Northern Virginia Community College
Alexandria Campus

<table>
<thead>
<tr>
<th>Course ID: ITN100</th>
<th>Section: 002A</th>
<th>Course Title: Introduction to Telecommunications</th>
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<tbody>
<tr>
<td>Credit Hours: 3</td>
<td>Semester: Fall 2013, 1st 16 weeks</td>
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</tr>
<tr>
<td>Meeting Day: Wednesday</td>
<td>Times: 4:30PM-7:10PM.</td>
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<tr>
<td>Location: Room A-Bisdorf/AA-0414</td>
<td>Pre-requisites: ITE115, Introduction to Computer Applications and Concepts</td>
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</table>

Instructor information

Name: Hatim Hussein


Office Location: Room A-Bisdorf/AA-427

Office Hours: Tuesday: 4:30-7:00, Thursday: 4:30-7:00, or by appointment.

Contact information: 703.845.6341 [a new number coming soon]

Instructor Profile website: http://blogs.nvcc.edu/hshussein/

Blackboard site: https://nvcc.my.vccs.edu/jsp/home.jsp

Instructor email address: hshussein@nvcc.edu

Required Course Text book: Business Data Communications and Networking – 11th Edition by Fitzgerald and Dennis, ISBN: 978-1-118-08683-4 (older versions of the text will not be sufficient). This book is available via the College Library’s Safari Online subscription! Be logged on to the college and click on the following link:

http://proquest.safaribooksonline.com.ezproxy.vccs.edu:2048/book/networking/9781118086834/firstchapter#X2ludGVybmFsX0ZsYXNoUmVhVzZGVyP3htbGlkPTk3ODExMTgwODY4MzQvbmF2UG9pbnQtODU=

NOTE: This syllabus is subject to change at the instructor’s discretion. Students will be notified via email and through Blackboard when changes are made to due dates, class cancellations, or other significant adjustments are made to the syllabus.

Course Objective: To introduce the concept of telecommunications, to develop an understanding of the components of the history and future and the importance of telecommunications to industry, to develop knowledge of the hardware, software, protocols, and decisions involved in network development.

Upon completion of this course, the student will be able to:
A. Identify modern communications and network trends.
B. Explain the various data transmission media to include both analog and digital transmission and data coding techniques.
C. Explain synchronous and asynchronous transmission, SDLC, interfacing and error detection and correction technique.
D. Explain major multiplexing techniques and circuit, messages, and packet switching.
E. Identify the issues regarding local area networks to include topology and network protocols.
F. Explain data communication techniques used to facilitate decentralization of data processing.
G. Identify the important elements of data communications equipment and describe their function.
H. Explain the OSI 7-layer model for standards development.
I. Internet basic.
J. Internet technology and operation.
K. Digital image and audio processing

Course Content:
1. Communication system and OSI model
2. The business environment
3. Data communication codes and transmission media
4. Communication interface and modem
5. Communication networks
6. Line sharing
7. Protocols
8. Digital and analog signal transmission
9. Communication Administration
10. Internet Basics
11. Internet operation and addressing

Student Learning Outcomes:
1.0 Communication system and OSI model
1.1 Explain the OSI reference model and layers.
1.2 Discuss the TCP/IP layers and similarities to OSI.
1.3 Explain the OSI layer functions and purpose.
1.4 Explain message transmission and message type.
1.5 Describe communication basic components
1.6 Explain signal and systems, and signal propagation.
1.7 Describe the different vehicles of transmission.
1.8 Explain transmission basics in relation to reference model.
1.9 Define and explain distributed processing and distributed network.
1.10 Explain distributed forms.
1.11 Discuss centralized processing and its applications.
1.12 Introduce the evolution of modern communications systems
1.13 Discuss several business data communication issues and efficiency.
1.14 Distinguish between analog and digital information source.
2.0 The business environment
2.1 The value of information
2.1.1 Characterize business information type.
2.1.2 Describe major e-commerce and e-business.
2.1.3 Explain the characteristics of business community and organization.
2.1.4 Describe the trend of information super highway.
3.0 Data communication codes and transmission media
3.1 Explain different types of coding schemes.
3.2 Describe Data Encoding Schemes.
3.3 Explain decoding format, error checking, parities and control characters.
3.4 Explain various transmission media types, including guided and radiated (microwave, satellite, and radio frequency).
3.5 Explain the characteristics and functions of twisted pair, coaxial cable and fiber optics.
3.6 Explain fiber optics transmission characteristics.
3.7 Explain the various transmission impairments that affect the signal and the transfer rate.
3.8 Define bandwidth and its relation to pulse width.
4.0 Communication interfaces and modems
4.1 Explain interfacing methods.
4.2 Identify and explain different types of modulation techniques used today.
4.3 Explain MODEM basic structure and functions.
5.0 Communication networks
5.1 Explain different network architectures.
5.2 Discuss circuit switching and public switched networks.
5.3 Explain various topologies and configurations used in networks such as: Star, Ring, Bus and Tree.
5.4 Explain the Local Area Networks, the access methods and interconnection types.
5.5 Give examples of LAN applications.
5.6 Explain how DTE is interfaced to LAN.
5.7 List the various options provided in LAN operations.
5.8 Define and explain Wide Area Networks.
5.9 Describe Cellular Communications – including:
5.9.1 Evolution of cellular telephone networks
5.9.2 Components of a cellular network
5.9.3 Multiple access techniques
5.9.4 Generations of cellular systems
5.10 Describe Satellite communication systems including:
5.10.1 Satellite orbits
6.0 Line sharing
6.1 Discuss the use of Frequency division multiplexing.
6.2 Explain Time division multiplexing (TDM), its application and the difference between TDM and STDM.
6.3 Explain Asynchronous and Synchronous data transmission.
6.4 Discuss T-1 services and their importance.
7.0 Protocols
7.1 Describe the basic operation of Network Layer protocols.
7.2 Describe the basic operation of Transport Layer and Data Link Layer protocols.
8.0 Digital and analog signal transmission
8.1 Describe digital signal transmission and encoding.
8.2 Describe analog signal transmission and forms of encoding.
8.3 Explain the difference between synchronous and asynchronous.
9.0 Communication Administration
9.1 Describe ways that messages are routed within a network.
9.2 Describe the functions of the network operation.
9.3 Describe how network performance is monitored and measured.
9.4 Explain the importance of network security.
9.5 List the most important security threats faced by distributed system.
9.6 Discuss application of encryption to network security.
9.7 Discuss telecommunications polices
10.0 Internet Basics
10.1 Explain Internet technology
10.2 Explain Internet Protocol and services.
10.3 Explain the features of client server computing.
10.4 Explain the architecture of client server applications.
11.0 Internet Operation and Addressing
11.1 Discuss Internet Addressing.
11.2 Describe subnet and their usage.
11.3 Discuss IP routing algorithm and protocols.
11.4 Explain the role of subnet mask in IP addressing.
12.0 Digitizing grayscale and color images
12.1 Types of images
12.2 Brightness resolution
12.3 Spatial resolution
12.4 The image digitization process
12.5 Tradeoffs involved in digitizing images
12.6 Calculations involving images
13.0 Digital video
13.1 Creating digital video
13.2 Calculating size of digital video files
14.0. Digital Audio
14.1 Converting sound into electricity
14.2 Frequency, amplitude and phase
14.3 Calculations involving properties of sound waves
14.4 Multipliers for frequency and period
14.5 Defining complex tones and pure tones
14.6 Frequency spectrum of audio signals
14.7 The 3 steps for digitizing audio
14.8 Nyquist sampling theorem
14.9 PCM
14.10 Quantization error
14.11 Constructing audio signals from binary streams
14.12 Tradeoffs involved in audio digitization
14.13 Calculations involving digital audio files

**Course Requirements:**

Your attendance is measured by your participation in class and in Blackboard. In the first class, please login to Blackboard and introduce yourself to the rest of the classes. More instruction will be given in the first class.

Student who misses the first three classes will be dropped from the class automatically. Students who are dropped for non-attendance may not receive financial aid and will not receive a refund.

**Telecommunications Topics Paper:** Select a topic from the following 1) Convergence, 2) Cloud Computing, or 3) IT Security or related topics such as systems security, network security – security of corporate desktop and server systems, social engineering, botnets, etc.). Your paper must be 3 – 5 double-spaced pages in length and cited to APA style guidelines. All papers will be run through Safe Assign to ensure that they are not copied from the Internet or other sources. Use at least 3 external sources to cite your paper (otherwise, it is just opinion). Again, any papers that are copied will result in a 0 for the course.

**Grades:** All exams and assignments are mandatory - none will be dropped. Grading on coursework is as follows:

<table>
<thead>
<tr>
<th>Course Component</th>
<th>Points</th>
<th>% of Final Grade</th>
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<tbody>
<tr>
<td>Midterm Exam</td>
<td>300</td>
<td>30%</td>
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<tr>
<td>Final Exam</td>
<td>300</td>
<td>30%</td>
</tr>
<tr>
<td>Blackboard Assignments/Quizzes</td>
<td>300</td>
<td>30%</td>
</tr>
<tr>
<td>Telecommunications Topics Paper</td>
<td>100</td>
<td>10%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1000</strong></td>
<td><strong>100%</strong></td>
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</table>
**Grade Scale:**

- 90 - 100 A
- 80 - 89 B
- 70 - 79 C
- 60 - 69 D
- 59 and Below F

College policy prevents the distribution of student grades via email or phone. Grades are posted on Nova net.

Note: Since these grades are weighted, you will not be able to use Blackboard’s Totals as an indicator of your final grade.

**Independent Assignments:** Assignments/quizzes, class paper, and all grade-able work submitted for this class can’t be shared with any student. Assignment responses, paper and exam responses that contain uncited information copied from other sources will not receive any credit.

All assignments, quizzes and paper must be submitted via Blackboard.

None of the above will be accepted via email. All course assignments, quizzes and papers must be submitted in Blackboard to receive credit. Quizzes/assignments will be graded within 7 days from their respective due date.

**Fall 2013 Semester Important Dates:** [http://www.nvcc.edu/academics/academic-calendar/index.html#fall](http://www.nvcc.edu/academics/academic-calendar/index.html#fall)

<table>
<thead>
<tr>
<th>16-Week Session</th>
<th>Date</th>
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<tbody>
<tr>
<td>Classes begin</td>
<td>August 21</td>
</tr>
<tr>
<td>Schedule adjustments (add/drop/swap) on NOVAConnect (open to all)</td>
<td>August 21–27</td>
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<tr>
<td>Late schedule additions (in-person), permission required</td>
<td>August 28–September 3</td>
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<tr>
<td>Drops on NOVAConnect with tuition refund</td>
<td>August 21–September 7</td>
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<tr>
<td>Labor Day holiday. College closed.</td>
<td>September 2</td>
</tr>
<tr>
<td>Last day to drop with tuition refund or change to audit (census date)**</td>
<td>September 7</td>
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<tr>
<td>Last day to apply for Fall graduation. Earlier application recommended</td>
<td>October 1</td>
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<tr>
<td>Non-instructional days. No classes. College offices open.</td>
<td>October 14-15</td>
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<tr>
<td>Last day to withdraw without grade penalty</td>
<td>October 31</td>
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<tr>
<td>Non-instructional day. College closes at noon.</td>
<td>November 27</td>
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<tr>
<td>Thanksgiving holiday. College closed.</td>
<td>November 28–29</td>
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<tr>
<td>Non-instructional days. No classes.</td>
<td>November 30–December 1</td>
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<tr>
<td>Last week of classes</td>
<td>December 4-10</td>
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<tr>
<td>Final exam week</td>
<td>December 17</td>
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</table>

**Inclement Weather Policy:** In the event that snow or other weather events either closes the college or prevents me from making it to class, I will send an email to all students and will post an announcement in Blackboard. Students will be expected to review the chapter and slides that would have been covered in the lecture and work any discussions and/or assignments assigned that week by the instructor. Students can come in to see me in my office during office hours if there is any question with the material.
Course Format: Lectures are provided in class on the nights indicated, below. The course assignments/quizzes will be posted in the day following the class, and they will be due before one day before the next class. Course assignments and quizzes are the sole responsibility of the student. And I should be completed by the student independently.

Academic Honesty: It is assumed that all students have familiarized themselves with the college's policy on and definition of academic dishonesty. All work should be the student's own - academic honesty is expected of everyone. Those who do not adhere to college and professional expectations with respect to this will be dealt with in accordance with college policy. In general – students will receive a 0 on their work if they either submit work that isn’t their own (including cutting and pasting content from the Internet without proper citation) or allow other students to use their work. A second instance results in failure of the course.

Special Needs and Accommodations: Please address any special problems or needs at the beginning of the semester with the instructor. If you are seeking accommodations based on a disability, you should provide a disability data sheet, which can be obtained from the counselor for special needs, who is located in Room 148 of the Bisdorf Building, telephone number 703-845-6301

Please note: Students who fail to make payment at the time of registration and are subsequently dropped from the course may not be able to reenroll if the course has filled!

Slides and other course supplements available at:

http://bcs.wiley.com/he-bcs/Books?action=index&itemid=0471771163&bcsid=3229

Course Schedule:

<table>
<thead>
<tr>
<th>Unit/Week</th>
<th>Classroom Topics/Activity</th>
<th>Assignment/Quizzes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week #1 [8/21]</td>
<td>Class Introductions, Review of Syllabus and Course Expectations Quick Blackboard Crash course Chapter 1: Introduction to Data Communications [page 2] Supplemental reading : <a href="http://www.nvcc.edu/home/mleary/osi.doc">www.nvcc.edu/home/mleary/osi.doc</a></td>
<td>Chapter 1 Quiz (due next Wednesday before class) Introduce Yourself, discussion</td>
</tr>
<tr>
<td>Week #2 [8/28]</td>
<td>Chapter 2: Application Layer [page 38]</td>
<td>Chapter 2 Quiz (due next Wednesday before class)</td>
</tr>
<tr>
<td>Week #3 [9/4]</td>
<td>Chapter 3: Physical Layer [page 76]</td>
<td>Chapter 3 Quiz (due next Wednesday before class)</td>
</tr>
<tr>
<td>Week #4 [9/11]</td>
<td>Chapter 4: Data Link Layer [page 118]</td>
<td>Chapter 4 Quiz (due next Wednesday before class)</td>
</tr>
<tr>
<td>Week #5 [9/18]</td>
<td>Chapter 5: Network and Transport Layers [page 147]</td>
<td>Chapter 5 Quiz (due next Wednesday before class) Networking Discussion</td>
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<tr>
<td>Week #6 [9/25]</td>
<td>Special topic : IP subnetting and supernetting</td>
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<td>Week #7 [10/2]</td>
<td>Chapter 6: Wired and Wireless LANs [page 196]</td>
<td>Chapter 6 Quiz (due next Wednesday before class)</td>
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<tr>
<td>Week #8 [10/9]</td>
<td>Chapter 7: Backbone Networks [page 238]</td>
<td>Chapter 7 Quiz (due next Wednesday before class)</td>
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<tr>
<td>Week #9 [10/16]</td>
<td>Chapter 8: Wide Area Networks [page 268]</td>
<td>Chapter 8 Quiz (due next Wednesday before class)</td>
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<tr>
<td>Week #10 [10/23]</td>
<td>-No Class, Study for midterm exam</td>
<td>Study for midterm</td>
</tr>
<tr>
<td>Week #11 [10/30]</td>
<td>Midterm Exam (in class, close book close notes)</td>
<td></td>
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<tr>
<td>Week #12 [11/6]</td>
<td>Chapter 9: The Internet [page 310]</td>
<td>Chapter 9 Quiz (due next Wednesday before class) Internet Discussion</td>
</tr>
<tr>
<td>Week #14 [11/20]</td>
<td>Chapter 11: Network Design</td>
<td>Chapter 12 Quiz (due next Wednesday before class)</td>
</tr>
<tr>
<td>Week #15 [11/27]</td>
<td>Thanksgiving No Class</td>
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<tr>
<td>Week #16 [12/6]</td>
<td>Chapter 12: Network Management</td>
<td>Chapter 12 Quiz (due next Wednesday before class)</td>
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