

Nova Southeastern University
Graduate School of Computer and Information Sciences

DCIS 730 – Network Security (4 credits)
Fall 2009 (August 28, 2009 – December 13, 2009)

Professor

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Course Description

Study of the technical challenges of securing computer networks, the tools and techniques that have been developed to address these challenges, and the current research in protecting critical information networks. Topics in the course will include network protocols designed to enhance security, wireless security approaches, intrusion detection, cryptography, and authentication and access control techniques. A significant focus of the course will be on current and emerging network security research areas.

Required Software

Pretty Good Privacy (PGP). Version 7.5.8 or later.

Learning Outcomes

By the end of the course, the student will be able to:

1. Identify and analyze the existing body of research concerning issues in network security.
2. Synthesize that existing research into support for new areas for investigation.
3. Develop the structure for original research into secure network infrastructures.

Course Outline

This course will include the following areas beyond familiarity with basic security concepts:

- Cryptography (symmetric key, public-key, AES, etc.)
- Secure network protocols
- Intrusion detection
- Network authentication approaches

- Wireless security (WLAN, MANET, etc.)
- Current approaches to securing networks
- Research directions in network security

Instruction Methods and Tools

The following on-line tools will be used in the course:

WebCT - The WebCT web-based interface will be used by the student to submit all course assignments. The instructor will provide assignment grades through WebCT and all broadcast messages through the “Course Announcements” forum.

Email – Electronic mail will be used in the course by the instructor to notify students of course-related issues and requirements during non-cluster periods. Students will use email for all questions, concerns, or issues addressed to the instructor during the course. All correspondences via email will utilize the students NSU email account. Students should check their NSU email daily.

Assignments

Assignment	Value	Assignment Information
1	10%	<p><u>Annotated Bibliography</u> Research 10 good articles regarding network security from IEEE or ACM. No other sources are permitted. Write an annotation each and post individually in the Research in Information Security WebCT “course”. The subject of your posting must be the title of the article. The annotation should consist of 2-3 solid paragraphs about the article that summarizes the article. Do not include your opinions of the article in the annotation.</p> <p><u>Due: 11:55 pm ET 9/13/09</u></p>

Assignment	Value	Assignment Information
2	20%	<p>Problem Identification</p> <p>This assignment will consist of two parts:</p> <ol style="list-style-type: none"> For this assignment the student will review the current academic literature (IEEE or ACM) relevant to one or more of the following topics: <ul style="list-style-type: none"> Cryptography Network-based authentication Intrusion detection Network security architectures Wireless security Computer forensics <p>Based on that review the student will write 10 problem statements. Each problem statement must be limited to one paragraph that will contain the clear statement of the problem, and a few sentences that support that problem as a viable research area by citing references from refereed literature. Each of the 10 problem statements must contain a current problem worthy of a dissertation or other significant research effort.</p> <ol style="list-style-type: none"> The student will then select one of the problem statements as the focus of their work for assignments 4 and 5. <p>For this portion of the assignment the student will conduct an in-depth review the current academic literature relevant to their selected topic and prepare a problem identification paper. This paper will fully describe the problem, a review of the literature, and information on the relevance and significance of the problem.</p> <p>This assignment will be evaluated based on the relevance of the selected problem, the clarity in which it is stated, the ability of the student to justify the problem, and the overall presentation of the report (proper grammar, spelling, etc.). The problem identification paper should be limited to 10 pages.</p> <p>The submission must be properly encrypted using Dr. Cannady's PGP public key Due: 11:55 pm ET 09/27/09</p>
3	10%	<p>Presentation</p> <p>During the December cluster the student will provide a 15 minute presentation to the class on the topic application being developed for assignment 4.</p> <p>Due: 11:55 pm ET 10/22/09</p>

Assignment	Value	Assignment Information
4	25%	<p>Topic Application</p> <p>The student will conduct a thorough analysis of their course topic through the development of a Java-based or Matlab-based application that demonstrates some aspect of the topic area. The task is to design and develop a prototype system that further justifies the need for research into the selected research problem. The prototype should demonstrate some aspect of the current state-of-the-art and thereby highlighting the deficiencies of current approaches and the need for additional research in the area.</p> <p>The student will submit a brief final report on the application that includes the following:</p> <ul style="list-style-type: none"> • Identify the research problem and the current technique that is being demonstrated. • Explain all algorithms and solution strategies that were used. • The results from your tests of the system (if appropriate) with appropriate data. • Source code must be included as an appendix to the report. <p>This assignment will be evaluated based on the ability of the prototype to demonstrate the intended concepts and the overall presentation of the report (proper grammar, spelling, etc.).</p> <p>The source code and the final report must be placed in a single folder that must then be compressed using zip or another similar compression algorithm.</p> <p>The submission must be properly encrypted using Dr. Cannady's PGP public key</p> <p><u>Due: 11:55 pm ET 11/01/09</u></p>
5	35%	<p>Research Proposal</p> <p>The student will prepare a research proposal on an aspect of their selected course topic following the format of the GSCIS Idea Paper. The proposal must be thorough and include a well-considered and fully supported potential solution to the research problem.</p> <p>This assignment will be evaluated based on the relevance of the selected problem, the clarity in which it is stated, the ability of the student to justify the problem, and the overall presentation of the report (proper grammar, spelling, etc.).</p> <p>The submission must be properly encrypted using Dr. Cannady's PGP public key</p> <p><u>Due: 11:55pm ET 12/13/09</u></p>
Total Value	100%	

Grading Criteria

Grade	% Required
A	95%
A-	90%

B+	87%
B	84%
B-	80%
C+	77%
C	74%
C-	70%
F	< 70%

Course Rules

1. All assignments must be submitted to WebCT by 11:55 pm (ET) on the assigned due date. Students submitting their assignment after 11:55 pm (ET) on the due date will receive a 24 hour grace period to submit their assignment. However, there will be a 50% penalty assessed for assignments submitted during the grace period. No assignments will be accepted after the end of the grace period, except in extraordinary circumstances AND with the prior approval of the instructor before the original deadline.
2. All student submissions must be properly encrypted using Dr. Cannady's PGP Public Key. **Unencrypted or improperly encrypted submissions will receive no credit.**
3. All class assignments must be submitted via [WebCT](#). The acceptable formats are PDF, ZIP, ASCII text, postscript, and Microsoft Word.
4. Students are encouraged to discuss and share information pertaining to this course. However, all submitted work must be original and must be your own.
5. A student may not do additional work or repeat an examination to raise a grade.

School and University Policies and Procedures:

Students must comply with the policies published in the school's *Graduate Catalog* and the *NSU Student Handbook*, some of which are included or referenced below. The catalog is at http://www.scis.nova.edu/NSS/pdf_documents/Catalog.pdf . The handbook is at <http://www.nova.edu/cwis/studentaffairs/forms/ustudenthandbook.pdf> .

1. Standards of Academic Integrity For the university-wide policy on academic standards, see the section Code of Student Conduct and Academic Responsibility in the *NSU Student Handbook*. Also see the section Student Misconduct in the GSCIS catalog.

Each student is responsible for maintaining academic integrity and intellectual honesty in his or her academic work. It is the policy of the school that each student must:

- Submit his or her own work, not that of another person
- Not falsify data or records (including admission materials and academic work)
- Not engage in cheating (e.g., giving or receiving help during examinations; acquiring and/or transmitting test questions prior to an examination; or using unauthorized materials, such as notes, during an examination)
- Not receive or give aid on assigned work that requires independent effort
- Properly credit the words or ideas of others according to accepted standards for professional publications (see the next section *Crediting the Words or Ideas of Others*)
- Not use term paper writing services or consult such services for the purpose of obtaining assistance in the preparation of materials to be submitted in courses or for theses or dissertations
- Not commit plagiarism (*Merriam-Webster's Collegiate Dictionary* (2004) defines plagiarism as “stealing or passing off ideas or words of another as one’s own” and “the use of a created production without crediting the source.”) (see *Crediting the Words or Ideas of Others* below)

Crediting the Words or Ideas of Others

When using the exact words of another, quotation marks must be used for short quotations (fewer than 40 words), and block quotation style must be used for longer quotations. In either case, a proper citation must also be provided. *Publication Manual of the American Psychological Association, Fifth Edition*, (2001, pp. 117 and 292) contains standards and examples on quotation methods.

When paraphrasing (summarizing, or rewriting) the words or ideas of another, a proper citation must be provided. (*Publication Manual of the American Psychological Association, Fifth Edition* (2001) contains standards and examples on citation methods (pp. 207–214) and reference lists (pp. 215–281)). The *New Shorter Oxford English Dictionary* (1993) defines paraphrase as “An expression in other words, usually fuller and clearer, of the sense of a written or spoken passage or text...Express the meaning (of a word, phrase, passage, or work) in other words, usually with the object of clarification...”. Changing word order, deleting words, or substituting synonyms is not acceptable paraphrasing—it is plagiarism, even when properly cited. Rather than make changes of this nature, the source should be quoted as written.

Original Work

Assignments, exams, projects, papers, theses, dissertations, etc., must be the original work of the student. Original work may include the thoughts and words of others but such thoughts or words must be identified using quotation marks or indentation and must properly identify the source (see the previous section *Crediting the Words or Ideas of Others*). At all times, students are expected to comply with the school’s accepted citation practice and policy.

Work is not original when it has been submitted previously by the author or by anyone else for academic credit. Work is not original when it has been copied or partially copied from any other source, including another student, unless such copying is acknowledged by the person submitting the work for the credit at the time the work is being submitted, or unless copying, sharing, or joint authorship is an express part of the assignment. Exams and tests are original work when no unauthorized aid is given, received, or used before or during the course of the examination, reexamination, and/or remediation.

2. Writing Skills

Students must demonstrate proficiency in the use of the English language. Grammatical errors, spelling errors, and writing that fails to express ideas clearly will affect their grades and the completion of their academic programs. The faculty will not provide remedial help concerning grammatical errors or other writing difficulties. It is the student's responsibility to proofread and edit his or her work which, in both form and content, should be letter-perfect. Work that is not properly edited will be rejected. It is university policy that students must submit their own work, not that of another person. Consequently, they should refrain from using outside editors to redo their work.

3. Disabilities and ADA

NSU complies with the American with Disabilities Act (ADA). The university's detailed policy on disabilities is contained in the NSU *Student Handbook*. Student requests for accommodation based on ADA will be considered on an individual basis. Students with disabilities should discuss their needs with their academic advisors before the commencement of classes if possible.

4. Communication by Email

Students must use their NSU email accounts when sending email to faculty and staff and must clearly identify their names and other appropriate information, e.g., course or program. When communicating with students via email, faculty and staff members will send mail only to NSU email accounts using NSU-recognized usernames. Students who forward their NSU-generated email to other email accounts do so at their own risk. GSCIS uses various course management tools that use private internal email systems. Students enrolled in courses using these tools should check both the private internal email system and NSU's regular email system. NSU offers students web-based email access. Students are encouraged to check their NSU email account and their course management email daily.

5. The Temporary Grade of Incomplete (I)

The temporary grade of Incomplete (I) will be granted only in cases of extreme hardship. Students do not have a right to an incomplete, which may be granted only when there is evidence of just cause. A student desiring an incomplete must submit a written appeal to the course professor at least two weeks prior to the end of the term. In the appeal, the student must: (1) provide a rationale; (2) demonstrate that he/she has been making a sincere effort to complete the assignments during the term; and (3) explain how all the possibilities to complete the assignments on time have been exhausted. Should the course professor agree, an *incomplete contract* will be prepared by the student and signed by both student and professor. The *incomplete contract* must contain a description of the work to be completed and a timetable. The completion period should be the shortest possible. In no case may the completion date extend beyond 30 days from the last day of the term for master's courses or beyond 60 days from the last day of the term for doctoral courses. The *incomplete contract* will accompany the submission of the professor's final grade roster to the program office. The program office will monitor each *incomplete contract*. If a change-of-grade form is not submitted by the scheduled completion date, the grade will be changed automatically from I to F. No student may graduate with an I on his or her record.

6. Grade Policy Regarding Withdrawals

Course withdrawal requests must be submitted to the program office in writing by the student. Requests for withdrawal must be received by the program office by the calendar midpoint of the course (see dates in the academic calendar in the catalog and program brochures or websites). Withdrawals sent by email must be sent from the student's assigned NSU email account. Requests for withdrawal received after 11:59 p.m. EST on the withdrawal deadline date will not be accepted. Failure to attend class or participate in course activities will not automatically drop or withdraw a student from the class or the university. Students who have not withdrawn by the withdrawal deadline will receive letter grades that reflect their performance in the course. When a withdrawal request is approved, the transcript will show a grade of W (*Withdrawn*) for the course. *Students with four withdrawals will be dismissed from the program.* Depending on the date of withdrawal, the student may be eligible for a partial refund (see the appropriate catalog section Refund Policy Regarding Withdrawals).

7. Acceptable Use of Computing Resources

Students must comply with the university's *Policy on Acceptable Use of Computing Resources* (see *NSU Student Handbook*).

8. Academic Progress, Grade Requirements, and Academic Standing

Students must be familiar with the school's policies that are contained in its catalog.

9. Student Research Involving Human Subjects

Students must be familiar with the university's policy (see paragraph in catalog).