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American Public University System

The Ultimate Advantage is an Educated Mind

School of Science and Technology
Department of Information Technology
ISSC421: Computer and Network Security
3 Credit Hours
8 Week Course
Prerequisite(s): None

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Instructor Information

Instructor:

Email:

Phone:

Office hours:

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Course Description (Catalog)

This course offers an introduction to Virtual Private Networks (VPNs) and firewalls for securing a network. Various network securities related issues are introduced and examined. Different types of VPNs for securing data in an organizational setup are discussed as well as the benefits and architecture of a VPN and how to implement a VPN. Other topics include the utility of firewalls in tackling security problems and the limitations of a firewall. In addition, instruction is also given on how to construct, configure and administer a firewall and the functionality of a firewall.

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Course Scope

The student will become familiar with security models that can be applied to both individual computers and computers interconnected by local area and wide-area networks. This course has a strong formal focus, but uses many real world illustrations to bring those formal models "to life."

Note to Students: The course materials, assignments, learning outcomes, and expectations in this upper level undergraduate course assume that the student has completed all lower level general education and career planning coursework necessary to develop research, writing, and critical thinking skills. Students

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who have not fulfilled all general education requirements through courses or awarded transfer credit should strongly consider completing these requirements prior to registering for this course.

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Course Objectives

The successful student will fulfill the following learning objectives:

1. Review essential Transmission Control Protocol/Internet Protocol (TCP/IP) behavior and applications used in IP networking.
2. Explain the fundamental concepts of network security.
3. Recognize the impact that malicious exploits and attacks have on network security.
4. Identify network security tools and discuss techniques for network protection.
5. Describe the fundamental functions performed by firewalls.
6. Assess firewall design strategies.
7. Describe the foundational concepts of VPNs.
8. Describe network security implementation strategies and the roles each can play within the security life cycle.
9. Appraise the elements of firewall and VPN implementation and management.
10. Identify network security management best practices and strategies for responding when security measures fail.

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Course Delivery Method

This B.A. in Information Technology Management 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 each week (Sunday at 11:55 pm) and include forum questions (accomplished in groups through a threaded forum), examinations (graded electronically), and individual assignments (submitted for review by the Faculty Member). Assigned faculty will support the students throughout this eight-week course.

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Course Materials

Required Text (Electronic version can be found in Course Tools>Resources)

Stewart, J. M. (2011). *Network Security, Firewalls, and VPNs*, Sudbury, MA: Jones and Bartlett Learning – ISBN: 9780763791308

Web-based Readings

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

Software Requirements

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

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Evaluation Procedures

The grading will be based on six graded homework assignments, eight labs, four forums, a paper, and a case study.

1. There will be **five quizzes**. Each quiz contains 10 questions, with a one hour time limit. Quizzes cover the material within the week it is due. For example, Quiz 1 covers material from Chapter 3 and 4 and is due at the end of Week 2.
2. There will be **five forums**. Answers should restate the question with supporting sentences using the terms, concepts, and theories from the required readings. The key requirement is to express your idea and then support your position to demonstrate that you understand the material. Your answer should be a **minimum of 250 words**. Please see Appendix A for the grading rubric on all written assignments.

In addition, you are to **respond** to at least **two** of your classmates' postings by critiquing, supporting or supplementing the other students' answers. Your responses should be **at least 100 words long**. All responses should be courteous with sound supporting sentences. You may respond multiple times within a continuous discussion with points and counter points. **Duplicate responses will not receive credit.**

3. There will be **eight labs**. It is required that you complete these labs on a weekly basis. You can access the labs by going within the course, and clicking on **Online Labs** within COURSE TOOLS. Step-by-Step instructions for each lab is also available, and you can access this file within **Resources** and then within the Labs folder. Submit deliverables through the **Assignments** link within your course.
4. A **paper** is due in week 7 of the course (a minimum of 2000 words). Below is a list of pre-approved topics:
 - Protecting IT: A Roadmap for Securing the Enterprise
 - Best Practices for Network Security
 - Firewalls: Great Network Security Devices, but Not a "Silver Bullet" Solution
 - Modern Day Attacks Against Firewalls and VPNs
 - VPN Security Vulnerabilities Exposed

The key to this assignment is to demonstrate your understanding of the topics, not to re-word the text or reference material. Please see Appendix A for the grading rubric on all written assignments.

The paper will follow a conventional report format (introduction, body, conclusion, references). The paper is to follow the APA style guide, Sixth Edition (available via bookstores). Also refer to APA's online resources: <http://apastyle.apa.org/learn/tutorials/basics-tutorial.aspx> and the APUS web site: <http://www.apus.edu/Online-Library/tutorials/apa.htm>

There should be a minimum of 10 peer-reviewed references (for example, there should be no references to blogs or Wikipedia). You will be required to run your paper through Turnitin.com, ensure that your similarity index is sufficiently low, and submit an originality report with your paper.

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- There will be one case study (10%) that is due at the end of week 8. After transitioning out of the military, you were contracted by a medium-sized start-up company that processes credit card transactions on a daily basis. The Chief Executive Officer (CEO) and other business staff have no knowledge of network security or the threats they face. They have an open position for a Chief Information Security Officer (CISO), but have yet to fill it. Thus, they hire you for your expertise in network security, firewalls, and VPN solutions.

This is a short term engagement that lasts 30 days. As the company's subject matter expert/consultant, the CEO wants a 4-6 page report at the end of your assignment. The CEO tells you they will have remote users, so firewall and VPN technologies are needed. They provide you with the following report outline to use:

1.0 Introduction

2.0 Overview of network security fundamentals, security threats, and issues.

3.0 Detailed network security recommendations

Note: Section 3 should include 1) fundamentals of firewalls and VPNs, 2) recommendations for firewall and VPN solutions for the new company, 3) recommendations for implementing your proposed solutions, and 4) practices that you will use to ensure security within the enterprise if they hire you long term. You may make these as sub-sections if you'd like (e.g., 3.1 Fundamentals of Firewalls and VPNs, 3.2 Recommended Firewall and VPN Solutions, etc.)

4.0 Summary

Note: This section should be short, a paragraph or two. Your submission should be 4 to 6 pages long (not including the title page and the reference page) in APA format with proper citations and references. The key to this assignment is to demonstrate your understanding of the topics, not to re-word the text or reference material. Please see Appendix A for the grading rubric on all written assignments.

- Grading rubric for the assignments, forums, and the paper: see **Appendix A..**

GRADED EVENTS		% OF FINAL GRADE
Quizzes	Weeks 2 – 6 (5% each)	25%
Labs	Weeks 1 – 8 (3.13% each)	25%
Forum Postings	Weeks 1, 3, 5, 7, 8 (5% each)	25%
Week 2 Topic Selection	Research Topic Selection (due Week 2)	6.25%
Week 4 Outline	Research Outline (due Week 4)	6.25%
Week 7 Research Paper	Individual Project Paper (due Week 7)	6.25%
Week 8 Case Study	Case Study (Week 8)	6.25%
Total		100 %

Late Submission Policy: All late assignments and postings lose 1 point per one-week period following the due date (late paper submissions lose 1 point per day overdue), unless the instructor has granted prior approval for late submission of an assignment. Approval for late submissions must be obtained at least one week in advance of the scheduled time for the assignment or be based on a documented medical emergency. Late assignments will not receive credit beyond the last day of class.

Grading Scale

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Please see the [student handbook](#) to reference the University's [grading scale](#).

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Course Outline

Week	Learning Objective(s)	Reading(s)	Assignment(s)
1	CO 1,2	Chapter 1 & 2	Week 1 Intro and Forum and Lab 1
2	CO 3,4	Chapter 3 & 4	Quiz 1, Week 2 Topic Selection and Lab 2
3	CO 1,3,4	Chapter 5 & 6	Week 3 Forum, Quiz 2 and Lab 3
4	CO 5,6	Chapter 7 & 8	Quiz 3, Week 4 Outline and Lab 4
5	CO 5,6	Chapter 9 & 10	Week 5 Forum, Quiz 4 and Lab 5
6	CO 7	Chapter 11 & 12	Work on paper, Quiz 5 and Lab 6
7	CO 8,9	Chapter 13 & 14	Week 7 Forum , Week 7 Paper and Lab 7
8	CO 4,10	Chapter 15	Week 8 Forum, Week 8 Case Study and Lab 8

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Policies

Please see the [student handbook](#) to reference all University policies. Quick links to frequently asked question 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 or 12-point font or Times New Roman 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* (6th 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

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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. Assignments submitted late without a prearranged extension will be subject to a 10% late penalty. **No late assignments will be accepted after the last day of the course.**

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.

- **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.
- **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:** 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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Selected Bibliography

Abdel-Aziz, A. (2009). Intrusion Detection & Response Leveraging Next Generation Firewall Technology. Retrieved from: http://www.sans.org/reading_room/whitepapers/firewalls/intrusion-detection-response-leveraging-generation-firewall-technology_33053

Christodonte, M., II. (2010). [Cyber Within](#): A Security Awareness Story (and guide) for Employees. Virginia: Proactive Assurance LLC

Christodonte, M., II. (2010). Creating a proactive enterprise incident response program. Retrieved from: http://searchsecurity.techtarget.com/tip/0,289483,sid14_gci1507515,00.html

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Feig, R. (2002). The OSI Reference Model. Retrieved from <http://www2.rad.com/networks/1994/osi/intro.htm>

Ferrigni, S. (2003). SSL Remote Access VPNs. Is this the end of IPSec? Retrieved from: http://www.sans.org/reading_room/whitepapers/vpns/ssl-remote-access-vpns-ipsec_1285

Sillito, R. (2007). Don't just patch, protect! Retrieved from: http://www.sans.org/reading_room/whitepapers/firewalls/dont-patch-protect_1771

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.

APUS Assignment Rubric Undergraduate Level 300-400	EXEMPLARY LEVEL 4	ACCOMPLISHED LEVEL 3	DEVELOPING LEVEL 2	BEGINNING LEVEL 1	TOTAL POINTS
FOCUS/THESIS	<p>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.</p>	<p>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.</p>	<p>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.</p>	<p>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.</p>	<p>10</p>
CONTENT/SUBJECT KNOWLEDGE	<p>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.</p>	<p>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.</p>	<p>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.</p>	<p>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.</p>	<p>20</p>

CRITICAL THINKING SKILLS	Student demonstrates a higher-level of critical 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.	Student exhibits a good command of critical 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.	Student takes a common, conventional approach in 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.	Student demonstrates beginning 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.	20
ORGANIZATION OF IDEAS/FORMAT	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.	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.	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.	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.	20
WRITING CONVENTIONS (GRAMMAR & MECHANICS)	Student demonstrates an excellent command of grammar, as well as presents research in a clear and concise writing style. Presents a thorough, extensive	Student provides an effective display of good writing and grammar. Assignment reflects student's ability to select appropriate word usage	Assignment reflects basic writing and grammar, but more than 5 errors. Key terms and concepts are somewhat vague and not completely explained by	Topics, concepts, and ideas are not coherently discussed or expressed in assignments. Student's writing style is weak and needs	20

	<p>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.</p>	<p>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.</p>	<p>student. Student uses a basic vocabulary in assignment. Student's writing ability is average, but demonstrates a basic understanding of the subject matter.</p>	<p>improvement, along with numerous proofreading errors. Assignment lacks clarity, consistency, and correctness. Student needs to review and revise assignment.</p>	
USE OF COMPUTER TECHNOLOGY/ APPLICATIONS	<p>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.</p>	<p>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.</p>	<p>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.</p>	<p>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.</p>	10
TOTAL POINTS					100