**University of Detroit Mercy**
**College of Engineering and Science**
**Department of Mathematics, Computer Science and Software Engineering**

**CSSE-4540 01 Computer Security (3 cr.)**
**Winter 2016-2017**

**DESCRIPTION OF COURSE:** Computer security software, cryptanalysis techniques, Shannon's Theory, the data encryption standard, public-key cryptography, factoring algorithms, discrete log problems, bit security of discrete logs, signature schemes, cryptography and hash functions, key distribution and agreement, identification schemes, authentication codes, secret sharing schemes, Projects.

**PREREQUISITES:** CSSE-1710 and MTH-1420

**PREREQUISITES BY TOPIC:** None

**REQUIRED TEXT:** Cryptology and Network Security: Principles and Practice, William Stallings, Prentice Hall, Sixth Edition, ISBN: 0-13-335469-5, 2014

**INSTRUCTOR:** Dr. Kevin Daimi, Room E324. Tel: 313-993-1060.
Email: daimikj@udmercy.edu
Web page: http://daimikj.faculty.udmercy.edu

**OFFICE HOURS:** Tuesday and Thursday 02.00-3.00 pm. Or contact me to schedule an appointment.

**LECTURE:** TR 3.30-4.45 PM, Room E223.

**COURSE OBJECTIVE:** To introduce the concepts, techniques, standards, and methods of symmetric and public key encryption, digital signatures, and authentication, and their applications to computer and network security

**COURSE OUTCOMES:** Upon completion of the course, students will be able to:

1. Understand and apply Block and Stream Ciphers, and Public Key Cryptology techniques to ensure the secrecy of information (a, b, i, j).
2. Use Message Authentication and Digital Signatures (a, b, i, j)
3. Employ algorithms, protocols, and techniques to secure web, wireless networks, Email, and Internet Protocol (a, b, i, j).
4. Understand the professional, ethical, legal, security, and social issues and responsibilities of computer and network security (e).
5. Present their projects both orally and in writing (f).
6. Work in teams and lead teams (d).
7. Carry out independent learning through literature and standards search (h)

8. Understand the local and global impact of computer and network security on individuals, organizations, and society (g).
9. Use Cryptographic software tools (i)

**COMPUTER USAGE**: Students will use JCrypTool, which can be downloaded from https://www.cryptool.org/en/.


**Schedule (**Subject to Change**):**

- Overview (Week 1)
- Classical Encryption Techniques (Week 1)
- Block Ciphers and the Data Encryption Standard (Week 2)
- Basic Concepts in Number Theory (Week 2)
- Advanced Encryption Standard (Week 3)
- Block Cipher Operation (Week 3)
- Pseudorandom Number Generation (Week 4)
- More on Number Theory (Week 4)
- Public Key Cryptology (Week 5)
- Other Public Key Cryptosystem (Week 5)
- Cryptographic Hash Functions (Week 6)
- Message Authentication Codes (Week 6)
- Digital Signature (Week 7)
- Key Management and Distribution (Week 7)
- User Authentication Protocols (Week 8)
- Transport Level Security (Week 8)
- Wireless Security (Week 9)
- Electronic Mail Security (Week 9)
- IP Security (Week 10)
- Exam, Term paper Presentations, Term Project Presentation/Discussion Weeks 11-14). See details below.


**COURSE ASSIGNMENTS:**

Term papers and projects will be presented by students. The dates and times for the presentations will be finalized by week 9 of the term.

| Assignment | Topic Covered | Assign Date | Collect Date |
|---|---|---|---|
| Term Paper | Autonomous Vehicle Security | 01/10/2017 | 03/02/2017 |
| Term Project | Application of Cryptography to E-Visit Systems | 01/10/2017 | 03/30/2017 |

- *Students may suggest other projects subject to instructor approval*

- *Journal and conference papers used in preparing the Research Paper must be approved by the instructor by **01/19***
- *Project Plan and Paper Plan need be submitted on **01/26**.*

**GRADING**:

| | |
|---|---|
| Term Paper | 20% |
| Term Project | 50% |
| Exam | 30% |

**EXAM SCHEDULE:**
**(TENTITATIVE)**

*Exam*: **Tuesday, March 28, 3.30-4.30 pm**.
(All covered chapters + notes + handouts + papers + tools)
*Paper Presentation*: **March 23, 30**
*Term Project Presentation*: **April 4, 6,11, 13, 18, 20**

**GRADING SCALE:**

A 95-100, A- 90-94, B+ 85-89, B 80-84, B- 75-79,
C+ 70-74, C 65-69, C- 60-64, D+ 55-59, D 50-54

**IMPORTANT DATES**:

| | |
|---|---|
| January 15 | Last Day to Add a Class |
| January 15 | Last Day to drop a Class without a "W" |
| January 16 | Martin Luther King Jr. Holiday (No Classes) |
| February 01 | Mid-Term Grades Due |
| March   06-11 | Spring break |
| March   13 | Advising for Fall Term Begins |
| March   20 | Registration for Fall Term Begins |
| March   30 | Last Day to Withdraw from Class |
| April    14-16 | Easter Recess (university Closed) |
| April    25-29 | Final Exam Week |

**ATTENDANCE/PARTICIPATION**

Students are expected to attend class on a regular basis and participate in the discussions. They are responsible for all the material presented therein.  Formal attendance records will not be maintained; however, attendance is highly correlated with performance on the projects and the exams.

The instructor will attempt to make reasonable accommodations for students who miss a class due to illness, death in the family, or other legitimate reasons.  However, students who are forced to miss several classes will have difficulty completing the course in a satisfactory manner.  Make Up exams will only be given to students who miss an exam for legitimate reason (as defined above) and who notify the instructor in advance.

## CLASSROOM DECORUM

- Students are not allowed to talk to their classmates at any time unless permitted by the instructor.
- Cell phones are not allowed to be used and should be put away.  They should be on silent mode.
- Computers can only be used to follow the PowerPoint slides of the class.  Students can use their computers for other purposes when allowed by the instructor.
- Under normal road and weather conditions, students are allowed into the classroom no more than 5 minutes after the class starts.

## CLASS CANCELATION

If a class is cancelled, students will be informed the day before or early morning of the day of the class. This applies to any other important messages.

## ASSIGNMENT DEADLINES

Enough time has been allocated for both the term papers and projects to be completed.  If students follow instructions, they should be able to complete the assignments 1-2 weeks before the deadlines.  Late papers and projects will not receive full credit.  Unless otherwise specified, papers turned in late may lose as much as 10 points, and projects turned in late may lose as much as 20 points.  Papers /projects may not be accepted at all if submitted a week after the deadline.

## PROJECT/PAPER GROUP FORMATION

Students can form their own teams for both the group paper and project.  The instructor specifies the size of the groups.  The instructor may make some changes to the groups if needed.

## STUDENTS WITH DISABILITIES

If you need an accommodation because of a disability, have emergency medical information to share, or if you need special arrangements in case the building must be evacuated, please contact:

> Emilie Wetherington, Director
> Disability Support Services.
> McNichols Campus Library, Room 328
> Email: gallegem@udmercy.edu
> Phone:  313-993-1158

It is very important for students to be proactive with regard to requesting their disability accommodations every semester. Students are encouraged to have open communication with their professors. However, it is a personal choice and never a requirement for

students to disclose their disabilities to anyone except the Director of Disability Support Services, and only if they wish to request accommodations. You must be registered with Disability Support Services and your faculty must receive official notification from the DSS office before they can make arrangements for your accommodations.

## IMPORTANT LINKS

UDM Mission:
http://www.udmercy.edu/mission/mission-vision/index.htm

Engineering and Science College Mission:
http://www.udmercy.edu/catalog/undergraduate2015-2016/colleges/eng-sci/

Student Handbook:
http://www.udmercy.edu/slo/office/handbook/index.htm

Academic Integrity:
http://www.udmercy.edu/catalog/graduate2016-2017/colleges/eng-sci/index.htm


## TITLE IX PROTECTIONS

The University of Detroit Mercy is committed to promoting an environment which supports its educational mission and Jesuit and Mercy traditions. In addition, the University seeks to create a climate which preserves the safety and dignity of its members. In particular, the University views, with the utmost seriousness, offenses against an individual such as stalking, sexual harassment, inappropriate sexual touching, sexual assault and any other form of non-consensual sexual activity.  The University experience includes learning to make wise choices. The decision-making process can be a challenge and an opportunity for students, faculty and staff. At the University of Detroit Mercy, choices are framed by an ethical and moral commitment to honesty, to the dignity of the individual and to responsibility to others.

**STATEMENT**:  This is a tentative syllabus. Syllabus is subject to change.