NET 363-501
Midterm Quiz Guide
Quiz Time: Thursday, February 4th, 2021 at 1:30 pm

- **Midterm Quiz will be Available on D2L: <u>Thursday, Feb 4th 1:30 – 3:00 pm</u>:**
  Students can take the Quiz on any computer. Students should choose a location that is reasonably private and quiet. The Quiz will have 15-20 questions, which will mainly be short-answer questions, similar to homework questions. Quiz completion time is limited to 90 minutes.

- **D2L Content Unavailable:**
  NET 363 D2L Content and Homeworks will not be visible after 1:00 pm on February 4th and throughout the quiz time.

- **No Team Work**
  Students must complete the Midterm Quiz alone and you must agree to an Academic Integrity statement stating this. You are not permitted to communicate with anyone else about this Quiz except the instructor. If multiple students submit answers that are substantially similar or there is other evidence of collaboration, then this will be investigated.

- **Evidence of Comprehension – Use Your Own Words**
  You should write all answers clearly in your own sentences. If an answer consists only of phrases that are copy-and-pasted from course materials or the Internet then it may receive a reduced score because it does not clearly demonstrate your comprehension.

- **Exam Questions**
  The questions on the Quiz will mainly be short-answer questions – similar to the questions on Homework 1 and Homework 2.

  There will be 15-20 questions on the exam. Each question will be taken from one of the topics in the list below.

- **Topics you should be able to explain (Example questions: What is X? What is the purpose of X? How does X work? Give an example of X. What is the advantage of X over its alternatives?)**

1. Networks and Protocols
   a) Network design characteristics
      i) Fault tolerance, scalability, quality of service, security
   b) Converged networks
   c) Basics of DNS and DHCP
   d) Be able to explain protocol stacks and use of multiple packet headers
   e) TCP/IP and OSI protocol model
   f) Addresses used at Layer 2, Layer 3, Layer 4.
2. Packet Forwarding
   a) Host forwarding
      i) What is a default gateway?
      ii) How outgoing MAC header addresses are determined for destinations on the same and on different IP subnet.
   b) Hub forwarding
      i) How packets are forwarded through a hub

c) Switch forwarding
    i) How data packets are forwarded using Forwarding Table
    ii) How new entries are added to Forwarding Table
    iii) How entries are removed from Forwarding Table
    iv) Store-and-Forward vs. Cut-Through mode
    v) Virtual LANs
        a) Definition and advantages
        b) Relationship between VLANs and IP subnets
        c) 802.1q tags on packets
        d) Difference between access ports and trunk ports on a switch
        e) Inter-VLAN routing
            (1) Legacy routing using one router interface per VLAN
            (2) Router-on-a-Stick using subinterfaces
            (3) Layer 3 switches
        f) Dynamic Trunking – what is it?
d) Router forwarding
    i) Contents of Routing Table
    ii) How outgoing interface and next hop are determined
    iii) How outgoing MAC header addresses are determined
    iv) Default routes

3. Ethernet Technologies
    a) MAC address format - Manufacturer ID and serial number
        i) Broadcast address
    b) Name and use of each Ethernet frame header field
    c) PoE and Auto-MDIX
    d) Spanning Tree Protocol
        i) Purpose of STP
        ii) How Root Switch is determined
            a) BID format –
                (1) Enhanced Priority: Priority and VLAN
                (2) MAC address
            b) How to set priority
        iii) How Port Roles are determined
            a) How to determine Path Costs
        iv) Which ports are placed into Forwarding Mode vs. Blocking Mode
        v) Rapid Spanning Tree Protocol
            a) Basic differences from STP
            b) Edge Ports / PortFast
            c) BPDU Guard, Root Guard
        vi) Basic definitions of PVST+, Rapid PVST+, MSTP
4. Internet Protocol
    a) Purpose of each IP header field
    b) How ARP is used, ARP caches
    c) IP Subnetting
        i) Equivalence between prefix length (/n), subnet mask and subnet size
        ii) Rules for Valid Subnet IDs (0-bits in Host bits for network address)
5. Cisco technologies
    a) What are startup-config and running-config
    b) Command line modes
    c) Routing table structure

d) You should be able to read configs learned so far, such as interface config, static routes, trunk modes, etc. But you will not need to write any configs.

- **Things you should be able to do:**

1. Homework problems
   a) Be able to do any of the problems from homework #1 or #2 with different network diagrams and/or data values.
2. Packet flow and header address values
   a) Determine the correct values for source & destination addresses in both Ethernet and IP headers for a packet transmission across any given network.
3. Table entries
   a) List all table entries for switch Forwarding Table, Routing Table and/or ARP table in any PC, router or switch shown in a diagram.
   b) Given forwarding table and/or routing table, describe how packets are forwarded through a network.
   c) Given a sequence of packet transmissions through a switch, determine the resulting contents of the Forwarding Table and determine the ports out which each packet will be sent.
4. IP Subnetting
   a) Given a Subnet ID, determine:
      i) First and Last Assignable IP
      ii) Broadcast IP.
   b) Given any IP address and subnet mask, determine Subnet ID for its subnet.
   c) Given an IP address block, and a number of subnets or host IP addresses, determine the subnet mask needed for Straight Subnetting into equal-sized subnets
      i) List of subnet IDs within this address block using this mask
5. Spanning Tree Protocols
   a) Given a network of switches and a list of switch BIDs, determine:
      i) Which switch will be root switch
      ii) Port Roles for all ports
      iii) Which ports will be Blocking and Forwarding