.

The full policy is available at [here](#)

You are reminded that plagiarism, collusion and other forms of academic misconduct as referred to in the Academic Misconduct procedure of the assessment regulations are taken very seriously. Assignments in which evidence of plagiarism or other forms of academic misconduct is found may receive a mark of zero.