

Course Syllabus  
MAT 147-Mathematics for Cybersecurity  
Spring 2018  
Dr. John Peter  
Utica College

**Course Description:** The purpose of this course is to provide students with the mathematical background that they will need as they progress through their studies, and eventually their career, in cybersecurity. The topics outlined below, although well-known in the world of mathematics, rarely appear in a single, unified exposition. The course will be taught from the point of view of a mathematician, but will draw as frequently as possible on relevant examples from cybersecurity. In particular, the theoretical aspects of the mathematics will be discussed, although not in tremendous detail. The focus will be on developing the material through relevant examples

**Course Learning Goals:**

- In accordance with the Program Learning Goals of the Mathematics Department, the student will demonstrate an ability to formulate and solve mathematical problems (PG3) and to communicate mathematics in written form (PG4).
- Set Theory & Logic: The student should become familiar with the basic theory of sets, operations with sets, (bi)conditionals, truth tables, quantifiers, functions, and countability.
- Modular Arithmetic: The student should be able to compute with integers modulo  $n$ , and understand congruence classes, division algorithms, Euler's theorem, and possibly the Chinese Remainder Theorem.
- Number Systems in Different Bases: The student should understand the general theory of number systems in different bases, and be able to compute in different bases (in particular binary and hexadecimal).
- Combinatorics: The student should understand permutations, combinations, and basic methods for counting.
- Cryptography: The student should understand Public-Key Cryptography and develop a general idea of how the Diffie-Hellman Key exchange works. The student should also become familiar with the RSA cryptosystem (and possibly others).

**Class Meetings:** Tuesday & Thursday from 1:00pm to 2:15pm in 108 Hubbard

**Required Text:** There is no required text. The instructor will distribute relevant sets of notes throughout the course.

**Course Webpage:** [http://www.utica.edu/faculty\\_staff/jpeter/mat147s18.cfm](http://www.utica.edu/faculty_staff/jpeter/mat147s18.cfm)

**Contacting me:** EMAIL: [jwpeter@utica.edu](mailto:jwpeter@utica.edu) (The best way to contact me)  
OFFICE PHONE: 315-792-3730

**Office/Hours:** Room 257 White Hall  
Monday, Tuesday, Thursday, and Friday from 11:30AM to 12:30PM  
*or* By Appointment (made either in person or by email)

**Coursework/Weights:**

Assessment	% of Final Grade
Participation	5%
Project on the Phi Function	5%
Weekly Quizzes (Each Thursday)	15%
Midterm Exam 1	25%
Midterm Exam 2	25%
Final Exam	25%

**Final Exam Date & Time:** Tuesday, May 1, 11:30am

**NO MAKE-UP WORK WILL BE GIVEN.**

**Grading:** The grading scale will be *no worse* than:

90 – 100% = A/A-      70 – 79% = C+/C/C-      Below 60% = F  
80 – 89% = B+/B/B-      60 – 69% = D+/D

**Secrets to success in this course:**

- Do lots of problems . . . homework and more!
- Come to class
- ASK QUESTIONS!

**Attendance:** It is mandatory that I keep track of your attendance. An attendance sheet will be available for you to sign at the beginning of each class. Your attendance will count toward your participation grade. **YOU ARE EXPECTED TO ATTEND EVERY CLASS PERIOD.** In the event that you miss class (or are mentally absent from class!) it is your responsibility to keep up with all announcements, syllabus adjustments, and/or policy changes made during scheduled class time and/or sent to you via your Utica College email. Please make sure that your Utica College email is functioning properly, and make every effort to contact me using your Utica College email address (as opposed to gmail, yahoo, etc.) to avoid confusion. If class must be cancelled for some reason, you will be notified as early as possible via your Utica College email.

**Homework/Quizzes:** We will take a quiz during the last 20 minutes of class each Thursday. The quizzes will be based on the lecture notes and the assigned homework problems. The homework will not be collected, but it is up to you to keep up with the homework, since it is fair game for all of the quizzes and exams!

**Classroom Etiquette:** Always keep in mind that you are in a college classroom. You and all of the people around you have paid to be here. By simply showing up for class, you are demonstrating that you take very seriously the opportunity to pursue the best learning experience possible. You are expected to treat all people in the classroom with respect, and to come to class prepared to learn. Disruptive behavior, including (but not limited to) talking, whispering, texting, eating loudly, etc. will negatively impact EVERYONE'S experience and will not be tolerated.

**Intellectual Honesty:** Academic honesty is necessary for the free exchange of ideas. Utica College expects academic honesty from all students and Utica College faculty are authorized to assign a wide range of academic penalties for incidents of academic dishonesty. Academic dishonesty includes both cheating and plagiarism. Plagiarism is the intentional or unintentional use of other people's ideas, words, and/or factual information as your own and without crediting the source. It doesn't matter if the words come from a book, journal article, web site, or personal letter; if somebody else originally wrote them you may not use them without attributing them to that individual by appropriately citing the source. Plagiarism also refers to self-plagiarism, or re-purposing material that you've already completed for another course or assignment. Cheating refers to giving and/or receiving unauthorized assistance in taking examinations or creating assigned and/or graded class work. Students who assist other students in, or contribute to, acts of academic dishonesty are subject to the appropriate penalties. As mentioned above, Utica College faculty are authorized to

assign a wide range of academic penalties for incidents of academic dishonesty. Depending on the nature of the offense, the penalty may include a reduced grade or grade of zero for the particular assignment, a grade of F for the course, or the grade of “F for cheating in the course. Incidents of academic dishonesty are reported to the Vice President for Academic Affairs who will refer any repeat offense, or any particularly egregious first offense, to the Academic Standards Committee which may recommend a more severe penalty than that imposed by the faculty member.

**Disability Disclosure:** Any student who has need of special accommodations in this class due to a documented disability should speak with me as soon as possible, preferably within the first two weeks of class. You should also contact Kateri Henkel, Director of Learning Services in the Academic Support Services Center (315-792-3032 or khenkel@utica.edu) in order to determine eligibility for services and to receive an accommodation letter. We will work with you to help you in your efforts to master the course content in an effective and appropriate way.

**Writing Proficiency:** Students are expected to possess and use adequate writing skills. All written assignments should be well-written and free of grammar, punctuation, and spelling errors. Help is available in the Writing Center located in the library.

**Math and Science Center:** Peer tutors are available in the Math and Science Center located on the first floor of the library. These services are typically available beginning in the second week of a Fall/Spring semester.

### Tentative Course Schedule

1/16: Syllabus / Begin Chapter 1	2/15: Chapter 2 continued / Quiz 4
1/18: Chapter 1 continued	2/20: Chapter 3
1/23: Chapter 1 continued	2/22: <b>MIDTERM EXAM 1</b>
1/25: Chapter 1 continued / Quiz 1	2/27: Chapter 3 continued
1/30: Chapter 1 continued	3/1: Chapter 3 continued / Quiz 5
2/1: Chapter 2 / Quiz 2	3/6: Chapter 3 continued
2/6: Chapter 2 continued	3/8: Chapter 3 continued / Quiz 6
2/8: Chapter 2 continued / Quiz 3	3/12-3/16: <b>NO CLASS - Spring Break</b>
2/13: Chapter 2 continued	3/20: Chapter 4
	3/22: Chapter 4 continued / Quiz 7

3/27: Chapter 4 continued	4/12: Chapter 5 continued / Quiz 9
3/29: <b>MIDTERM EXAM 2</b>	4/17: Chapter 5 continued
4/3: Chapter 4 continued	4/19: Chapter 5 continued / Quiz 10
4/5: Chapter 4 continued / Quiz 8	4/24: Review
4/10: Chapter 5	4/26: Review / Last Day of Class

*The author of this syllabus reserves the right to change it at any time during the semester.*