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*The Ultimate Advantage is an Educated Mind*

School of Science and Technology  
Department of Information Technology  
ISSC640 – Computer Networks & Data Systems  
3 Credit Hours  
8 Week Session  
Prerequisite(s): None

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**Instructor Information**

**Instructor:**  
**Email:**  
**Phone:**  
**Office Hours:**

**NOTE: IT IS IMPORTANT THAT THE STUDENT READ THE ENTIRE STUDENT SYLLABUS THOROUGHLY. THIS DOCUMENT DETAILS THE INSTRUCTOR'S GOALS AND EXPECTATIONS FOR THIS COURSE AND PROVIDES ALL OF THE NECESSARY INFORMATION CONCERNING ASSIGNMENTS, GRADING AND ADDITIONAL COURSE REQUIREMENTS.**

**Course Description (Catalog)**

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This course is a study of computer networks and the evolution of modern communication systems. It also examines the various layers of the basic reference models such as the five-layer IP model or the seven-layer OSI model, by scale, connection method, network architecture, or topology. and in-depth analysis of the vehicles of transmission, the capabilities and limitations of various communications systems, current, new and probable future hardware, software, firmware components of a network. A prior knowledge of networks and networking is recommended.

**Course Scope**

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This course offers a wide-ranging, self-contained tour of the concepts, principles, and technologies that enable today's Internet to support applications ranging from web browsing to telephony and multimedia. It includes extensive coverage of topics ranging from wireless protocols to network performance. The course begins by illuminating the applications and facilities offered by today's Internet. Next, the underlying network technologies and protocols that make them possible are illustrated: low-level data communications; packet switching, LAN, and WAN technologies; and Internet protocols such as TCP, IP, UDP, and IPv6. With these concepts and technologies established, several of the most important contemporary issues faced by network implementers and managers, including quality of service, Internet telephony, multimedia, network security, and network management are discussed.

## Course Objectives

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1. Profile the chronology and evolution of communications systems.
2. Compare and contrast the differences between the various network topologies (both physical and logical).
3. Differentiate between the different types of physical media used in local area networks (LANs).
4. Examine the seven-layer OSI networking model and its relation to common protocol stacks.
5. Inspect the components of a packet (header, body, CRC, etc.).
6. Compare and contrast major network architectures such as Ethernet, Token Ring, and Appletalk.
7. Assess the common network administration and support functions.
8. Distinguish between the various topologies used in wide area networks (WANs).
9. Appraise the various network troubleshooting tools and techniques.

## Course Delivery Method

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This Masters level course delivered via distance learning will enable students to complete academic work in a flexible manner, completely online. Course materials and access to an online learning management system will be made available to each student. **Online assignments are due by the last day of the week assigned** and include Forum questions (accomplished in groups through a threaded Forum), examinations and quizzes (graded electronically), and individual assignments (submitted for review by the Faculty Member). Assigned faculty will support the students throughout this eight-week course.

## Course Materials

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### Required Text

Comer, D. E. (2008). *Computer Networks and Internets with Internet Applications*, 5<sup>th</sup> Edition with CD, Prentice Hall, Inc. ISBN: 0136061273 – eBook Available at [www.coursesmart.com](http://www.coursesmart.com)

**Reference:** Blackley, J. A., Peltier, J., & Peltier, T. (2003) *Information Security Fundamentals*, 1<sup>st</sup> Edition. Boca Raton, FL. Auerbach Publications. ISBN: 0849319579/9780849319570

**Reference:** American Psychological Association. (2010). *Publication manual of the American Psychological Association* (6<sup>th</sup> edition). Washington, DC: Author. ISBN: 1-4338-0561-8

### Companion Website

<http://www.prenhall.com/comer>

### Web-based Readings

See Web Resources in Selected Bibliography

<http://www.sans.org/rr/>

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<http://www.sans.org/resources/policies/>  
<http://www.cert.org/>

### **Software Requirements**

- Microsoft Office (MS Word, MS Excel, MS PowerPoint)
- Adobe Acrobat Reader ([Click here for free download](#))

### **Evaluation Procedures**

The grading will be based on homework assignments, Forum postings, an open book final examination, and 3 research papers.

1. There will be eight homework assignments. The assignments and exercise will count as 20% of the final grade. The homework assignments will follow each of the major portions of the course. These assignments will be problems or questions from the text. They are selected to provide the student with information to understand the concepts discussed. Assignments should be prepared in Microsoft Word or an equivalent word processor program and uploaded into the student folder by the due date.
2. There will be eight Forum postings you will need to respond to. A main post and at least 2 responses to classmates are required. The main post should be significant (200 to 300 words), and should as much as possible include links, references, citations, etc. to enrich the shared learning. The response posts should be around 75-100 words. You may **attack**, **support** or **supplement** other students' answers using the terms, concepts and theories from the required and any supplemental readings. All responses should be a **courteous paragraph** that contains a **topic sentence** with good **supporting sentences**. You may respond multiple times with a continuous discussion with points and counter points. The key requirement is to express your idea and then **support your position** using the terms, concepts and theories from the readings to demonstrate that you understand the material. The Forum postings will count as 20% of the final grade.
3. There will be one research paper.
4. There will be a Case Study on modeling
5. The Week 8 Quiz will be a 75 minute non-proctored examination. It will count as 20% of the final grade. This examination will cover selected sections of the textbook. All questions are either multiple-choice or true-false and will be open book and open note.

| <b>Grade Instruments</b>                         | <b>Points Possible</b> | <b>% of Final Grade</b> |
|--|------------------------|-------------------------|
| <b>Homework Assignments (8, 2.5 points each)</b> | <b>20</b>              | <b>20%</b>              |
| <b>Forum Postings (8, 2.5 points each)</b>       | <b>20</b>              | <b>20%</b>              |
| <b>Paper</b>                                     | <b>25</b>              | <b>25%</b>              |
| <b>Case Study</b>                                | <b>15</b>              | <b>15%</b>              |
| <b>Week 8 Quiz</b>                               | <b>20</b>              | <b>20%</b>              |
| <b>TOTAL</b>                                     | <b>100 Points</b>      | <b>100%</b>             |

### **Grading Scale**

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Please see the [student handbook](#) to reference the University's [grading scale](#). [Course Outline](#)  
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| <b>Week</b> | <b>Topic(s)</b> | <b>Reading(s)</b> | <b>Assignment(s)</b> |
|-------------|-----------------|-------------------|----------------------|
|-------------|-----------------|-------------------|----------------------|

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|   |  |                                 |  |
|---|--|---------------------------------|--|
| 1 | <ul style="list-style-type: none"> <li>- <i>Introduction &amp; Overview</i></li> <li>- <i>Internet Trends</i></li> <li>- <i>Internet Applications &amp; Network Programming</i></li> <li>- <i>Traditional Internet Applications</i></li> </ul> | <b>Chapters</b><br><b>1-4</b>   | Week 1 Assignment<br>Week 1 Forum Discussion     |
| 2 | <ul style="list-style-type: none"> <li>- <i>Overview of Data Communications</i></li> <li>- <i>Information Sources &amp; Signals</i></li> <li>- <i>Transmission Media</i></li> <li>- <i>Reliability &amp; Channel Coding</i></li> </ul>         | <b>Chapters</b><br><b>5-8</b>   | Week 2 Assignment<br>Week 2 Forum                |
| 3 | <ul style="list-style-type: none"> <li>- <i>Transmission Modes</i></li> <li>- <i>Modulations &amp; Modems</i></li> <li>- <i>Multiplexing &amp; Demultiplexing</i></li> <li>- <i>Access &amp; Interconnection Technologies</i></li> </ul>       | <b>Chapters</b><br><b>9-12</b>  | Week 3 Assignment<br>Week 3 Forum                |
| 4 | <ul style="list-style-type: none"> <li>- <i>Local Area Networks</i></li> <li>- <i>IEEE MAC Sub-Layer</i></li> <li>- <i>Wired LAN Technology</i></li> <li>- <i>Wireless Networking Technologies</i></li> </ul>                                  | <b>Chapters</b><br><b>13-16</b> | Week 4 Assignment<br>Week 4 Forum                |
| 5 | <ul style="list-style-type: none"> <li>- <i>LAN Extensions</i></li> <li>- <i>WAN Technologies &amp; Dynamic Routing</i></li> <li>- <i>Networking Technologies Past &amp; Present</i></li> <li>- <i>Internetworking</i></li> </ul>              | <b>Chapters</b><br><b>17-20</b> | Week 5 Assignment<br>Week 5 Forum<br>Case Study  |
| 6 | <ul style="list-style-type: none"> <li>- <i>IP: Internet Addressing</i></li> <li>- <i>Datagram Forwarding</i></li> <li>- <i>Support Protocols &amp; Technologies</i></li> <li>- <i>The Future IP (IPv6)</i></li> </ul>                         | <b>Chapters</b><br><b>21-24</b> | Week 6 Assignment<br>Week 6 Forum                |
| 7 | <ul style="list-style-type: none"> <li>- <i>UDP</i></li> <li>- <i>TCP</i></li> <li>- <i>Internet Routing &amp; Routing Protocols</i></li> <li>- <i>Network Performance</i></li> </ul>  | <b>Chapters</b><br><b>25-28</b> | Week 7 Assignment<br>Week 7 Forum<br>Term paper  |
| 8 | <ul style="list-style-type: none"> <li>- <i>Multimedia &amp; VoIP</i></li> <li>- <i>Network Security</i></li> <li>- <i>Network Management (SNMP)</i></li> <li>- <i>Trends in Networking Technologies</i></li> </ul>                            | <b>Chapters</b><br><b>29-32</b> | Week 8 Assignment<br>Week 8 Forum<br>Week 8 Quiz |

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## WEEK 1

### Week 1 Topics:

1. *Introduction & Overview*
2. *Internet Trends*
3. *Internet Applications &*
4. *Network Programming*
5. *Traditional Internet Applications*

### Reading Assignments

1. *Computer Networks and Internets*, 5<sup>th</sup> Edition by Douglass Comer - Read Chapters 1 - 4

### Week 1 Discussion Questions:

1. Provide a self introduction (200-250 words): background, occupation, educational goals, expectation from this course, courses taken so far at AMU/APU and which you liked the most, time zone, contact info. Note: this bio is mandatory requirement by the University.
2. The current Internet functions with the legacy TCP/IP suite of protocols (e.g., ARP, IPv4, RIP, OSPF, BGP, TCP, SMTP, HTTP, DNS, FTP, etc.). Many of these protocols lack security and/or operational robustness. To improve the trust in Internet communications, a vision has been underway to develop new, or revamp existing protocols for the Internet of the future. The High Assurance Domain (HAD) is one of such projects (<http://www.nist.gov/itl/antd/had-project.cfm>). Discuss the pros and cons of this vision. You may discuss specific protocols and their weaknesses and your own vision for addressing those weaknesses.

### Assignments:

Homework Assignment #1: (2.5%)

- Complete the Homework Assignment 1 located in your **Assignments** tab per **ISSC640Week1.doc**.
- Make sure to save the file in the following format:  
FirstName\_LastName\_ISSC640\_Assignment1.doc(x)
- The answers within your solution should each be comprised of at least 100 words.
- Also, please provide at least one reference to support each answer, and properly cite from the reference(s).
- Upload the completed file as an attachment to this assignment (via **Assignments** tab)

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## **WEEK 2**

### **Week 2 Topics:**

1. *Overview of Data Communications*
2. *Information Sources & Signals*
3. *Transmission Media*
4. *Reliability & Channel Coding*

### **Reading Assignments**

1. *Computer Networks and Internets*, 5<sup>th</sup> Edition by Douglass Comer - Read Chapters 5-8
2. Watch [http://www.youtube.com/watch?v=G2Xk9fvCN\\_0](http://www.youtube.com/watch?v=G2Xk9fvCN_0)

### **Week 2 Discussion Questions:**

Answer forum discussion (Forums tab)

### **Assignments:**

Homework Assignment #2: (2.5%)

- Complete the Homework Assignment 2 located in your **Assignments** tab per **ISSC640Week2.doc**.
- Make sure to save the file in the following format:  
FirstName\_LastName\_ISSC640\_Assignment2.doc(x)
- The answers within your solution should each be comprised of at least 100 words.
- Also, please provide at least one reference to support each answer, and properly cite from the reference(s).
- Upload the completed file as an attachment to this assignment.

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### **WEEK 3**

#### **Week 3 Topics:**

1. *Transmission Modes*
2. *Modulations & Modems*
3. *Multiplexing & Demultiplexing*
4. *Access & Interconnection Technologies*

#### **Reading Assignments**

1. *Computer Networks and Internets*, 5<sup>th</sup> Edition by Douglass Comer - Read Chapters 9-12

#### **Week 3 Discussion Questions:**

Answer forum discussion (Forums tab)

#### **Assignments:**

Homework Assignment #3: (2.5%)

- Complete the Homework Assignment 3 located in your **Assignments** tab per **ISSC640Week3.doc**.
- Make sure to save the file in the following format:  
FirstName\_LastName\_ISSC640\_Assignment3.doc(x)
- The answers within your solution should each be comprised of at least 100 words.
- Also, please provide at least one reference to support each answer, and properly cite from the reference(s).
- Upload the completed file as an attachment to this assignment.

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## **WEEK 4**

### **Week 4 Topics:**

1. *Local Area Networks*
2. *IEEE MAC Sub-Layer*
3. *Wired LAN Technology*
4. *Wireless Networking Technologies*

### **Reading Assignments**

1. *Computer Networks and Internets*, 5<sup>th</sup> Edition by Douglass Comer - Read Chapters 13-16
2. Watch <http://www.youtube.com/watch?v=3npjH-0DE4>

### **Week 4 Discussion Questions:**

Answer forum discussion (Forums tab)

### **Assignments:**

Homework Assignment #4: (2.5%)

- Complete the Homework Assignment 4 located in your **Assignments** tab per **ISSC640Week4.doc**.
- Make sure to save the file in the following format:  
FirstName\_LastName\_ISSC640\_Assignment4.doc(x)
- The answers within your solution should each be comprised of at least 100 words.
- Also, please provide at least one reference to support each answer, and properly cite from the reference(s).
- Upload the completed file as an attachment to this assignment.

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## WEEK 5

### Week 5 Topics:

1. *Transmission Modes*
2. *Modulations & Modems*
3. *Multiplexing & Demultiplexing*
4. *Access & Interconnection Technologies*

### Reading Assignments

1. *Computer Networks and Internets*, 5<sup>th</sup> Edition by Douglass Comer - Read Chapters 17-20

### Week 5 Discussion Questions:

Answer forum discussion (Forums tab)

### Assignments:

Homework Assignment #5: (2.5%)

- Complete the Homework Assignment 5 located in your **Course Materials** per **ISSC640Week5.doc**.
- Make sure to save the file in the following format:  
FirstName\_LastName\_ISSC640\_Assignment5.doc(x)
- The answers within your solution should each be comprised of at least 100 words.
- Also, please provide at least one reference to support each answer, and properly cite from the reference(s).
- Upload the completed file as an attachment to this assignment.

Case Study Modeling (15%)

- Complete the Case Study Modeling assignment located in your **Assignments**
- Prepare a Word document of at least 3 pages (not including title or reference pages) to present the data, the modeling graph(s) in Excel, and the discussion of the graphs.
- Be sure to use APA Guidelines and include at least 3 references.
- Make sure to save the file in the following format:  
FirstName\_LastName\_ISSC640\_CaseStudy.doc(x)
- Upload the completed file as an attachment to this assignment.

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## WEEK 6

### Week 6 Topics:

1. *IP: Internet Addressing*
2. *Datagram Forwarding*
3. *Support Protocols & Technologies*
4. *The Future IP (IPv6)*

### Reading Assignments

1. *Computer Networks and Internets*, 5<sup>th</sup> Edition by Douglass Comer - Read Chapters 21-24
2. Watch <http://www.youtube.com/watch?v=PA30EcbLCl0&feature=related> and [http://www.youtube.com/watch?v=lzk50CpKf\\_s](http://www.youtube.com/watch?v=lzk50CpKf_s)

### Week 6 Discussion Questions:

Answer forum discussion (Forums tab)

### Assignments:

Homework Assignment #6: (2.5%)

- Complete the Homework Assignment 6 located in your **Assignments** tab per **ISSC640Week6.doc**.
- Make sure to save the file in the following format:  
FirstName\_LastName\_ISSC640\_Assignment6.doc(x)
- The answers within your solution should each be comprised of at least 100 words.
- Also, please provide at least one reference to support each answer, and properly cite from the reference(s).
- Upload the completed file as an attachment to this assignment.

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## WEEK 7

### Week 7 Topics:

1. *UDP*
2. *TCP*
3. *Internet Routing & Routing Protocols*
4. *Network Performance*

### Reading Assignments

1. *Computer Networks and Internets*, 5<sup>th</sup> Edition by Douglass Comer - Read Chapters 25-28
2. Watch <http://www.youtube.com/watch?v=601x64peZtU> and [http://www.youtube.com/watch?v=bq\\_2wYF8to8&feature=channel](http://www.youtube.com/watch?v=bq_2wYF8to8&feature=channel)

### Week 7 Discussion Questions:

Answer forum discussion (Forums tab)

### Assignments:

Homework Assignment #7: (2.5%)

- Complete the Homework Assignment 7 located in your **Assignments** tab per **ISSC640Week7.doc**.
- Make sure to save the file in the following format:  
FirstName\_LastName\_ISSC640\_Assignment7.doc(x)
- The answers within your solution should each be comprised of at least 100 words.
- Also, please provide at least one reference to support each answer, and properly cite from the reference(s).
- Upload the completed file as an attachment to this assignment.

Term Paper (25%)

- Complete the Term Paper assignment located in your **Assignments**
- Prepare a Word document with a minimum of 10 pages (not including title and references pages) and a minimum of 5 solid references
- Be sure to use APA Guidelines for references.
- Make sure to save the file in the following format: FirstName\_LastName\_ISSC640\_Paper.doc(x)
- Upload the completed file as an attachment to this assignment.

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## WEEK 8

### Week 8 Topics:

1. *Multimedia & VoIP*
2. *Network Security*
3. *Network Management (SNMP)*
4. *Trends in Networking Technologies*

### Reading Assignments

1. *Computer Networks and Internets*, 5<sup>th</sup> Edition by Douglass Comer - Read Chapters 29-32
2. Watch <http://www.youtube.com/watch?v=TrxQNAajMgk>

### Week 8 Discussion Questions:

Answer forum discussion (Forums tab)

### Assignments:

Homework Assignment #8: (2.5%)

- Complete the Paper 3 assignment located in your course materials per **Assignments**.
- Make sure to save the file in the following format:  
FirstName\_LastName\_ISSC640\_Final\_Paper.doc(x)
- Prepare a 2-3 page (not including title or reference pages) research paper on any topic mentioned in Chapters 9-20 of your text.
- Be sure to use APA Guidelines and include at least 3 references in order to demonstrate a diverse level of subject matter understanding.
- Upload the completed file as an attachment to this assignment.

Week 8 Quiz (20%)

Complete the Quiz located in your **Tests&Quizzes** tab

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## Policies

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Please see the [student handbook](#) to reference all University policies. Quick links to frequently question asked about policies are listed below.

- [Drop/Withdrawal Policy](#)
- [Plagiarism Policy](#)
- [Extension Process and Policy](#)

## WRITING EXPECTATIONS

All written submissions should be submitted in a font and page set-up that is readable and neat. It is recommended that students try to adhere to a consistent format, which is described below.

- Typewritten in double-spaced format with a readable style and font and submitted inside the electronic classroom (unless classroom access is not possible and other arrangements have been approved by the professor).
- Arial 11-point font (e.g., Times New Roman, Arial, styles).
- Page margins Top, Bottom, Left Side and Right Side = 1 inch, with reasonable accommodation being made for special situations and online submission variances.

## CITATION AND REFERENCE STYLE

Assignments completed in a narrative essay or composition format must follow APA guidelines. This course will require students to use the citation and reference style established by the American Psychological Association (APA), in which case students should follow the guidelines set forth in *Publication Manual of the American Psychological Association* (6<sup>th</sup> ed.). (2010). Washington, D.C.: American Psychological Association.

## LATE ASSIGNMENTS

Students are expected to submit classroom assignments by the posted due date and to complete the course according to the published class schedule. As adults, students, and working professionals I understand you must manage competing demands on your time. Should you need additional time to complete an assignment please contact me before the due date so we can discuss the situation and determine an acceptable resolution. Routine submission of late assignments is unacceptable and may result in points deducted from your final course grade.

## ANTI-PLAGIARISM CHECK

The research paper and Case Study are subject to anti-plagiarism check at turnitin.com. Students are advised to review the School's policy on plagiarism.

## DISCLAIMER STATEMENT

Course content may vary from the outline to meet the needs of this particular group.

## Academic Services

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## ONLINE LIBRARY RESEARCH CENTER & LEARNING RESOURCES

The Online Library Resource Center is available to enrolled students and faculty from inside the electronic campus. This is your starting point for access to online books, subscription periodicals, and Web resources that are designed to support your classes and generally not available through search engines on the open Web. In addition, the Center provides access to special learning resources, which the University has contracted to assist with your studies. Questions can be directed to [orc@apus.edu](mailto:orc@apus.edu).

- **Charles Town Library and Inter Library Loan:** The University maintains a special library with a limited number of supporting volumes, collection of our professors' publication, and services to search and borrow research books and articles from other libraries.

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- **Electronic Books:** You can use the online library to uncover and download over 50,000 titles, which have been scanned and made available in electronic format.
- **Electronic Journals:** The University provides access to over 12,000 journals, which are available in electronic form and only through limited subscription services.
- **Turnitin.com** is a tool to improve student research skills that also detect plagiarism. Turnitin.com provides resources on developing topics and assignments that encourage and guide students in producing papers that are intellectually honest, original in thought, and clear in expression. This tool helps ensure a culture of adherence to the University's standards for intellectual honesty. Turnitin.com also reviews students' papers for matches with Internet materials and with thousands of student papers in its database, and returns an Originality Report to instructors and/or students.
- **Smarthinking:** Students have access to 10 free hours of tutoring service per year through [Smarthinking](#). Tutoring is available in the following subjects: math (basic math through advanced calculus), science (biology, chemistry, and physics), accounting, statistics, economics, Spanish, writing, grammar, and more. Additional information is located in the Online Research Center. From the ORC home page, click on either the "Writing Center" or "Tutoring Center" and then click "Smarthinking." All login information is available.

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### Web Resources

1. Network Design – White Papers, Webcasts and Case Studies: <http://itpapers.zdnet.com/NETWORKING+and+COMMUNICATIONS/Network+Management/Network+Design/>
2. Howstuffworks "How Home Networking Works": <http://computer.howstuffworks.com/home-network.htm>
3. IEEE Standards Association: <http://standards.ieee.org/>
4. IEEE Pervasive Computing: <http://www.computer.org/pervasive/>
5. Internet Society: <http://www.isoc.org/>
6. O'Reilly P2P Directory: [http://www.openp2p.com/pub/q/p2p\\_category](http://www.openp2p.com/pub/q/p2p_category)
7. Atlas of Cyberspace: <http://www.kitchin.org/atlas/index.html>
8. WLAN links: <http://wi-fiplanet.webopedia.com/TERM/W/WLAN.html>
9. How Ethernet works: <http://computer.howstuffworks.com/ethernet.htm>
10. How OSI works: <http://computer.howstuffworks.com/osi.htm>
11. OSI model: [http://en.wikipedia.org/wiki/OSI\\_model](http://en.wikipedia.org/wiki/OSI_model)
12. Ethernet links: <http://www.webopedia.com/TERM/E/Ethernet.html>
13. WAN links: [http://www.webopedia.com/TERM/W/wide\\_area\\_network\\_WAN.html](http://www.webopedia.com/TERM/W/wide_area_network_WAN.html)
14. RFC.net repository of RFC STD BCP and FYI documents: <http://www.rfc.net>
15. Internet RFC/FYI/STD/BCP Archives: <http://www.faqs.org/rfcs/>
16. How cable modems work: <http://electronics.howstuffworks.com/cable-modem.htm>
17. Wifi411: Online Wi-Fi Hot Spot Locator: <http://www.wifi411.com/>
18. WLAN links: <http://wi-fiplanet.webopedia.com/TERM/W/WLAN.html>
19. Official Bluetooth Web Site: <http://www.bluetooth.com/>
20. The Wi-Fi Alliance Home Page: <http://www.wi-fi.org/OpenSection/index.asp>
21. WiMAX Forum: <http://www.wimaxforum.org/home>
22. WAP Resource Center: <http://www.palowireless.com/wap/>
23. Planes and Trains: Wireless on the Move: <http://www.techworld.com/mobility/features/index.cfm?featureid=512&Page=2&pagePos=2>
24. WLANs Spreading to Hospitals: <http://www.wi-fiplanet.com/news/article.php/1581811>
25. Case study: "Ubiquitous Network Societies: The Case of the Republic of Singapore":
  - 1) <http://www.itu.int/osg/spu/ni/ubiquitous/Papers/UNSSingaporeCaseStudy.pdf>
26. HiperLAN/2: An efficient high speed WLAN <http://www.wi-fiplanet.com/tutorials/article.php/2109571>
27. Wireless LAN (WiFi) tutorials: <http://www.tutorial-reports.com/wireless/wlanwifi/>
28. How LAN switches work: <http://computer.howstuffworks.com/lan-switch.htm>
29. IP addressing links: [http://www.webopedia.com/TERM/I/IP\\_address.html](http://www.webopedia.com/TERM/I/IP_address.html)
30. IP addressing and subnetting for new users: <http://www.cisco.com/warp/public/701/3.html>
31. Classless Inter-Domain Routing (CIDR) overview: <http://public.pacbell.net/dedicated/cidr.html>
32. Online IP CIDR calculator: <http://www.subnet-calculator.com/cidr.php>
33. The IPv6 portal: <http://www.ipv6tf.org>
34. Why you want IPv6: <http://linuxreviews.org/features/ipv6/>

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35. Security Focus: <http://www.securityfocus.com>
36. Symantec security response—search and latest virus threats page: <http://www.symantec.com/avcenter/vinfodb.html>
37. Buffer overflow basics: <http://www.linuxsecurity.com/content/view/119087/49/>
38. Snort, a lightweight network intrusion detection system: <http://www.snort.org/>
39. Anti-phishing working group: <http://www.antiphishing.org/>
40. National fraud information center: <http://www.fraud.org/>
41. Nessus, an open-source vulnerability scanner: <http://www.nessus.org/>
42. Spamassassin, an open-source spam filter: <http://spamassassin.apache.org/>
43. IETF IPsec charter: <http://www.ietf.org/html.charters/OLD/ipsec-charter.html>
44. IPsec links: <http://www.pcwebopedia.com/TERM/I/IPSec.html>
45. IPTables tutorial: <http://www.faqs.org/docs/iptables/>
46. How firewalls work: <http://www.howstuffworks.com/firewall.htm>
47. How Network Address Translation works: <http://computer.howstuffworks.com/nat.htm>
48. NAT links: <http://www.webopedia.com/TERM/N/NAT.html>
49. Squid Web proxy cache: <http://www.squid-cache.org/>
50. Proxy server links: [http://www.webopedia.com/TERM/P/proxy\\_server.html](http://www.webopedia.com/TERM/P/proxy_server.html)

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## Appendix A – Grading Rubric

All written assignments will be assessed according to this rubric. Note that a score of 0 may be assigned in any category where your work does not meet the criteria for the beginning level.

| <b>APUS Assignment Rubric Graduate Level 600+</b> | <b>EXEMPLARY LEVEL 4</b>  | <b>ACCOMPLISHED LEVEL 3</b>   | <b>DEVELOPING LEVEL 2</b>   | <b>BEGINNING LEVEL 1</b>  | <b>TOTAL POINTS</b> |
|---|---|---|---|---|---------------------|
| <b>FOCUS/THESIS</b>                               | Student exhibits a defined and clear understanding of the assignment. Thesis is clearly defined and well constructed to help guide the reader throughout the assignment. Student builds upon the thesis of the assignment with well-documented and exceptional supporting facts, figures, and/or statements.        | Establishes a good comprehension of topic and in the building of the thesis. Student demonstrates an effective presentation of thesis, with most support statements helping to support the key focus of assignment.   | Student exhibits a basic understanding of the intended assignment, but the thesis is not fully supported throughout the assignment. While thesis helps to guide the development of the assignment, the reader may have some difficulty in seeing linkages between thoughts. While student has included a few supporting facts and statements, this has limited the quality of the assignment. | Exhibits a limited understanding of the assignment. Reader is unable to follow the logic used for the thesis and development of key themes. Introduction of thesis is not clearly evident, and reader must look deeper to discover the focus of the writer. Student's writing is weak in the inclusion of supporting facts or statements. | 10                  |
| <b>CONTENT/SUBJECT KNOWLEDGE</b>                  | Student demonstrates proficient command of the subject matter in the assignment. Assignment shows an impressive level of depth of student's ability to relate course content to practical examples and applications. Student provides comprehensive analysis of details, facts, and concepts in a logical sequence. | Student exhibits above average usage of subject matter in assignment. Student provides above average ability in relating course content in examples given. Details and facts presented provide an adequate presentation of student's current level of subject matter knowledge. | The assignment reveals that the student has a general, fundamental understanding of the course material. Whereas, there are areas of some concern in the linkages provided between facts and supporting statements. Student generally explains concepts, but only meets the minimum requirements in this area.  | Student tries to explain some concepts, but overlooks critical details. Assignment appears vague or incomplete in various segments. Student presents concepts in isolation, and does not perceive to have a logical sequencing of ideas.  | 20                  |
| <b>CRITICAL THINKING SKILLS</b>                   | Student demonstrates a higher-level of critical   | Student exhibits a good command of critical   | Student takes a common, conventional approach in  | Student demonstrates beginning  | 20                  |

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| APUS Assignment Rubric Graduate Level 600+ | EXEMPLARY LEVEL<br>4   | ACCOMPLISHED LEVEL<br>3   | DEVELOPING LEVEL<br>2  | BEGINNING LEVEL<br>1  | TOTAL POINTS |
|--|--|---|--|---|--------------|
|  | <p>thinking necessary for 300-400 level work. Learner provides a strategic approach in presenting examples of problem solving or critical thinking, while drawing logical conclusions which are not immediately obvious. Student provides well-supported ideas and reflection with a variety of current and/or world views in the assignment. Student presents a genuine intellectual development of ideas throughout assignment.</p>  | <p>thinking skills in the presentation of material and supporting statements. Assignment demonstrates the student's above average use of relating concepts by using a variety of factors. Overall, student provides adequate conclusions, with 2 or fewer errors.</p>   | <p>guiding the reader through various linkages and connections presented in assignment. However, student presents a limited perspective on key concepts throughout assignment. Student appears to have problems applying information in a problem-solving manner.</p>          | <p>understanding of key concepts, but overlooks critical details. Learner is unable to apply information in a problem-solving fashion. Student presents confusing statements and facts in assignment. No evidence or little semblance of critical thinking skills.</p>  |              |
| <p><b>ORGANIZATION OF IDEAS/FORMAT</b></p> | <p>Student thoroughly understands and excels in explaining all major points. An original, unique, and/or imaginative approach to overall ideas, concepts, and findings is presented. Overall format of assignment includes an appropriate introduction (or abstract), well- developed paragraphs, and conclusion. Finished assignment demonstrates student's ability to plan and organize research in a logical sequence. Student uses at least of 5-7 references in assignment.</p> | <p>Student explains the majority of points and concepts in the assignment. Learner demonstrates a good skill level in formatting and organizing material in assignment. Student presents an above average level of preparedness, with a few formatting errors. Assignment contains less than 5 resources.</p> | <p>Learner applies some points and concepts incorrectly. Student uses a variety of formatting styles, with some inconsistencies throughout the paper. Assignment does not have a continuous pattern of logical sequencing. Student uses less than 3 sources or references.</p> | <p>Assignment reveals formatting errors and a lack of organization. Student presents an incomplete attempt to provide linkages or explanation of key terms. The lack of appropriate references or source materials demonstrates the student's need for additional help or training in this area. Student needs to review and revise the assignment.</p> | <p>20</p>    |

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| APUS Assignment<br>Rubric<br>Graduate Level 600+                 | EXEMPLARY<br>LEVEL<br>4   | ACCOMPLISHED<br>LEVEL<br>3  | DEVELOPING<br>LEVEL<br>2  | BEGINNING<br>LEVEL<br>1  | TOTAL<br>POINTS |
|--|---|---|---|--|-----------------|
| <b>WRITING<br/>CONVENTIONS<br/>(GRAMMAR &amp;<br/>MECHANICS)</b> | Student demonstrates an excellent command of grammar, as well as presents research in a clear and concise writing style. Presents a thorough, extensive understanding of word usage. Student excels in the selection and development of a well-planned research assignment. Assignment is error-free and reflects student's ability to prepare a high-quality academic assignment.                                      | Student provides an effective display of good writing and grammar. Assignment reflects student's ability to select appropriate word usage and present an above average presentation of a given topic or issue. Assignment appears to be well written with no more than 3-5 errors. Student provides a final written product that covers the above-minimal requirements. | Assignment reflects basic writing and grammar, but more than 5 errors. Key terms and concepts are somewhat vague and not completely explained by student. Student uses a basic vocabulary in assignment. Student's writing ability is average, but demonstrates a basic understanding of the subject matter.        | Topics, concepts, and ideas are not coherently discussed or expressed in assignments. Student's writing style is weak and needs improvement, along with numerous proofreading errors. Assignment lacks clarity, consistency, and correctness. Student needs to review and revise assignment.   | 20              |
| <b>USE OF COMPUTER<br/>TECHNOLOGY/<br/>APPLICATIONS</b>          | Student provides a high-caliber, formatted assignment. Learner exhibits excellent use of computer technology in the development of assignment. Quality and appropriateness of stated references demonstrate the student's ability to use technology to conduct applicable research. Given assignment includes appropriate word processing, spreadsheet and/or other computer applications as part of the final product. | Assignment presents an above-average use of formatting skills, with less than 3 errors. Students has a good command of computer applications to format information and/or figures in an appropriate format. Student uses at least two types of computer applications to produce a quality assignment.   | Student demonstrates a basic knowledge of computer applications. Appearance of final assignment demonstrates the student's limited ability to format and present data. Resources used in assignment are limited. Student may need to obtain further help in the use of computer applications and Internet research. | Student needs to develop better formatting skills. The student may need to take additional training or obtain help from the Educator Help Desk while preparing an assignment. Research and resources presented in the assignment are limited. Student needs to expand research scope. The number of formatting errors is not acceptable. | 10              |
| <b>TOTAL POINTS</b>  |   |   |   |  | 100             |

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