JARAMOGI OGINGA ODINGA UNIVERSITY OF SVIENCE AND TECHNOLOGY

SCHOOL OF INFORMATICS AND INNOVATIVE

COURSE CODE: IIT3217

COURSE TITLE: NETWORK DESIGN AND IMPLEMENTATION

ACADEMICS YEAR 2013/2014

PERIOD: JAN-APRIL 2014

DURATION: 2 HOURS

INSTRUCTIONS

1 This Paper Contains Five Questions

2 Question ONE is Compulsory and ANY other TWO Questions

3 Write all your answers in the booklet provided

QUESTION ONE (30 Marks)- Compulsory

a) A bit stream 110101011 is transmitted using standard CRC method. The generator polynomial is x^4+x+1. Show the actual bit string transmitted. [3 Marks]
b) Compare and contrast distance vector routing and link state routing algorithm. [4 Marks]
c) Explain the following concepts :Tunneling , Network address translation and DHCP [7 Marks]
d) Discuss different types of guided and unguided media used to transmit data in network. [5 Marks]
e) How does a DNS work [4 Marks]
f) Explain IEEE Standard 802.4 in detail [4 Marks
g) Explain Frame Relay in detail [3 Marks]

QUESTION TWO (20 Marks)

a) Explain Distance Vector Routing Algorithm [3 Marks]
b) Explain in details using a diagram the full architecture of the OSI Model [7 Marks]
c) How would you establish effective and Efficient network [4 Marks]
d) Explain the three way handshake mechanisms connection establishment and termination [3 Marks]
e) Explain the error detecting and correcting code with example. [3 Marks]

QUESTION THREE (20 Marks)

a) Compare and contrast connection oriented and connectionless services [4 Marks]
b) Explain the leaky bucket algorithm [3 Marks]
c) Differentiate Router and Switch [4 Marks]
d) What is the serious drawback of distance vector routing? [2 Marks]
e) An organization is granted the block 211.17.180.0/24. The administrator wants to create 32 subnets.
    i)   Find the subnet mask. [1 Mark]
    ii) Find the number of addresses in each subnet. [2 Marks]
    iii) Find the first and last addresses in subnet 1. [2 Marks]
    iv) Find the first and last addresses in subnet 32 [2 Marks]

QUESTION FOUR (20 Marks)

a) Your organizations' network of which you are in-charge has lately been experiencing frequent downtimes; identify diagnostic tools and the key procedures that would help solve the network problem. [5 Marks]
b) Given a VLAN, briefly explain how you would configure it at the router using a packet tracer? [7 Marks]
c) Define network base lining and state why it is important in a network environment [4 Marks]
d) Briefly explain the main factors that affect network performance [4 Marks]

QUESTION FIVE (20 Marks)

a) Explain wireless LAN protocol and the challenge of hidden station and exposed station. How would you solve this problem [6 Marks]

b) As a system administrator of an organization, you are tasked to separate the following departments using VLANs; HR, Procurement, Medical, Students and Admissions. Briefly explain using IP addressing, connectivity devices and practical drawings how you would implement this task so that the departments can only communicate within but not with each other unless they use internet [9 Marks]

c) Briefly explain how you would protect your wireless network against security threats. [5 Marks]

COURSE DESCRIPTION

FIRST YEAR 2ND SEM

IIT 3217	NETWORK DESIGN AND IMPLEMENTATION
Lecture Hrs	28
Practical Hrs	14
Course Objective	1. Understand basic computer network technology. 2. Understand and explain Data Communications System and its components. 3. Identify the different types of network topologies and protocols. 4. Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer. 5. Identify the different types of network devices and their functions within a network 6. Understand and build skills of sub-netting and routing mechanisms. 7. Familiarity with the basic protocols of computer
Course Content	Networking Media, Structured Cabling, Cable Testing. Communication basics, network types, functions (e.g., transmission, firewalls, switching, multiplexing, routing, addressing, error recovery, congestion control); layered architectures (OSI, TCP/IP, IEEE 802.x); standards and bodies. Applications: data, telephony, music, image, video; traffic characteristics, requirements, characterisation and parameters. Network performance: concepts and parameters. Performance prediction techniques: simple queueing theory, simulation, reliability and availability. LANs: overview of Ethernet, FDDI; emphasis on QoS support. TCP/IP suite of protocols. Frame relay, ATM: operation, leaky bucket, token bucket for traffic shaping. Routing algorithms & protocols. IP routers: address filtering, IP QoS, IntServ, RSVP, DiffServ, queue management, congestion control. WANs; IP WANs, IP over ATM, IP over Frame Relay, MPLS. Router configuration based on Cisco routers. Troubleshooting network configurations. Wireless networking systems: configuration and security. Performance issues on networks. Diagnostic tools for network.

Learning & Teaching Methodologies	Lectures and Tutorials	
Instructional Materials/Equipments	Classroom and Computer Laboratory	
Course Assessment	Type	Weighting (%)
	Assignments	10
	Continuous Assessment	20
	Examination	70
	Total	100
Recommended Reading	1. Data Communications and Networking, 3/e, Behrouz A Forouzan. 2.The TCP/IP Guide, by Charles M. Kozierok, Free online Resource, http://www.tcpipguide.com/free/index.htm 3.	