Course ID/Name: Comp 715/815 Information Security (rev 8/28/24)

Semester: Fall 2024

Instructor: Michael Jonas (**office:** room 141. **email:** mcy59@unh.edu)

Time and Location: Wednesday, 5:30 – 8:30pm, room 142 in Pandora

Office Hours: by appointment

Web Presence:

Website: http://stem.unh.edu/mcy59/comp/715

Course Description:

Topics include general security principals and practices, network and system security, access control methodology, and cryptography. Students develop a simple cryptographic system based on sound mathematical principals, work to improve it, and find ways to attack it. Some programming required. Prerequisite: Open to seniors only or permission. No credit for students who have completed CIS 615. 4 cr.

Learning Objectives:

Students should develop skills and understanding in policies and technologies used in the field of information security. By not only using existing encryption technologies but also developing simple forms of them, students will learn how they work and gain insight into the challenges of protecting information from outside threat.

Textbook:

Primary: *Introduction to Computer Security*, Michael T. Goodrich & Roberto Tamassia, Addison Wesley, 2011 (ISBN: 978-0-321-51294-9)

Software Tools:

We will use JavaScript to implement simple forms of complex algorithms to do encryption and decryption, hashing, digital signatures and ways to attack those systems. We will also use tools such as WireShark and NetStumbler to investigate how to capture data across wireless networks.

Student Work and Class Pedagogies:

Lectures will generally take the form of board presentation with questions and answers. The course is 4 credits for undergraduates and the expectation is a minimum of 3 hours engaged time per week per credit over 16 week semester.

Lab Work:

For labs, students will be given a problem to solve individually. Most of the lab work will also translate to further homework assignments where student can show individually what they have learned within the collaborative setting of the lab.

Homework Assignments:

A total of 5 homework assignments are given during the semester. Each assignment will have review questions from chapter readings along with a lab section of technologies covered and developed during lab time. All homework is expected to be done individually.

Schedule:

Class Date	***Class Topics***	***Assignments Due***	***Class Activity***	***Chapter Readings***
Aug 28	Class begins: *Overview of Information security*		Nova Film	
Sep 4	Basics*: Fundamental Concepts; Access Control Models*		JavaScript & HTML	1.1 – 1.2
Sep 11	Basics: *Cryptographic Concepts; Implementation Issues*		32-bit random num generator	1.3 – 1.4
Sep 18	Physical Security: *Locks & Safes; Authentication; Attacks*		En/Decrypt program	2.1 – 2.3
Sep 25	Operating Systems: *Concepts; Process, Memory & File Security*	Problem Set1	Problem Set1 review & Hashing/Checksums	3.1 – 3.3
Oct 2	Malware: *Insider Attacks; Computer Viruses*		AES, DES & 3DES	4.1 – 4.2
Oct 9	Malware: *Outsider Attacks; Privacy-Invasive Software, Countermeasures*	Problem Set2	Problem Set2 review & Digital signature	4.3 – 4.5
Oct 16	Networks: *Concepts; Link Layer, Network Layer*		Problem Set3 Q&A	5.1 – 5.4
Oct 23	Networks: *Transport Layer, Denial-of-Service*	Problem Set3	Problem Set3 review	5.4 – 5.5
Oct 30	Networks: *Application Layers; Firewalls; Tunneling*		Problem Set4 Q&A	6.1 – 6.2
Nov 6	Networks: *Tunneling*	Problem Set4	Problem Set 4 review & Problem Set5 Lab Intro	6.3
Nov 13	Networks: *Intrusion Detection, Wireless*		Brute force attack w/dictionaries & regex	6.4 – 6.5
Nov 20	Web: *Basic Concepts; Client & Server Attacks*		Brute force w/regex & 16 bit random numbers	7.1 – 7.3
Nov 27	*No classes, Thanksgiving*			
Dec 4	Project presentations	Project		
Dec 11	**Exam**		Problem Set5 lab reveal	
		Problem Set5 (due Dec 20th)		

Grading:

15% Participation[1]
This includes attendance, participation, and preparedness (5 points each)
40% Assignments[2]
There will be 5 problem sets worth 8 points each
20% Project[3]
More details in the first half of class
25% Exam[4]

Policies

Academic Honesty and Collaboration:

Collaboration is encouraged and supported in the classroom through lab activities and outside the classroom as directed by instructor. Note that homework assignments and tests you submit **must be entirely your own work.** Deviation from this policy will result in dismissal from the course.

See the University policy on **Academic Honesty** for more information.

Attendance:

Is mandatory and you will lose on class participation grade for unexcused absences. Since work is based off lecture and class activities it becomes difficult to do well with too many absences.

Late Assignments and Make-Up Exams:

Policies for late assignments and make-up exams are very strict and apply only in exceptional cases of student illness, accident, or emergencies that are properly documented. It is your responsibility to make arrangements with instructor before the deadline as soon as you are aware you will miss a deadline, exam or class. Unexcused late assignments are penalized 20% per day.

Use of Electronic Devices in Classroom:

Not allowed during examinations. Absolutely no cell phone use during class time.

Accessibility Services:

The University is committed to providing students with documented disabilities equal access to all university programs and facilities. If you think you have a disability requiring accommodations, you must register with Student Accessibility Services (SAS) office. The Student Accessibility Coordinator at UNHM is Jenessa Zurek (email jenessa.zurek@unh.edu).

Mental Health and Wellness

In partnership with The Mental Health Center of Greater Manchester, UNH Manchester offers free mental health sessions for students. For scheduling a session email unhm.advising@unh.edu.

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[1] COMP 815 any lost points subtracted from overall grade
[2] COMP 815 will have 50% - 5 problem sets worth 10 points each plus 5 point quiz on each problem
[3] COMP 815 project worth 22%
[4] COMP 815 exam worth 28%