Module 2: Telecommunication Networks and Services

Stage	1
Semester	1
Module Title	Telecommunication Networks and Services
Module Number	2
Module Status	Mandatory
Module ECTS Credits	5
Module NFQ level	9
Pre-Requisite Module Titles	None
Co-Requisite Module Titles	None
Capstone Module	No
List of Module Teaching Personnel	Dr. Faheem Bukhatwa

Contact Hours				Non-contact Hours			Total Effort (hours)
36				64			100
Lecture	Practical	Tutorial	Seminar	Assignment	Placement	Independent Work	
24		12		12		52	

Allocation of Marks (Within the Module)					
	Continuous Assessment	Project	Practical	Final Examination	Total
Percentage Contribution	40			60	100%

Intended Module Learning Outcomes

On successful completion of this module the learner will be able to:

1. Discuss the underlying principles in modern day communication systems

2. Evaluate and implement some of the wide area network technologies currently available

3. Critically analyse a communication protocols used in network communications

4. Write a technical report and/or programs to implement the protocols used in network communication systems

5. Understand, explain compare and contrast different versions of IP protocol and different communication protocols.

6. Analyse network traffic and congestion problems and evaluate QoS for different types of networks.

Module Objectives

This module aims to provide the learner with an understanding of the issues involved in the design and analysis of telecommunication networks, as well as knowledge of such systems in terms of physical implementation, protocols, routing algorithms, management. The learners will gain in depth knowledge of core topics, and state of the art architectures and emerging trends. This module also focusses on IP6 and QoS in communication networks.

Module Curriculum

- **Anatomy of Telecommunication Networks**
  Circuit Switching vs Packet Switching, Packet Switching Networks,
  Classical approaches and state of the art architectures, emerging trends.

- **Review of Fundamentals of Telecommunication Networking**
  Data communications, Error control, compression,
  Data link protocols, Protocol design, Specification, Verification

- **IP Telecommunication Networks**
  IP6 infrastructure, strategies, adaptation, requirements, management

- **Routing**
  Analysis and evaluation of protocols and protocol design implemented on existing WANs and communication systems.

- **Congestion and congestion control**
  Analysis and mechanisms and principles of congestion. TCP congestion control.

- **Network architecture and QoS**
  Network control and service architectures. Quality of service and service level agreements. IP QoS. Effective Qos. Policy management effecting QoS in mobile networks and VOIPp

Reading Lists and other learning materials

Recommended Reading

Barreiros M. Lundqvist P, 2010, *QOS-Enabled Networks: Tools and Foundations*, Wiley

Stallings W, 2010, *Data and Computer Communications*, 9th Edition, Pearson

Graziani R, 2012, *IPv6 Fundamentals: A straightforward Approach to Understanding IPv6,* 1st Edition, Cisco Press

Vinod J, Chapman B, 2009, *Deploying QoS for Cisco IP and Next Generation Networks* , Elsevier

Additional reading as recommended by lecturer, appropriate to topic and to each learner's area of research.

Zuo Xu, 2010, *QoS Designing and Implementing IP/MPLS-Based Ethernet layer 2 VPN services*, Alcatel-Lucent

Marchese M, 2007, *QoS Over Heterogeneous Networks*, Wiley

Module Learning Environment

Lectures and tutorials are carried out in class rooms / lecture halls or labs in the College.

Library

All learners have access to an extensive range of physical and electronic (remotely accessible) library resources. The library monitors and updates its resources on an on-going basis, in line with the College's Library Acquisition Policy. Lecturers update reading lists for this course on an annual basis as is the norm with all courses run by Griffith College.

Module Teaching and Learning Strategy

Learners are taught using a combination of lectures and tutorials. Tutorial sessions involve working through problems and a collaborative learning environment is encouraged where problems are discussed.

Module Assessment Strategy

Element No.	Weighting	Type	Description	Learning Outcomes Assessed
1.	10%	Tutorials	This will involve a series of tutorials. They aim at enhancing the understanding of concepts and ideas using practical problems and case studies.	1, 2, 5,6
2.	10%	Assignment	This will involve a programming work and/or producing a written technical paper format report.	3,4
3.	20%	Test	This will happen during the second half of the semester. This will cover most of the topics involved during the course.	1, 2, 5, 6
4.	60%	Examination	End of module examination	1, 3, 4, 5,6