Welcome to Regis University SPS

Local Area Networks

CN 310

5W3 2004

Faculty:  Judy L. Richards

<table>
<thead>
<tr>
<th>Contact Information:  <a href="mailto:jlrichar@regis.edu">jlrichar@regis.edu</a></th>
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<tr>
<td>Preferred email</td>
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<tr>
<td><a href="mailto:jlr6@yahoo.com">jlr6@yahoo.com</a> (ISP)</td>
</tr>
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</table>

| Office Hours: 6 to 9 p.m. |
| U. S. Mountain time       |
| Monday through Friday     |

| Telephone: 303 664 1339   |
| Leave a voice mail if I do not answer. |

Faculty : Course Description : Text : Rules of the Road

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**Faculty**

Facilitator Bio

**Course Description**

CN 310 Course Description

**Text**

Description of required text materials
Errata

**Rules of the Road**

Facilitator's expectations

**Grading**

Criteria for grading

**Syllabus and Assignments**

What you are required to do in order to pass this course
I am Judy Richards. I have had a long-term interest in teaching and consider myself a perennial student. I believe that a person learns better when they feel comfortable to question "Why and how does that work". Obviously, I teach something that is a bit concrete - local area networking and computer information systems. Not that there isn't room for theory, but one is expected to be able to engineer a network and get results. I have taught since 1997 at Regis for the computer networking department and for various other education institutions in the Denver Metro Area.

Personally, I am not so concrete - I like science fiction, fantasy and mystery novels as well as action/adventure novels. A few authors I prefer are Elizabeth Peters, Marion Zimmer Bradley, Anne Perry, Tony Hillerman and Clive Cussler (Where is Dirk Pitt when you really need him?) and one could call me a Trekkie. People I admire are Nelson Mandella, Eleanor Roosevelt, Georgia O'Keeffe and Frida Kahlo.

Activities I enjoy are traveling, soaring (fixed wing aircraft) and classic cars. I own a '66 Ford Mustang Convertible and am a member of the Colorado Chassis Lassies and maintain the Web site. I have been a long time volunteer and work with refugees at Emily Griffith Opportunity School in the conversation program for English as a second language. Previously, I have volunteered in various capacities at National Jewish Hospital, The Soaring Society of Boulder, the Arts & Humanities of Boulder County and am a founding mother of The Colorado Women's Hall of Fame. My family includes Dozzer T. Dog and Murphy T. Pussycat as well as an extended family of friends.

I have been involved with personal computers since the mid-1980s and was
involved previously with mainframes. Therefore, I consider I have at least
20 solid years of local area networking and computer software and hardware
experience in various platforms and architectures. I am a Certified Netware
Engineer and am a Certified Network Consultant through the National
Association of Communication Systems Engineers (NACSE) and am
Chairperson for the LAN & Data Networks Board of Standards. My
educational background includes training in most Microsoft products such as
TCP/IP, IIS, server and workstation as well as Solaris system administration,
shell programming and network administration. More recently, I have
expanded my experience into telecommunications. I have extensive
experience in technical program/project management, which includes the
Rational Unified Process (RUP), Extreme Programming iteration planning and
the Capability Maturity Model (CMM). My formal education also includes
MBAs in Computer Information Systems and Finance & Accounting through
Regis University (1992).

Additionally, I have owned a bookkeeping firm and have experience as an oil
and gas accountant. Until recently, I worked as a business systems analyst
for Custom Software Solution's Professional Services department at CSG
Systems. Prior to CSG, I worked as a Member of Technical Staff, Research &
Development - Coretech at US West, and at Exabyte Corporation as Senior
Network Administrator and Amoco Corporation. I am now Vice President of
Comfort Technical Assistants, LLC a company that provides professional IT
services (without attitude).

Good luck to you all. I am here to help in any way I can.

You may reach me by eMail, jlrichar@regis.edu, or at 303 664 1339, please
leave a detailed message if I am not available to answer your call
immediately. Please read and absorb all the material as presented, they
supersede all other documents regarding this class.

**************************
In Units 1 and 2, we review the fundamental concepts that you learned in the Introduction to Networking course. We recall the general classifications of networks and the basic types of network topologies. We then review the characteristics of the transmission media that create those topologies. Both topologies and media are closely related to media access method, thus the next few units examine the popular Data Link protocols such as Ethernet, Token Ring, and Fiber Distributed Data Interface (FDDI). These concepts were introduced in Introduction to Networking, but this course will examine each in much greater detail. We will also discuss Asynchronous Transfer Mode (ATM) in depth, because this popular wide area protocol is gradually moving to the LAN environment. When you have a firm understanding of the lower layers of a LAN, we move on to consider the specialized software applications called network operating systems (NOSs). We then examine the details of the dominant LAN operating systems (OSs): Windows NT/2000 and Novell NetWare. Finally, we take a look at the factors a network administrator must consider when maintaining or expanding a LAN. We introduce the most common methods and tools you will need to keep a local network working smoothly.

**Format**

Adult student participation techniques will be used to further the learning objectives and understanding of course content such as shared experiences among students whenever possible to assist experiential learning and peer education. Active student interaction and participation in the learning process is essential for lively stimulating course work.

Rich Text Format is required for written submittals; Visio format is not acceptable for drawings and/or schematics.

**Requirements**

Course participation includes thoughtful written contributions, active
discernment and facilitating meaningful exchange of ideas, concepts and opinions.

## Learning Objectives

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<td>This topic covers the predominant LAN MAC layer protocols, namely Ethernet, Token Ring, Token Bus and FDDI. How each works as well as common configurations are discussed. Frames and port addresses are used to augment each section. The topic ends with a look at Network Interface Cards (NICs).</td>
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### Topic Outcomes

**Upon completion of this topic students will be able to:**

- Explain difference between LANs, MANs and WANs
- List the different topologies found in Local Area Networks
- Explain the three methods computers communicate with each other computers
- Describe the addresses and functions of each layer of the OSI Model
- Differentiate between logical and physical addresses
- Explain how processes, protocols and addresses work together in a network

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**Learning Topic #1: Fundamentals of LANs**

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### Topic Outcomes

**Upon completion of this topic students will be able to:**

- How Token Ring gains access to the physical media and transmits frames
- How Token Bus gains access to the physical media and transmits frames
- How FDDI gains access to the physical media and transmits frames
- The differences between frame formats of the various LAN protocols
- Different LAN configurations
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**Upon completion of this topic students will be able to:**

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- List the major functions of the NetWare NOS
- List the products offered by Novell
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- Understand the protocols used by NT to move information across a network
- Describe how NT and NetWare interoperate
disadvantages of the different cabling systems used for LANs
• List the physical arrangements of LANs systems
• Name the advantages and disadvantages of Token Ring, Ethernet and FDDI
• Understand MAC layer protocols and how they are used in networking

**Learning Topic #3: Ethernet LANs**
This topic covers the predominant LAN MAC layer protocols, namely Ethernet, Token Ring, Token Bus and FDDI. How each works as well as common configurations are discussed. Traces are used to augment each section. The topic ends with a look at Network Interface Cards (NICs).

**Topic Outcomes**
Upon completion of this topic students will be able to:

- How Ethernet gains access to the physical media and transmits frames
- How to read LAN traces
- The differences between frame formats of the various LAN protocols
- At least one encoding scheme
- Different LAN configurations
- Advantages and disadvantages of LAN protocols and configurations
- The purpose and function of Virtual LANs (VLANs)

students will be able to:
- Explain the need for technologies such as ATM
- Describe why ATM can be used for the transport of multimedia applications
- Explain the features and functions of ATM switches
- Describe the purpose and usage of LAN Emulation (LANE)

**Learning Topic #6: LAN Networking Software**
This topic covers the basic principles needed to understand Network Operating Systems (NOSs). The six primary NOSs in the LAN industry are then analyzed with special emphasis placed on the market leaders, Novell NetWare and Windows NT.

**Topic Outcomes**
Upon completion of this topic students will be able to:

- Name the primary advantages of the client/server model when used in PC LAN environments.
- Indicate the advantages of Remote Procedure Call tools to developers of network applications.
- Identify the generic mapping of PC LAN Network Operating Systems to the OSI model.
- Identify primary products and product characteristics of the leading NOS vendors.
- Identify major trends in the PC LAN marketplace.
- Name web server applications in wide usage today.

- List the tools that are used with NT Server
- Follow the flow of information across a network when using NT

**Learning Topic #9: Analysis of LANs**
This topic includes information on how to evaluate LANs from several perspectives. The first perspective is the particular LAN functions that are necessary to share information and increase productivity. Other areas covered are LAN availability and general LAN costs.

**Topic Outcomes**
Upon completion of this topic students will be able to:

- The performance characteristics of the major MAC layer protocols.
- How to increase LAN availability.
- The different functions LANs perform.
- The costs of LAN implementation and maintenance.
**Required Text**


**Errata:** [Text errata page 177](Adobe PDF)

Additional readings may be selected from various sources. Students are encouraged to present additional course-related materials to the class at their own initiative.

Reading assignments are assigned in the Syllabus as well as occasionally throughout the course. Assignments are required, unless specifically designated as optional.
Let me begin by saying that I want as few rules as possible and want to stimulate participation and interaction. My role is to guide the process. However, I must also manage the process.

**Our Roles**

My role will be to guide the learning process. I make the assignments and evaluate your progress (through participation, depth of analysis and the written assignments). I will make input to help you understand an issue or to clarify a concept. I will try to summarize and synthesize what has been discussed and will provide feedback on your investigations.

Your role is not just to assemble facts through reading or searching the internet, book or the media. Your role is to analyze and synthesize, to think things through by drawing on your experience, the experience of the community, and using all of those “make a leap”.

**Ethics Statement**

An integral component of SPS Undergraduate Program courses is student and facilitator/instructor self-disclosure and the use of personal experiences for the purpose of facilitating coursework. Each student is expected to honor confidentiality as it pertains to student disclosure. No shared information, comments, or opinions expressed by another student or facilitator/instructor in the educational setting should ever be used in a manner which is intended to humiliate, embarrass, harass, damage, or otherwise injure the student in his/her personal, public or business life. In addition, confidentiality must be upheld by not disclosing any information, which would identify a particular individual or organization.

An additional integral component of higher education is challenging one’s own perceptions and beliefs regarding the course content and integrating information as well as understanding opposing perceptions and beliefs. Thus, students have the right to choose how much he/she will disclose and must also accept the responsibility of respecting disclosure of other students and facilitators/instructors.
Academic Dishonesty

Regis University is committed to intellectual integrity in its academic pursuits. The University’s policy prohibits all forms of academic dishonesty. Academic dishonesty is normally defined by, though not necessarily limited to, the following categories:

Cheating - defined as using inappropriate sources of information on a test or assignment.

Plagiarism - defined as presenting as one’s own, the ideas, words, or products of another.

The academic dishonesty policy, as stated in the Regis University Bulletin, applies to all courses, regardless of learning format. The academic dishonesty policy also applies to any assignment or exam submitted by a student, whether in person or by electronic means.

Attendance Policy

The expectation is for students to attend all classes and dress in an appropriate manner such as “business casual”. Because of the accelerated nature of the course work in the School for Professional Studies, missing any class may have a negative impact on the student’s learning and course performance. Any student who misses the first class due to emergency circumstances must contact the facilitator/instructor or the Faculty and Curriculum department prior to the course starting. If the student fails to do so, they will automatically be dropped from the course and assessed a drop fee. Recognizing emergency circumstances do occur, the following guidelines are available for students and facilitators/instructors.

Make up work should be required if the student misses a class. This work is arranged, in advance, between the facilitator/instructor and the student. The student is responsible for contacting the facilitator/instructor for the additional assignment(s).

Definition of Participation

The collaborative adult learning model Regis University implements require students to participate and actively engage in the learning process. Participation is not the same as attendance. Attendance is simply being present in the classroom but does not require the student to actively
Participate.

Participation requires students to be actively involved in the learning process, which makes the classroom experience more meaningful. The contributions made by the student should be related to the course content and meaningful to the class discussion. You are expected to participate. If you have a great deal of experience in a particular subject so much the better. Your expertise adds to the learning process. Please see the Grading Criteria section below in order to fully understand the essentials of participation.

Office Hours

Office hours are Monday through Friday 6 p.m. to 9 p.m. (U.S. Mountain Time). I will need prior notification if you wish to have a one-on-one telephone conversation during these times; with pre-arrangement, I am available on special request at other times. I will advise the class if there is any change in this arrangement.

E-mail

Written assignments will be sent to me by e-mail, as an attachment. Please try to use Microsoft Word, in any case, save the attachment in Rich Text Format (RTF). If you have a different word processor/office set-up, please let me know so we can negotiate the differences.

Please use the following file naming convention for e-mailing assignments:

1. Send as an attachment and be sure to put your name within the file (on the document).
2. Name the written assignment file with your first initial and last name, the week of the class assignment, and a description of the assignment.
3. The prefix in the subject line of the email should read “CN310” and your name.

Examples follow:

jrichardsW01U01L02 Activities.rtf (from Judy Richards Week 01 Unit 01 Lesson 02 Activities assignment)

Deadlines and Basis of Grades

There are deadlines for assignments; note CN310 assignments must be
emailed to me each Friday of the week. That means that I will be using the weekends to review your work. I will return your work by email with a grade as soon as possible. Please try to make deadlines. If you cannot, you must let me know. If you have a good excuse, we can negotiate. If you do not, expect that lateness will reduce your grade by 25%. There may be options offered in order for you to make up work, if necessary. Except under extraordinary circumstances, I will not accept work more than 1 day late.

**Assignments**

All assignments are typewritten, double spaced, 12 pt Font. Grammar, punctuation and critical thinking are imperative to your success and assignments will be graded accordingly. Written assignments will be graded: 25% mechanics/grammar, 25% quality of presentation and organization, and 50% for analysis. You may use the American Psychological Association (APA) format. Regis has an online writing program (OWL) if you need help in this area - see regis.edu for more information. As mentioned above, I will return all assignments with a grade as soon as possible.

**Emergency Contact**

If you want to discuss something with me on a confidential basis please contact me at 303-664-1339. I can usually be reached between 6-9 p.m. (US Mountain Time), leave a detailed message if I do not answer. Of course, you may contact me at my email address, jlrichar@regis.edu.

**Disabilities**

If you have a documented disability requiring academic adjustments for this class, please contact Dr. KoKo Oyler, Director of Disability Services (303-458-4941), koyler@regis.edu. She will review your documentation with you and help determine appropriate, reasonable accommodations. Following the meeting with Dr. Oyler, please make an appointment with me, as your instructor, to discuss your accommodation request in light of the course requirements. You may self-disclose and request an academic adjustment any time during the term. However, I strongly recommend that you do so as soon as possible, because accommodations are not provided retroactively and adequate lead-time is required.

**Flexibility**
You may have questions about the class set up, while we have a syllabus and outline, I am flexible. If circumstances and expectations dictate, we can modify this course as necessary.
Grading Criteria

For the official Regis definitions regarding grades, attendance, ethics, see below; I will use these definitions as my guide for determining grades, attendance and ethics issues.

Definition of Letter Grades

- **A** = Demonstrates an accurate and sophisticated understanding of the readings and issues. Does more than repeat what the text says or what was said in class. Draws out additional important implications. Shows a critical stance toward opinions expressed in class or in the readings. Expresses his/her own views articulately and defends them well. Shows originality of thought in expressing the critical stance, in drawing out additional implications from the readings and class discussions, and in finding personal meaning in the readings and issues discussed. Expresses his/her ideas clearly. Papers contain minor grammatical or stylistic weaknesses.

- **B** = Shows all the elements of A work, but with less accomplishment. There is still accurate understanding of readings and issues with a demonstrated ability to do more than repeat the text; a critical stance with some effort, not always successful, to defend that stance; some attempt to find personal meaning, with at least hints of originality and creativity of thoughts and ideas.

- **C** = Overall demonstrates an accurate grasp of the readings and issues, but with some inaccuracy and without deeper sophistication and the ability to draw out additional implications. Some attempt to take a critical stance, but with little effort or success in defending that stance. Some attempt to find personal meaning. Sufficient clarity of expression to communicate ideas, but stylistic or grammatical weaknesses creates some difficulties.

- **D** = An effort to understand has been made, with some demonstrated understanding of readings and issues, but with serious deficiencies. Generally lacking in critical stance or in a defense of that stance. The attempt to find personal meaning is either lacking or greatly hindered by difficulties in understanding.

- **F** = Simply an unsatisfactory effort in key respects, especially in understanding or clarity of expression.

Awarding of Incomplete Grades

A grade of "I" denotes that the required work for the course is incomplete due to extraordinary circumstances. The student must specifically request in writing from the instructor that such a grade be assigned. If accepted, the
facilitator/instructor is responsible for establishing the time frame for completing the course requirements. This should be done as quickly as possible and communicated, in writing, to the student. The recommended time frame for completing the course requirements is within 30 days of the end of the course. However, the maximum allowable time to complete an incomplete grade is defined as the end of the semester following the semester during which the I/alternate grade was assigned. Spring semester grades are an exception; they are due at the end of fall, not summer, semester.

When submitting a grade of "I", the facilitator/instructor will also submit an alternate grade (e.g. "I/C", "I/D", etc.). The alternate grade will become the permanent grade if the facilitator/instructor does not submit a final grade by the end of the maximum time period. The alternative grade is the grade the facilitator/instructor determines the student should receive in the event that the student fails to complete the required work.

**Deadlines and Basis of Grades**

There are deadlines for assignments; note CN310 assignments must be emailed to me each Friday of the week. That means that I will be using the weekends to review your work. I will return your work by email with a grade as soon as possible. Please try to make deadlines. If you cannot, you must let me know. If you have a good excuse, we can negotiate. If you do not, expect that lateness will reduce your grade by 25%. There may be options offered in order for you to make up work, if necessary. Except under extraordinary circumstances, I will not accept work more than 1 day late.

**Grading Criteria**

Understanding of course content will be analyzed using the following activities:

- 20%: Discussion participation
- 25%: Timely submission of weekly activity assignments
- 25%: Weekly quizzes
- 30%: Final Test

**Written assignments** will be graded on the following criteria:

- 25% mechanics/grammar
  - Citations/reference page follow guidelines
Properly cites ideas/info from other sources
Paper is laid out effectively--uses, heading and other reader-friendly tools
Paper is neat/shows attention to detail
Rules of grammar, usage, punctuation are followed
Spelling is correct
Sentences are complete, clear, and concise
Sentences are well-constructed with consistently strong, varied structure
Transitions between sentences/paragraphs/sections help maintain the flow of thought
Words used are precise and unambiguous
The tone is appropriate to the audience, content, and assignment

25% quality of content and organization
Executive summary is provided
The introduction provides a sufficient background on the topic and previews major points
Central theme/purpose is immediately clear
Structure is clear, logical, and easy to follow
Subsequent sections develop/support the central theme
Conclusion/recommendations follow logically from the body of the paper
The introduction provides a sufficient background on the topic and previews major points
Central theme/purpose is immediately clear
Structure is clear, logical, and easy to follow
Subsequent sections develop/support the central theme
Conclusion/recommendations follow logically from the body of the paper

50% for analysis
Key elements of assignments covered
Content is comprehensive/accurate/persuasive
Displays an understanding of relevant theory
Major points supported by specific details/examples
Research is adequate/timely
Writer has gone beyond textbook for resources
Writer compares/contrasts/integrates theory/subject matter with work environment/experience
At an appropriate level, the writer analyzes and synthesizes theory/practice to develop new ideas and ways of conceptualizing and performing
Participation Policies

Class participation is 20% of your grade and will include interaction and discussions during class period, including all in-class exercises, small group and large group discussions and facilitated discussion. Thinking, being creative, curious and sharing of your ideas with the class is important.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Criteria</th>
<th>Points</th>
<th>Percentage</th>
</tr>
</thead>
</table>
| "A" Level | In addition to the lists below, students who are judged to have excellent participation will also ask questions which:  
• Clarify and synthesize discussion  
• Relate their ideas and/or experience to classroom topics  
• Contribute examples or counter-examples which are relevant to classroom topics  
• Challenge what is being taught with logic, examples and consideration  
• Acknowledge and extend the ideas and contributions of others  
• Relate content from class materials, readings and experiences to the discussion | 20.00-18.5 | 100-93% |
| | (Active in class discussions, shares ideas, raises issues.) | 18.49-18.0 | 92-90% |
| | (Interacts with class, discusses issues and subject matter.) | 17.99-17.5 | 89-87.5% |
| | (Was responsive to issues and class discussions when asked.) | 17.49-16.5 | 87-83% |
| | (Was “alive” during class, with some good contribution.) | 16.49-16.0 | 82-80% |
| | (Was “alive” during class but contribution was minimal.) | 15.99-14.5 | 79-73% |
| | (Was “alive” during class, but not obvious to other students.) | >14.49 | > 72% |
| | (Was “alive” but all academic vital signs were non-functional.) | | |
A final letter grade will be assigned according to the following criteria:

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90 - 100%</td>
</tr>
<tr>
<td>B</td>
<td>80 - 89%</td>
</tr>
<tr>
<td>C</td>
<td>70 - 79%</td>
</tr>
<tr>
<td>D</td>
<td>60 - 69%</td>
</tr>
<tr>
<td>F</td>
<td>&lt;60%</td>
</tr>
</tbody>
</table>

**********
This syllabus and assignments document takes precedent over all documents that are otherwise available to date.

Week 1: Review of LAN Fundamentals - Unit 1

Connecting Computers - Unit 2

03/24

Preliminary Work

ASSIGNMENTS LISTED HERE ARE PART OF ADVANCE CLASS PREPARATION AND SHOULD BE COMPLETED PRIOR TO THE CLASS FOR WHICH THEY ARE ASSIGNED.

Required Reading: All documents: Faculty, Course Description, Text, Rules of the Road, Grading and Syllabus & Assignments. Reading assignments are assigned in the Syllabus as well as occasionally throughout the course. Assignments are required, unless specifically designated as optional.

Read Unit 1, Lessons 1-3

1. Send to facilitator: email address and information regarding your virus protection software (no graphics) as well as the date of the last virus signature update by Friday.
2. Submit All Activities to Facilitator by Friday.
3. Submit Unit 1 Quiz to Facilitator by Friday.

Read Unit 2, Lessons 1-5

4. Submit the first two activities for each lesson to Facilitator by Friday.
5. Submit Unit 2 Quiz By Friday.

Lecture Units 1 and 2
- Introductions
- Choose Class Representative

Assignment for next week:
Read Unit 3 lessons 1-6

Read Unit 4 lessons 1-3
### Week 2: Ethernet LANs - Unit 3

**Token Ring and FDDI - Unit 4**

03/31

**Units 3 & Unit 4**

1. Submit the first two activities for each lesson to Facilitator by Friday.
   (Exception for Unit 3, Lesson 3 which has only one activity.)
2. Submit Unit 3 and Unit 4 Quizzes By Friday

**Lecture Units 3 and 4**

Assignment for next week:

Read **Unit 5** lessons 1-6

### Week 3: ATM LANs - Unit 5

04/07

**Unit 5**

1. Submit the first six activities for each lesson to Facilitator by Friday.
   (Exception for Unit 5, Lesson 2 which has only four activities.)
2. Submit Unit 5 Quiz By Friday.

**Lecture Unit 5**

- Class Representative Report

Assignment for next week:

Read **Unit 6** lessons 1-7
Read **Unit 7** lessons 1-6
Week 4: LAN Networking Software - Unit 6

Novell NetWare Client/Server System - Unit 7

04/14

Units 6, 7

Lecture Units 6 and 7

1. Submit first two activities for each lesson to Facilitator by Friday.
2. Submit Units 6 and 7 Quizzes By Friday.

Read Unit 8 lessons 1-5
Read Unit 9 lessons 1-3

Week 5: Network OS Software Windows NT - Unit 8

Analysis of LANs - Unit 9

04/21

Units 8 and 9

Lecture Units 8 and 9

1. Submit first two activities for each lesson to Facilitator by Friday.
   (Exception for Unit 8, Lesson 4 which has only one activity.)
2. Submit Units 8 and 9 Quizzes By Friday.
3. Submit Final Exam by Friday.