**DTL 3601 : COMPUTER NETWORKS AND COMMUNICATION IN CHIEFDOMS**

**Lecturer: Prof. William Phiri**

**RATIONALE**

In this 21st century, Digital Communication has become very relevant to the design of a variety of ICT systems, such as voice and video digital cellular telephones, digital cable TV distribution, wireless LANs, digital subscriber loop, metallic Ethernet, voice-band data modems, and satellite communication systems. Since digital transmission is used by virtually all communications systems today, this course is therefore an essential foundation for Bachelors’ Degree for the Royal Highnesses as it will enable them work in systems, conduct testing, operations, maintenance, planning, and research and development. The need to understand digital communications technology (i.e. concept, and technique) cannot be over-emphasized considering the fact that Digital Communications is now applicable in every digital communication technology at the heart of today's wireless and Internet revolutions. It is therefore important that skills in designing these digital transmissions infrastructure are taught to the Royal Highnesses pursuing a Bachelor’s Degree in Traditional Leadership and Governance.

**Aim:**

The aim of this course is to equip students with fundamentals applied in a variety of Telecommunications Systems, such as voice and video digital cellular telephones, digital cable TV distribution, wireless LANs, digital subscriber loop, metallic Ethernet, voice-band data modems, and satellite communication systems based on digital communication technologies. The course intends to further equip the student with the Knowledge and skills required to Design, install and maintain a local Area Network (LAN) system and understand the principles of communication across these networks

**Objectives:**

At the end of the course, the student should be able to:

* Escalate the need for network protocols and standards
* Describe with understanding, the principles of operation of local and wide area networks
* Apply practical design, operation and installation of typical Local Area Networks
* Acquire a working knowledge of the Internet protocol suite

**UNIT 1: Telecommuting and Communication**.

1.1Internet and E-mail

1.2Office Automation

1.3Telecommuting

**UNIT 2: Data Transmission**

2.1Transmission Media

2.2Communication Channels

**UNIT 3: Communication Protocols**

3.1Functional task of a protocol

3.2Levels of protocol

3.3Principles of data link protocol

3.4Protocol types

**UNIT 4:** **Networks**

4.1 Networks and distributed systems

4.2 Local Area Network

4.3 Metropolitan Area Network

4.4 Wide Area Network

4.5 Network Topologies

**UNIT 5:** **Open system Interconnection (OSI)**

5.1 Reference Model

5.2 Standards

**UNIT 6:** **Network Installation**

6.1 Tools

6.2 Network planning

6.3 Cabling

6.4 Network Operating System

**UNIT 7: Digital Communication**

7.1 Principles of digital transmission

7.2 Architectures and formats of digital transmission systems

7.3 Asynchronous and synchronous digital hierarchies

7.4 signal-to noise ratio

7.5 Link power budget

7.6 Analog-to-digital conversion

7.7 Data compression

7.8 Digital modulation

7.9 Facility switching.

**UNIT 8:** **Network Security**

8.1 Access Controls

8.2 Firewalls

8.3 Backup

**ASSESSMENT**

Graded Coursework, assignments and examinations

|  |  |  |
| --- | --- | --- |
| **ASSESSMENT**  | **COMMENTS** | **% OF FINAL GRADE** |
| Two Assignments of Equal weight |  | 20 |
| Lab project | Presentations and lab Reports | 40 |
| FINAL EXAM |  | 40 |
| TOTAL POINTSOut of 100% | Add up all points | 100 |

**PRESCRIBED BOOK**

Öberg. T. (2001). ***“Modulation, Detection and Coding, 1st Edition”***, Wiley, John & Sons, ISBN-10: 0471497665 or ISBN-13: 978- 0471497660.

Haykin, S. (2013). ***"Digital Communication Systems, 1st Edition”****,* Wiley, ISBN-10: 0471647357 or ISBN-13: 978- 0471647355.

Smith, D. R. (2003).***“Digital Transmission Systems, 3rd Edition”***, Springer, ISBN-10: 1402075871 or ISBN-13: 978- 1402075872.

Phiri, W. (2021). Networking and Information Security: A Practical Guide for ICT Educators: Ndola: Mission Press.

Phiri, W. & Ng’andwe, E. (2022). Contexualisation and Adoption of Digital Platforms in Library and Information Management. Ndola: Mission Press.

Phiri, W. & Yamba, L. (2020). Information And Communications Technology (Ict) For Emerging Educators: Bridging The Gap Between Rural And Urban Training Institutions. Ndola Mission Press.

**RECOMMENDED BOOKS**

Lathi, Zhi Ding, B. P. (2009). **“*Modern Digital and Analog Communication Systems, 4th Edition”***, Oxford University Press, ISBN-10: 0195331451 or ISBN-13: 978- 0195331455.

Gallager, G. R. (2008). **“Principles of Digital Communication”**, Cambridge University Press, ISBN-10: 0521879078 or ISBN-13: 978- 0521879071.

Anderson, J. B. (2005). ***“Digital Transmission Engineering, 2nd Edition”***, Wiley-IEEE Press, ISBN-10: 0471694649 or ISBN-13: 978- 0471694649.

Phiri, W. & Sinyangwe, C. M. (2022). Adaptation and Application of Ethics in Information and Communications Technology. Ndola: Mission Press

**RECOMMENDED JOURNALS**

***“IEEE Transactions on Communications”***, ISSN: 0090-6778**,** IEEE Communications Society

***“IEEE Transactions on Wireless Communications”***, ISSN: 1536-1276, IEEE Communications Society

***“IEEE Communications Magazine”***, ISSN: 0163-6804, IEEE Communications Society

***“IEEE Journal on Selected Areas in Communications”***, ISSN: 0733-8716**,** IEEE Communications Society

**RECOMMENDED VIRTUAL LINKS**

[**https://www.youtube.com/watch?v=VwN91x5i25g**](https://www.youtube.com/watch?v=VwN91x5i25g)

[**https://www.youtube.com/watch?v=\_IOZ8\_cPgu8**](https://www.youtube.com/watch?v=_IOZ8_cPgu8)

[**https://www.youtube.com/watch?v=qhjj6WG7Rgc**](https://www.youtube.com/watch?v=qhjj6WG7Rgc)

[**https://www.youtube.com/watch?v=pvTJLPwzoFI**](https://www.youtube.com/watch?v=pvTJLPwzoFI)

[**https://www.youtube.com/watch?v=j0kCmPOtNew**](https://www.youtube.com/watch?v=j0kCmPOtNew)