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Computer Security Courses/Programs
Developed at
Metropolitan State University

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Outline

- The Department in a Nutshell
- Computer Security Courses
- Computer Forensics Program
- Current Challenges
- Future Plan
- Q and A
Background

Metropolitan State University

- University is one of seven state universities within the Minnesota State Colleges and Universities System (MnSCU)
- University has five colleges:
  - College of Arts and Sciences
  - Colleges of Management (IA)
  - College of Professional Studies
  - College of Nursing and Health Sciences
  - First College
- Department of Information and Computer Sciences is under College of Arts and Sciences
Three baccalaureate programs

- **Computer Information Systems**
  - Focusing on Web-based application development
  - Three-semester Java programming
  - Two-semester script programming (JavaScript and PHP)

- **Computer Science**
  - A traditional CS program based on Java/C/C++

- **Computer Forensics**
  - A newly developed program (will be discussed later)

**A Master’s program in computer science**

- Focusing on distributed systems and computer security
ICS Department: Students

Students:

- Computer Information Systems (270 / FY 2005)
- Computer Science (243 / FY 2005)
- Computer Forensics (133 / May 2008)
- Master’s Science in Computer Science (50 / May 2008)
Faculty

- 7 Resident Faculty (full time)
  - 5 with a Ph.D. in Computer Science (3 taught computer security courses)
  - 2 with an MBA
  - 1 with a law degree
  - 1 with a CISSP

- 21 Community Faculty (part time)
  - 5 with a Ph.D.
  - 4 with a CISSP
  - 1 with a law degree
ICS Department: Facility

- Graduate student research lab
- Two SUN Solaris 9 servers and 24 workstations
- Two Linux servers (Redhat and SUSE)
- Two Microsoft servers
- Oracle server
- MS SQL server
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Computer Security Courses

Four Computer Security Related Courses:

- **Undergraduate**
  - ICS 382 Computer Security

- **Graduate**
  - ICS 682 Cryptography and Computer Security
  - ICS 684 Cyberspace Security Engineering
  - ICS 686 Software Design of Information Assurance Systems
  - ICS 690 Special Topics in Computer Science
    - ICS 690 Forensic Computing (Summer 2007)
    - ICS 690 Enterprise System Protection (Summer 2008)
ICS 382 Computer Security

Course description:
This is an introductory course in computer security that will provide students with an understanding of the issues corporate security officers face every day. It will cover the “information warfare” that exists in the corporate environment today and what measures are taken to reduce the risk of attack and exposure.

Prerequisites:
- ICS 240 Elementary Data Structures or
- CFS 280 Introduction to Computer Forensics

Textbook:


The Craft of System Security by Sean Smith and John Marchesini, Addison Wesley, 2008 (to be used in fall 2008)
ICS 682 Cryptography and Computer Security

- **Course description:**
  This course will discuss a broad range of computer security issues. Students will study the design and use of cryptographic systems and analyze cryptanalytic attacks. A history of cryptographic systems and the mathematics behind them will be covered as well. Students will also learn the organizational procedures, processes and techniques that organizations use to proactively protect their infrastructure and reactively act upon threats and attacks. Each of the steps of deter, prevent, detect, recover and pursue a security incident is carefully examined.

- **Prerequisites:**
  - ICS 440 Sequential and Parallel Algorithms
  - ICS 460 Computer Networks

- **Textbook:**
ICS 684 Cyberspace Security Engineering

- **Course description:**
  
  This course includes the following topics: principles of secure network communications, techniques of authentication and identification, cryptographic key distribution and management, assurances of data integrity, access control, security policy; performance of implementation to policy. Particular system structures, protocols, utilities, and various commercial standards are also introduced in class.

- **Prerequisites:**
  
  - ICS 682 Cryptography and Computer Security or instructor’s consent

- **Textbook:**

ICS 686 Software Design of Information Assurance Systems

☐ Course description:

This course is an integrated course emphasizing the design, analysis, and implementation of software information assurance system solutions by analyzing the current information infrastructures, software design, and applying software development, programming, testing, and engineering concepts.

☐ Prerequisites:

- Graduate Standing

☐ Textbook:

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Computer Forensics Program

Bachelor of Applied Science (BAS) in Computer Forensics

- A newly approved four-year degree program (fall 2005)
- Total 124 credits
  - 63 major credits
  - 48 general education credits
  - 13 elective credits
- Offered by Department of Information and Computer Sciences
- The program was started fall 2005
Computer Forensics Program

Admission Requirements

- Admitted to the university:
  - A completed undergraduate admission form
  - A $20 non-refundable application fee
    - The application fee is waived for Metropolitan State graduates
  - All official transcripts sent from all institutions enrolled previously to Metropolitan State University
  - Other required forms
  - Website: http://www.metrostate.edu/admissions/
Admitted to the major (department):

- Admitted to the university
- Completed at least 60 credits of undergraduate study where
  - General education credits: 16 to 30 credits
  - Major credits: 30 to 44 credits that include:
    - 4 courses in computer science and information technology
    - 2 courses in criminal justice and law enforcement
    - 1 course in political science
    - 1 in mathematics (college algebra or above)
- An average GPA of 2.5 or higher on the following three courses, CFS 262, CFS 264, and CJS 210, or their equivalents.
First Two-Year Requirements (29 or 30 major credits in addition to 30 GE credits):

- **Computer Science and Technology** (16 credits)
  - CFS 262 Computer and Operating System Fundamentals I (4)
  - CFS 264 Computer and Operating System Fundamentals II (4)
  - CFS 280 Introduction to Computer Forensics (4)
  - ICS 140 Programming Fundamentals (4)

- **Criminal Justice and Law Enforcement** (6 credits)
  - CJS 210 Constitutional Law (3)
  - One of the following courses:
    - CJS 101 Introduction to Criminal Justice (3)
    - CJS 200 Literature and Methods in Criminal Justice (3)
    - LAWE 220 Legal Issues in Law Enforcement (3)

- **Mathematics and Political Science** (7 or 8 credits)
  - One of the following courses:
    - Math 210 Calculus I (4)
    - STAT 201 Statistics (4)
  - One of the following courses:
    - POL 101 Introduction to American Government and Politics (3)
    - POL 301 Citizenship in a Global Context (4)
Computer Forensics Program

Major requirements (34 major credits)

- **Core courses (23 credits)**
  - CFS 380 Digital Evidence Analysis (4)
  - CFS 499 Computer Forensics Internship/Capstone (3)
  - ICS 382 Computer Security (4)
  - ICS 461 Data and Voice Communication (4)
  - LAWE 325 Criminal Procedure and Investigations (4)
  - POL 331 Law and the Legal Process (4)

- **Electives (11 credits)**
  - *Group I* Criminal Justice (one of the following)
    - CJS 320 Applied Criminology (3)
    - CJS 367 Introduction to Forensic Science (3)
    - CJS 387 White Collar Crime (3)
  - *Group II* Law (one of the following)
    - BLAW 310 Business Law: UCC and Contracts (4)
    - ICS/CFS 484 Computer Law (4)
    - POL 333 Constitutional Law (4)
  - *Group III* Ethics (one of the following)
    - CJS/375/PHIL 325 Criminal Justice Ethics (4)
    - PHIL 327 Ethics in the Information Age (4)
    - PSYC 319 Technology on Human and Org. Behavior (4)

*Note: more elective options may be available each semester. Please consult your advisor before registration.*
Computer Forensics Program

Faculty (for teaching CFS and ICS courses only)

- Full time
  - 2 with a Ph. D. in Computer Science
  - 1 with a law degree
- Part time:
  - 1 Retired FBI agent
  - 1 BCA special agent
  - 2 CEOs of Computer Forensics Companies
  - 2 Computer Security Specialists
  - 1 System administrator
  - 1 Lawyer
Students

- 133 students currently enrolled
  - 70 % are new to Metropolitan State University
  - 30 % are women
  - 36 % are from either IT or CIS/CS
  - 21 % are from a liberal art major
  - 21 % are from either a criminal justice or a law enforcement major
  - 10 % are from a business major

- 9 students have graduated since spring 2007
  - 4 with an internship
  - 3 are women
Computer Forensics Program

Funding

- Center for Strategic Information Technology and Security
  - One of four technology centers funded by the state in Dec. 2006
  - lead by Metropolitan State with partnership from Minneapolis Community and Technical College and Inver Hills Community College
  - Each center receives $2.5 million from the state for the first two years
  - MnSCU has a matching fund to support each center for additional two years

- Support received the Center
  - FY 2007: $126,000 for setting up the CF lab
  - FY 2008: $50,000 for running the CFS program
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Current Challenges

- Enrollment
- Curriculum updates
- Faculty training
- Internship opportunities
- Advising
- Funding
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Future Plan

- A required course in computer security for CS and CIS majors
- Add 3 to 5 modules into CS and CIS curricula
- Faculty training: at least 8-hour training in computer security per year
- Funding: looking for more opportunities and collaborations
- Student recruitment: better resources for students
- Certification options for the majors, such as CISSP
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