

*Quality Enhancement Plan (QEP): From These Roots ... A Foundation for Life: Mathematics and Financial Literacy*

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## *CSC 483 Advanced Computer and Network Security (Online)*

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### **Online Comments**

*This is an online course. The following information is very important. CSC 4012 is the first course in the CNSS 4012 certification process. An awareness of the materials is the goal. You will be responsible for a number of readings and Cyber Security Training modules (see <http://www.teexwmdcampus.com/index.k2?locRef=1>) . The workload is reasonable but continuous. I will not accept any late submissions and you are expected to follow instructions.*

*If you have questions, contact me at once (see contact information below). If you have trouble with BlackBoard or using the Hampton University intranet system, **contact me immediately.***

### **Course Description**

*Introduction to security problems in computing and networking. Information Security Models. Encryption and decryption techniques. Cryptographic protocols and practices. Operations Security. Program Security. Security in networks and distributed systems. Database Security. Electronic commerce security. Legal and ethical issues in computer and network security. Prerequisite: CSC 382 or Consent of the Chair.*

**INSTRUCTOR:** *Mr. Robert A. Willis Jr.*

**Office:** *ST 120 Telephone: 757-727-5556*

### *Office Hours:*

→ *MWF 9:00 – 11:00*

→ *TR 11:00 – 1:00*

### *Contact:*

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### **Course Objectives**

*Design, implementation, and analysis of computer and network security. This courses provides the foundation for understanding the key issues association with assessing information security model,*

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*protecting computer and network resources, examining existing cryptographic protocols and designing new cryptographic protocols, studying operation security, analyzing security for operating systems and programs, implementing secure database and e-commerce systems. After completing the courses, students would be able to*

- *Identify and prioritize threats to computer and network resources.*
- *Identify and prioritize information security models.*
- *Identify and implement encryption and decryption techniques.*
- *Identify and design cryptographic protocols.*
- *Define the factors of operation security.*
- *Identify and define the factors of secure operating systems and programs.*
- *Identify and define the factors of secure database systems.*
- *Define and design secure e-commerce systems.*
- *Describe ethics, legal, and public relations implications of computer and network security.*

### **Minimum Competencies**

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*Students meeting minimum competencies should expect to receive a grade between 74% and 77%. Minimum competencies for this course are as follows:*

- *Identify and prioritize threats to computer and network resources.*
- *Identify and prioritize information security models.*
- *Identify and implement encryption and decryption techniques.*
- *Identify and design cryptographic protocols.*
- *Define the factors of operation security.*
- *Identify and define the factors of secure operating systems and programs.*
- *Describe ethics, legal, and public relations implications of computer and network security.*

### **Course Topics**

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*This course will cover most of the information assurance concepts including:*

- *Introduction to Computer and Network Security (6 hours)*
- *Information Security Model (3 hours)*
- *Encryption and Decryption (6 hours)*
- *Cryptographic Protocols (6 hours)*
- *Operation Security (3 hours)*
- *Operating Systems and Program Security (3 hours)*
- *Database and E-commerce Security (3 hours)*
- *Legal, Ethical, and Professional Issues in Computer and Network Security (3 hours)*
- *Laboratory (12 hours)*
- *[Mapping to CNSSI 4012 can be found here.](#)*

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**Textbooks:**

**Required:**

→ **(Pfleeger)** *Security in Computing, 4<sup>th</sup> edition (or the newest), C. P. Pfleeger, S. L. Pfleeger, Prentice Hall, 2003.*

**Reference:**

→ **(Whitman)** *Principle of Information Security, 3<sup>rd</sup> edition, Michael E. Whitman & Herbert J. Mattord, Thomson, 2005.*

→ **(Krutz)** *The CISSP Prep Guide: Mastering the CISSP and ISSEP Exams, 2nd edition, Ronald L. Krutz and Russell Dean Vines, Wiley, 2004.*

**Supplemental Materials (SM):**

- SM-1: TEMPEST
- SM-2: NSA-TEMPEST-A Signal Problem
- SM-3: NSTISSM TEMPEST 2-95
- SM-4: Information Leakage from Optical Emanations
- SM-5: NIST SP 800-12 An Introduction To Computer Security-The NIST Handbook
- SM-6: NIST SP 800-13 Telecommunications Security Guidelines for Telecommunications Management Network
- SM-7: A Model for Information Assurance: An Integrated Approach
- SM-8: DOE-Cyber Security Process Requirements Manual

**Tentative Course Outline**

Week	Topics	Text chapters (See 4012 map for the details)	Supplemental Materials	Tests / Programs
1	1. Introduction to Computer and Network Security  1.1 Computer Systems  1.2 Wired Network  1.3 Wireless Network  1.4 Connectivity (SM-5, SM-6)  1.5 Protocols	Pfleeger: Ch1, Ch8	SM-5, SM-6	HW-1
2	1.6 Threat/Attack/Vulnerability (SM-8)  1.7 Theft	Pfleeger: Ch1, Ch2, Ch4  Krutz: Ch2, Ch9, Ch12,	SM-1, SM-2, SM-3, SM-4, SM-8	HW-2

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	1.8 TEMPEST (SM-1, SM-2, SM-3, SM-4) 1.9 Countermeasures 1.10 Threat Analysis/Assessment	Appendix Whitman: Ch2, Ch4, Ch9		
3	LABORATORY			
4	2. Information Security Model 2.1 NSTISSC Security Model 2.2 Information Security Model (SM-7)	Whitman: Ch1	SM-7	HW-3
5	3. Cryptography 3.1 Encryption	Pfleeger: Ch2, Ch10, Whitman: Ch8		HW-4
6	3.2 Decryption	Pfleeger: Ch2, Ch10 Whitman: Ch8		HW-5
7	3.3 Key Exchange Protocols 3.4 Digital Signature	Pfleeger: Ch2, Ch10 Whitman: Ch8		HW-6
8	3.5 Hash Functions 3.6 Access Control 3.7 PKI	Pfleeger: Ch2, Ch10 Whitman: Ch8		HW-7
9	LABORATORY			
10	4. Operation Security	Krutz: Ch6		
11	5. Operating Systems and Program Security 5.1 Operating Systems Security 5.2 Program Security	Pfleeger: Ch3, Ch4, Ch5		HW-5
12	LABORATORY			
13	6. Database and E-Commerce Security 6.1 Database Security 6.2 E-Commerce Security	Pfleeger: Ch8		HW-6

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14	7. Legal, Ethical, and Professional Issues in Computer and Network Security	Pfleeger: Ch9 Whitman: Ch3		HW-7
15	LABORATORY			

**Important Dates:**

**Exam 1:**

**Exam 2:**

**Final Exam:**

**The following information applies to all students in the School of Science:**

*In addition to the minimum grade requirements established by Hampton University, all majors within the School of Science must pass all required courses offered within the School of Science with a grade of “C” or better in order to satisfy degree requirements. The minimum grade requirement is in effect for all science courses taken during Fall 2001 and beyond.*

**Course Assignment and Calendar:**

**Homework Assignments:** *There are two types of homework assignments: problems and projects. Both of them will be issued and specified with their due date in Blackboard. Problems will be used to evaluate the understanding of course materials and projects will be used to evaluate the complexity of algorithm studied in class. All of the projects must be implemented by Java in Unix/Linux environments. Late work will not be accepted and will be counted as zero.*

**Final Exam:** *The exam will be given on the date scheduled by the registrar. The exam will be comprehensive. There are no exemptions from the exam.*

**Attendance:** *The attendance policy of Hampton University will be observed. You are expected to attend all classes and to arrive on time. Your attendance and participation will be 10% of the final grade. More than 7 absences will constitute a failing grade, regardless to other considerations.*

**Writing-Across-The-Curriculum:** *Hampton University adopts the policy in all courses of “writing across the curricula”. In this course, the objectives will be achieved by homework assignments, program comments, and various tests.*

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**The Ethics Paper:** Details about the ethics paper will be provided at least one month prior to the due date. The ethics paper will be graded based on the criteria listed in “**Hampton University Scoring Rubric**”.

**Grades:** The final grade of this course will be determined by the combined weight of following components:

<i>Examination (2)</i>	<i>20 %</i>
<i>Homework (10)</i>	<i>40 %</i>
<i>Laboratory (3)</i>	<i>15%</i>
<i>Ethics Paper</i>	<i>5 %</i>
<i>Final exam</i>	<i>20 %</i>

*Course grades will follow the scale of the university grading system:*

<i>A+</i>	<i>98-100</i>
<i>A</i>	<i>94-97</i>
<i>A-</i>	<i>90-93</i>
<i>B+</i>	<i>88-89</i>
<i>B</i>	<i>84-87</i>
<i>B-</i>	<i>80-83</i>
<i>C+</i>	<i>78-79</i>
<i>C</i>	<i>74-77</i>
<i>C-</i>	<i>70-73</i>

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D+	68-69
D	64-67
D-	60-63
F	Below 60

**Make-Up Policy:** *No make-up tests will be given without previous arrangements, a written medical excuse, or an emergency approved by appropriate university official.*

**Policy on Electronic Devices:** *Any electronic device (i.e. cell phone, PDA, pagers, etc.) will be turned off during class. During any test or final, these devices will not be allowed at the test.*

**Policy on Academic Dishonesty:** *Please see page 29 of the Student Handbook.*

**Cheating:** *A student caught cheating on an examination or plagiarizing a paper which forms a part of a course grade shall be given an "F" in the course and will be subject to dismissal from the University. A student is considered to be cheating if, in the opinion of the person administering an examination (written or oral), the student gives, seeks, or receives aid during the process of the examination; the student buys, sells, steals, or otherwise possesses or transmits an examination without authorization; or, the student substitutes for another or permits substitution for himself/ herself during an examination. All cases of cheating shall be reported by the instructor to the chair of the department in which the cheating occurred, to the school dean/division director and to the Provost.*

*No penalty shall be imposed until the student has been informed of the charge and of the evidence upon which it is based and has been given an opportunity to present his/her defense. If the faculty member and the student cannot agree on the facts pertaining to the charge, or if the student wishes to appeal a penalty, the issue may be taken to the department chair. Each party will present his/her case to the chair who shall then call a meeting of all involved parties. If the issue is not resolved at the departmental level, the dean shall conduct a hearing. If the issue is not resolved at the school level either party may appeal the decision at the school level to the Provost who shall convene the appropriate individuals and conduct a hearing in order to resolve the issue.*

**Plagiarism:** *Plagiarism is defined as "taking and using as one's own the writing or ideas of another." All materials used to meet assigned written requirements of a course, from any source, must be given proper credit by citing the source. A student caught plagiarizing a paper which forms a part of a course grade shall be given an "F" in the course and will be subject to dismissal from the University.*

**PENALTIES FOR ACADEMIC DISHONESTY**

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Cases of academic dishonesty are initially investigated and reported by members of the instructional faculty to the chairperson of the department in which the cheating occurred, to the school dean, division director and to the Provost. Also, penalties for minor violations of academic dishonesty are to be recommended at the discretion of the instructor. The penalties for academic dishonesty on examinations and major course requirements may include one of the following:

1. A grade of "F" on the examination or project.
2. A grade of "F" on the examination or project and dismissal from the course.
3. A grade of "F" on the examination or project, dismissal from the course and from the University.

When dismissal from the University is the recommended penalty, the chairman of the department submits the details of the case to the Provost who schedules a hearing.

#### **ADMINISTRATIVE ACTION**

The Provost has the authority to dismiss or expel any student who fails to meet scholarship requirements or to abide by academic regulations.

#### **Dress Code:**

This code is based on the theory that learning to select attire appropriate to specific occasions and activities is a critical factor in the total educational process. Understanding and employing the Hampton University Dress Code will improve the quality of one's life, contribute to optimum morale, and embellish the overall campus image. It also plays a major role in instilling a sense of integrity and an appreciation for values and ethics as students are propelled towards successful careers.

Students will be denied admission to various functions if their manner of dress is inappropriate. On this premise students at Hampton University are expected to dress neatly at all times. The following are examples of appropriate dress for various occasions:

1. Classroom, Cafeteria, Student Union and University Offices – casual attire that is neat and modest.
2. Formal programs in Ogden Hall, the Convocation Center, the Student Center Ballroom, the Little Theater and the Memorial Chapel – event appropriate attire as required by the event announcement.
3. Interviews – Business attire.
4. Social/Recreational activities, Residence hall lounges (during visitation hours) – casual attire that is neat and modest.
5. Balls, Galas, and Cabarets – formal, semi-formal and after five attire, respectively.

Examples of inappropriate dress and/or appearance include but not limited to:



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1. *Do-rags, stocking caps, skullcaps and bandannas are prohibited at all times on the campus of Hampton University (except in the privacy of the student's living quarters).*
2. *Head coverings and hoods for men in any building.*
3. *Baseball caps and hoods for women in any building.*
  - a. *This policy item does not apply to headgear considered as a part of religious or cultural dress.*
4. *Midriff shirts or halters, mesh, netted shirts, tube tops or cutoff tee shirts in classrooms, cafeteria, Student Union and offices;*
5. *Bare feet;*
6. *Short shirts;*
7. *Shorts, all types of jeans at programs dictating professional or formal attire, such as Musical Arts, Fall Convocation, Founder's Day, and Commencement;*
8. *Clothing with derogatory, offensive and/or lewd message either in words or pictures;*
9. *Men's undershirts of any color worn outside of the private living quarters of the residence halls. However, sports jerseys may be worn over a conventional tee-shirt.*

**Procedure for Cultural or Religious Coverings**

1. *Students seeking approval to wear headgear as an expression or religious or cultural dress may make a written request for a review through the Office of the Chaplain.*
2. *The Chaplain will forward his recommendation to the Dean of Students for final approval.*
3. *Students that are approved will then have their new ID card picture taken by University Police with the headgear being worn.*

*All administrative, faculty and support staff members will be expected to monitor student behavior applicable to this dress code and report any such disregard or violations to the Offices of the Dean or Men, or Dean of Women for the attention of the Dean of Students.*

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**CODE OF CONDUCT**

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*Joining the Hampton Family is an honor and requires each individual to uphold the policies, regulations, and guidelines established for students, faculty, administration, professional and other employees, and the laws of the Commonwealth of Virginia. Each member is required to adhere to and conform to the instructions and guidance of the leadership of his/her respective area. Therefore, the following are expected of each member of the Hampton Family:*

1. *To respect himself or herself.*
2. *To respect the dignity, feelings, worth, and values of others.*
3. *To respect the rights and property of others and to discourage vandalism and theft.*
4. *To prohibit discrimination, while striving to learn from differences in people, ideas, and opinions.*
5. *To practice personal, professional, and academic integrity, and to discourage all forms of dishonesty, plagiarism, deceit, and disloyalty to the Code of Conduct.*
6. *To foster a personal professional work ethic within the Hampton University Family.*

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7. *To foster an open, fair, and caring environment.*
8. *To be fully responsible for upholding the Hampton University Code.*

Students with disabilities which require accommodations should (1) register with the Office of Testing Services and 504 Compliance to provide documentation and (2) bring the necessary information indicating the need for accommodation and what type of accommodation is needed. This should be done during the first week of classes or as soon as the student receives the information. If the instructor is not notified in a timely manner, retroactive accommodations may not be provided.

***DISCLAIMER***

*This syllabus is intended to give the student guidance in what may be covered during the semester and will be followed as closely as possible. However, the professor reserves the right to modify, supplement and make changes as course needs arise.*

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### **Hampton University Scoring Rubric**

*The Hampton University Advisory Council of the Writing Program has approved and recommended the use of the scoring rubric as a guide for evaluating student-writing performance across the curriculum.*

#### **6**

*A paper in this category:*

- *States purpose (e.g., position or thesis) insightfully, clearly and effectively*
- *Provide thorough, significant development with substantial depth and persuasively marshals support for position*
- *Demonstrates a focused, coherent, and logical pattern of organization*
- *Displays a high level of audience awareness*
- *Use disciplinary facts critically and effectively*
- *Has support control of diction, sentence structure, and syntactic variety, but may have a few minor flaws in grammar, usage, punctuation, or spelling*
- *Documents sources consistently and correctly using a style appropriate to the discipline*

#### **5**

*A paper in this category:*

- *States purpose (e.g., position or thesis) clearly and effectively*
- *Provide development with some depth and complexity of thought and supports position convincingly*
- *Demonstrates effect pattern of organization*
- *Displays a clear sense of audience awareness*
- *Use disciplinary facts effectively*
- *Has good control of diction, sentence structure, and syntactic variety, but may have a few minor errors in grammar, usage, punctuation, or spelling*
- *Documents sources correctly using a style appropriate to the discipline*

#### **4**

*A paper in this category:*

- *States purpose (e.g., position or thesis) adequately*
- *Provides competent development with little evidence of complexity of thought*
- *Demonstrates an adequate pattern of organization*
- *Displays some degree of audience awareness*
- *Uses disciplinary facts adequately*

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- Has adequate control of diction, sentence structure, and syntactic variety, but may have some error in grammar, usage, punctuation, or spelling
- Documents sources adequately using a style appropriate to the discipline

3

A paper in this category:

- States purpose (e.g., position or thesis) but with varying degree of clarity
- Provides some development for most ideas
- Demonstrates some pattern of organization, but with some lapses from the pattern
- Displays uneven audience awareness
- Uses some disciplinary facts
- Has some control of diction, sentence structure, and syntactic variety, but may have frequent error in grammar, usage punctuation, or spelling
- Documents sources using a style appropriate to the discipline, but may have errors.

2

A paper in this category:

- States purpose (e.g., position or thesis) unclearly
- Provides inadequate development of thesis
- Demonstrates inconsistent pattern of organization
- Displays very little audience awareness
- Uses disciplinary facts ineffectively
- Has little control of diction, sentence structure, and syntactic variety, and may have a pattern of errors in grammar, usage, punctuation, or spelling
- Acknowledges sources but does not document them using a style appropriate to the discipline

1

A paper in this category:

- Fails to state purpose (e.g., position or thesis)
- Fails to develop most ideas
- Lacks a pattern of organization
- Displays no audience awareness
- Use few or no disciplinary facts
- Lacks control of diction, sentence structure, and syntactic variety, with a pattern of errors in grammar, usage, punctuation, or spelling

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→ *Fails to document or acknowledge sources*

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**Mapping to NSTISSI 4012 Standard**

*Course Review Sheet for CNSS No. 4012 Standard*

		<b>CSC583</b>	<b>Krutz</b>	<b>Whitman</b>	<b>Pfleeger</b>	<b>Supplemental</b>
	<b>FUNCTION TWO - GRANT REVIEW ACCREDITATION</b>					
	<i>Reviewing the accreditation documentation to confirm that the residual risk is within acceptable limits for each network and/or IS.</i>					
<b>A.</b>	<b><u>THREATS</u></b>					
<b>1</b>	<b>Attacks</b>					
	<i>Discuss threats/attacks to systems</i>	Topic 1.6	<i>Ch1, Pg. 28 (Terms and Definitions), Ch2, Pg. 61-68 (Access Control Attack), Ch6, Pg. 373 (Threats and Vulnerabilities), Ch12, Pg. 593-596 (Initial Risk Estimation), Appendix D, Pg. 954-956 (Types and Classes of Attack), Appendix D, Pg. 983 (Threat Identification)</i>	<i>Ch2, Pg. 40-63 (Threats), Pg. 63-73 (Attacks)</i>	<i>Ch1, Pg. 5-6 (Threats, Vulnerabilities, and Controls)</i>	
	<i>Explain the importance of threats/attacks on systems</i>	Topic 1.6	<i>Ch2, Pg. 61-68 (Access Control Attack), Ch6, Pg. 373 (Threats and Vulnerabilities), Ch12, Pg. 593-596 (Initial Risk Estimation), Appendix D, Pg. 954-956 (Types and Classes of Attack), Appendix D, Pg. 983 (Threat Identification)</i>	<i>Ch2, Pg. 40-63 (Threats), Pg. 63-73 (Attacks)</i>	<i>Ch1, Pg. 5-6 (Threats, Vulnerabilities, and Controls)</i>	
<b>2</b>	<b>Environmental/Natural Threats</b>					
	<i>Discuss environmental/natural threats</i>	Topic 1.6	<i>Ch12, Pg. 594 (Threat-Source Identification), Appendix D, Pg. 983 (Threat Identification)</i>	<i>Ch2, Pg. 59-60 (Forces of Nature)</i>	<i>Ch8, Pg. 538-541 (Natural Disasters)</i>	

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<b>3</b>	<b>Human Threats</b>					
	Explain the importance of intentional and unintentional human threats	Topic 1.6	Ch6, Pg. 374 (Illegal Computer Operations and Intentional Attacks), Ch12, Pg. 594-596 (Human Threat-Sources), Appendix D, Pg. 983 (Threat Identification)	Ch2, Pg. 42-43 (Acts of Human Error or Failure)	Ch8, Pg. 541-543 (Human Vandals)	
<b>4</b>	<b>Theft</b>					
	Explain the importance of theft	Topic 1.7	Ch6, Pg. 374 (Illegal Computer Operations and Intentional Attacks)	Ch2, Pg. 54 (Deliberate Acts of Theft)	Ch8, Pg. 541-543 (Theft)	
<b>5</b>	<b>Threat</b>					
	Explain threat	Topic 1.6	Ch1, Pg. 28 (Terms and Definitions), Ch6, Pg. 373 (Threats and Vulnerabilities), Ch12, Pg. 593-596 (Initial Risk Estimation), Appendix D, Pg. 983 (Threat Identification)	Ch2, Pg. 40-63 (Threats)	Ch1, Pg. 5-6 (Threats, Vulnerabilities, and Controls)	
	Explain the importance of organizational threats	Topic 1.6	Ch1, Pg. 28 (Terms and Definitions), Ch6, Pg. 373 (Threats and Vulnerabilities), Ch12, Pg. 593-596 (Initial Risk Estimation), Appendix D, Pg. 983 (Threat Identification)	Ch2, Pg. 40-63 (Threats)	Ch1, Pg. 5-6 (Threats, Vulnerabilities, and Controls)	DOE-Cyber Security Process Requirements Manual
<b>6</b>	<b>Threat Analysis</b>					
	Explain the importance of threat analysis	Topic 1.10	Ch2, Pg. 68-69 (Penetration Testing), Ch12, Pg. 593 (Initial Risk Estimation), Pg. 597 (Threat Likelihood of Occurrence), Pg. 597-600 (Analyzing for Vulnerabilities), Appendix D, Pg. 984 (Control Analysis)		Ch7, Pg. 425-428 (Security Threat Analysis)	
<b>7</b>	<b>Threat Assessment</b>					
	Explain the importance of threat assessment	Topic 1.10	Ch12, Pg. 593 (Initial Risk Estimation)	Ch4, Pg. 133-134 (Identify and Prioritize Threats)	Ch7, Pg. 425-428 (Security Threat Analysis)	
<b>B.</b>	<b><u>COUNTERMEASURES</u></b>					
<b>1</b>	<b>Education, Training, and Awareness as Countermeasures</b>					
	Explain the importance of educational training, and awareness as countermeasures	Topic 1.9	Ch1, Pg. 42-45 (Security Awareness)	Ch5, Pg. 206-209 (Security Education, Training, and Awareness)		A Model for Information Assurance: An Integrated Approach

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				Program)		
	Ensure educational training, and awareness countermeasures are implemented	Topic 1.9	Ch1, Pg. 42-45 (Security Awareness)	Ch5, Pg. 206-209 (Security Education, Training, and Awareness Program)		
2	<b>Procedural Countermeasures</b>					
	Explain the importance of procedural/administrative countermeasures	Topic 1.9	Ch6, Pg. 354-356 (Administrative Controls)	Ch11, Pg. 492-498 (Employment Policies and Practices)	Ch8, Pg. 529-538 (Organization Security Policy)	
	Ensure procedural/administrative countermeasures are implemented	Topic 1.9	Ch6, Pg. 354-356 (Administrative Controls)	Ch11, Pg. 492-498 (Employment Policies and Practices)	Ch1, Pg. 25 (Policies and Procedures)	
3	<b>Technical Countermeasures</b>					
	Explain the importance of automated countermeasures/deterrents	Topic 1.9			Ch1, Pg. 22-25 (Methods of Defense)	A Model for Information Assurance: An Integrated Approach
	Explain the importance of technical countermeasures/deterrents	Topic 1.9			Ch1, Pg. 22-25 (Methods of Defense)	
	Ensure technical/automated countermeasures/deterrents are implemented	Topic 1.9			Ch1, Pg. 22-25 (Methods of Defense)	
C.	<b><u>VULNERABILITY</u></b>					
1	<b>Vulnerability</b>					
	Explain vulnerability	Topic 1.6	Ch1, Pg. 28 (Terms and Definitions), Ch6, Pg. 375-376 (Vulnerabilities and Attacks), Ch12, Pg. 593 (Initial Risk Estimation)	Ch2, Pg. 63 (Attacks)	Ch1, Pg. 12-19 (Vulnerabilities)	
2	<b>Vulnerability Analysis</b>					
	Explain the importance of vulnerability analysis	Topic 1.6	Ch12, Pg. 593 (Initial Risk Estimation), Pg. 597 (Analyzing for Vulnerabilities), Appendix D, Pg. 984 (Vulnerability Identification)	Ch4, Pg. 138-139 (Vulnerability Identification),	Ch8, Pg. 509-513 (Step 2: Determine Vulnerabilities)	
3	<b>Network Vulnerabilities</b>					



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	Explain the importance of network vulnerabilities	Topic 1.6	Ch3, Pg. 190-193 (Network Attacks and Abuses), Pg. 194-201 (Probing and Scanning)		Ch7, Pg. 387-390 (What Makes a Network Vulnerability), Pg. 426 (Network Vulnerabilities)	
<b>4</b>	<b>Technical Vulnerabilities</b>					
	Explain the importance of technical vulnerabilities	Topic 1.6	Ch6, Pg. 375-376 (Vulnerabilities and Attacks), Appendix B, Pg. 937 (Technical Vulnerability), Ch12, Pg. 597 (Analyzing for Vulnerabilities), Appendix D, Pg. 984 (Vulnerability Identification)		Ch1, Pg. 12-19 (Vulnerabilities)	
	<b>FUNCTION THREE - VERIFY COMPLIANCE</b>					
	Verifying that each information system complies with the information assurance (IA) requirements					
<b>C.</b>	<b><u>SECURITY REQUIREMENTS</u></b>					
<b>1</b>	<b>Access Authorization</b>					
	Explain the importance of access authorization	Topic 3.6	Ch2, Pg. 55-56 (Rationale)	Ch5, Pg. 179 (Authorized Access and Usage of Equipment)		
<b>2</b>	<b>Auditable Events</b>					
	Explain auditable events		Ch6, Pg. 369-372 (Auditing)			
<b>3</b>	<b>Authentication</b>					
	Explain authentication	Topic 3.1	Ch2, Pg. 69 (Identification and Authentication), Appendix B, Pg. 885 (Authentication)	Ch7, Pg. 338 (Authentication)	Ch2, Pg. 59 (symmetric and Asymmetric Encryption Systems)	
<b>4</b>	<b>Background Investigations</b>					
	Explain the importance of background investigations		Ch6, Pg. 354 (Administrative Controls)	Ch11, Pg. 493-494 (Background		

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				Checks)		
5	<i>Countermeasures</i>					
	<i>Explain the importance of countermeasures</i>	Topic 1.9	Appendix B, Pg. 894 (Countermeasure/Safeguard)		Ch1, Pg. 22-25 (Methods of Defense)	A Model for Information Assurance: An Integrated Approach
12	<i>Key Management Infrastructure</i>					
	<i>Discuss key management infrastructure</i>	Topic 3.3	Ch4, Pg 271-273 (Key Management)			NIST SP 800-57-Part1 Recommendation for Key Management - Part 1: General (Revised)
13	<i>Information Marking</i>					
	<i>Discuss information marking</i>		Ch6, Pg. 363-364 (Marking)			NIST SP 800-18 Guide for Developing Security Plans for Federal Information Systems  Administrative Communications System - US Department of Education  NIST SP 800-88_rev1 Guide for Media Sanitization  NSA/CSS Storage Device Declassification Manual
14	<i>Non-repudiation</i>					
	<i>Discuss non-repudiation</i>	Topic 3.4	Ch3, Pg. 102 (OSI Security Services and Mechanisms), Appendix B, Pg. 920 (Nonrepudiation)	Ch8, Pg. 377 (Digital Signature)	Ch7, Pg. 474 (Requirements and Solutions)	
	<i>Explain the importance and role of non-repudiation</i>	topic 3.4	Ch3, Pg. 102 (OSI Security Services and Mechanisms), Appendix B, Pg. 920	Ch8, Pg. 377 (Digital Signature)	Ch7, Pg. 474 (Requirements and Solutions)	

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			(Nonrepudiation)			
15	Public Key Infrastructure (PKI)					
	Explain the importance and role of PKI	Topic 3.7	Ch4, Pg. 267 (Public-Key Infrastructure (PKI))	Ch8, Pg. 375-377 (Public-Key Infrastructure (PKI))	Ch7, Pg. 436-438 (PKI and Certificates)	
	<b>FUNCTION FOUR ENSURE ESTABLISHMENT OF SECURITY CONTROLS</b>					
	Ensuring the establishment, administration, and coordination of security for systems that agency, service, or command personnel or contractors operate					
B.	<u>ACCESS</u>	-				
1	Access Controls					
	Define manual/automated access controls	Topic 3.6	Ch2, Pg. 55-61 (Access Control)	Ch4, Pg. 141-142 (Access Control)	Ch4, Pg. 194-204 (Control of Access to General Objects)	
	Explain the importance of manual/automated access controls	Topic 3.6	Ch2, Pg. 55-61 (Access Control)	Ch4, Pg. 141-142 (Access Control)	Ch4, Pg. 194-204 (Control of Access to General Objects)	
2	Access Privileges					
	Explain the importance of access privileges	Topic 3.6	Ch2, Pg. 56 (Controls), Pg. 57-58 (Models for Controlling Access), Ch6, Pg. 355-356 (Least Privilege), Pg. 361 (Privileged-Entity Controls)	Ch4, Pg. 141-142 (Access Control)	Ch4, Pg. 194-204 (Control of Access to General Objects)	
3	Discretionary Access Controls	Topic 3.6	Ch2, Pg. 58 (Discretionary Access Control)	Ch4, Pg. 141-142 (Access Control)		
	Discuss discretionary access controls	Topic 3.6	Ch2, Pg. 58 (Discretionary Access Control)	Ch4, Pg. 141-142 (Access Control)		
	Explain the importance of discretionary access controls	Topic 3.6	Ch2, Pg. 58 (Discretionary Access Control)	Ch4, Pg. 141-142 (Access Control)		
4	Mandatory Access Controls					

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	Define mandatory access controls	Topic 3.6	Ch2, Pg. 57-58 (Models for Controlling Access)	Ch4, Pg. 141-142 (Access Control)		
	Explain the importance of mandatory access controls A10 ANNEX A to CNSSI No. 4012	Topic 3.6	Ch2, Pg. 57-58 (Models for Controlling Access)	Ch4, Pg. 141-142 (Access Control)		
5	Biometrics/Biometric Policies					
	Explain biometric policies	Topic 3.6	Ch2, Pg. 72-74 (Biometrics)	Ch7, Pg. 342 (Acceptability of Biometrics)		
6	Separation of Duties					
	Define the need to ensure separation of duties where necessary	Topic 3.6	Ch2, Pg. 56-57 (Controls), Ch6, Pg. 346-348 (Separation of Duties)	Ch11, Pg. 500-501 (Internal Control Strategies)	Ch3, Pg. 172 (Separation of Duties), Ch5, Pg. 237 (Separation of Duty)	
	Explain the importance of the need to ensure separation of duties where necessary	Topic 3.6	Ch2, Pg. 56-57 (Controls), Ch6, Pg. 346-348 (Separation of Duties)	Ch11, Pg. 500-501 (Internal Control Strategies)	Ch3, Pg. 172 (Separation of Duties), Ch5, Pg. 237 (Separation of Duty)	
7	Need-To-Know Controls					
	Define need to know controls	Topic 3.6	Ch2, Pg. 57-58 (Models for Controlling Access), Ch6, Pg. 355 (Need to Know), Appendix B, Pg. 919 (Need to Know)	Ch4, Pg. 131 (Security Clearance)	Ch5, Pg. 232 (Military Security Policy)	NIST SP 800-16 Information Technology Security Training Requirements - A
	Explain the importance of need to know controls	Topic 3.6	Ch2, Pg. 57-58 (Models for Controlling Access), Ch6, Pg. 355 (Need to Know), Appendix B, Pg. 919 (Need to Know)	Ch4, Pg. 131 (Security Clearance)	Ch5, Pg. 232 (Military Security Policy)	Role and Performance Based Model
	<b>FUNCTION TEN ASSESS NETWORK SECURITY</b>					
	Ensure that when classified/sensitive information is exchanged between IS or networks (internal or external), the content of this communication is protected from unauthorized observation, manipulation, or denial					

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<b>1</b>	Connectivity					
	Discuss connected organizations	Topic 1.4				NIST SP 800-12 An Introduction To Computer Security- The NIST Handbook
	Discuss connectivity involved in communications	Topic 1.4	Ch3, Pg. 97 (Availability)			
	Explain the importance of connectivity involved in communications	Topic 1.4	Ch3, Pg. 97 (Availability)			NIST SP 800-13 Telecommunications Security Guidelines for Telecommunications Management Network
<b>2</b>	Emissions Security (EMSEC) and TEMPEST					
	Define TEMPEST requirements	Topic 1.8	Ch9, Pg. 474 (Emanation Eavesdropping)	Ch9, Pg. 425 (Interception of Data)		TEMPEST
	Discuss threats from Emissions Security (EMSEC)	Topic 1.8	Ch9, Pg. 474 (Emanation Eavesdropping)	Ch9, Pg. 425 (Interception of Data)		NSA-TEMPEST-A Signal Problem
	Discuss threats from TEMPEST failures	Topic 1.8	Ch9, Pg. 474 (Emanation Eavesdropping)	Ch9, Pg. 425 (Interception of Data)		NSTISSM TEMPEST 2-95
	Explain the importance of the threats from Emissions Security (EMSEC)	Topic 1.8	Ch9, Pg. 474 (Emanation Eavesdropping)	Ch9, Pg. 425 (Interception of Data)		Information Leakage from Optical Emanations
	Explain the importance of the threats from TEMPEST failures.	Topic 1.8	Ch9, Pg. 474 (Emanation Eavesdropping)	Ch9, Pg. 425 (Interception of Data)		
<b>3</b>	Wireless Technology					
	Discuss electronic emanations	Topic 1.8	Ch9, Pg. 474 (Emanation Eavesdropping)	Ch9, Pg. 425 (Interception of Data)		
	Discuss threats from electronic emanations	Topic 1.8	Ch9, Pg. 474 (Emanation Eavesdropping)	Ch9, Pg. 425 (Interception of Data)		
	Explain the importance of wireless technology	Topic 1.2-1.3	Ch3, Pg. 164-173 (Wireless Technologies)		Ch7, Pg. 370 (Wireless)	
	Explain the risks associated with portable wireless systems, viz., PDAs, etc.	Topic 1.2-1.3, 1.6	Ch3, Pg. 182 (PDA Security Issues)			

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	<i>Explain the importance of vulnerabilities associated with connected systems wireless technology</i>	<i>Topic 1.2-1.3, 1.6</i>	<i>Ch3, Pg. 175-182 (Wireless Vulnerability)</i>		<i>Ch7, Pg. 400-402 (Wireless)</i>	
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