New Course Proposal

Network Security

1. What is the nature of the proposed course?

1.1. What is the overall nature of the course briefly stated?

The objective of this course is to provide undergraduate students with an introduction to network security. Specifically, students will gain mastery of some fundamentals of cryptography and some protocols for security services. They will gain familiarity with network security threats and countermeasures, network security designs using available secure solutions, and advanced security issues and technologies. Finally, they will be exposed to original research in network security and to the importance of integrating people, processes and technology

1.2. What is the scope of the course in terms of expected changes to the current CIS curriculum?

Currently, no CIS networking courses includes security topics in their syllabuses, although some instructors (of CIS677, CIS679 and CIS788) mention security issues. The treatment of security in CIS systems courses is also rudimentary (CIS 760 for example sometimes include a lecture on access matrix model of resource protection). Hence, there is no need to change any other courses in the CIS curriculum.

1.3. What existing CIS courses or courses are related to the proposed course by similarity, prerequisites, etc.?

CIS 677 is the intended prerequisite for this course.

1.4. What other departments will be concerned with the proposed course and how?

Students from the EE department will benefit from such a course.

2. What problems does the proposed course solve and/or create?

2.1. Why is there a need for this course?

Given the relative importance of understanding security as a first order constraint in system design and maintenance, there is a need for dedicated courses in the subject. Dedicated courses are also essential (a) for training students to participate in cutting-edge security research and (b) for certifying CIS as complying with national standards in security education.

Network security is increasing being viewed as critical to our society, our economy, and our government. There is substantial demand -in industry, in government, and in academia- for students skilled in network security but the supply remains very low.

2.2. **What could not be accomplished if this course were not created?**

The status quo, where our students learn about security in the hard (and ad hoc) way, on the job, would continue. Local and national demand for CIS to produce IT professionals who can appreciate and address security would not be met. Also, our students would be less competitive in the job market, compared with those from universities which do provide such courses.

Moreover, CIS would not be able to build the groundwork for participating in the urgent task of helping secure critical national computer networks.

2.3. **Who is demanding the course or the product of the course?**

Students who have taken networking courses. Local and national industry. Local and national governmental organizations.

2.4. Who is the intended/expected audience for the course?

Fourth year undergraduate students, and graduate students.

2.5. How many students would be involved in the course?

40 per year.

2.6. How is the course related to national movements or trends?

The course is in very timely response to national demand for security professionals. Many universities are starting security programs/specializations in computing departments.

2.7. How is the course related to the GRE advanced test in CS?

No relationship.

3. What is the proposed course's detailed structure?

3.1. What draft sample course descriptions (objectives, prerequisites, syllabi, texts, grading schemes, ...) are available?

See attached.

3.2. What draft sample homework problems, lab assignments, and exam questions are available?

See attached.

3.3. What is the history and previous experience with this course (pilot sections, other universities,...)?

- Experience with the multiple offerings of 694G (Distributed Systems Security)
- Other universities, e.g. GaTech, UCDavis, & Colorado, are providing a similar course.

4. What resources are needed to implement and conduct the course?

4.1. What faculty are available/will be required to teach the course?

Anish Arora and Dong Xuan are interested and able to teach the course.
Steve Lai and Ken Supowit may be interested.

4.2. What computer resources (hardware, software, staff time, etc.) will be required to implement this course? What's the initial, one-time cost and what is the yearly maintenance, upgrade, replacement cost?

Current CIS infrastructure will be used. Some laboratory equipment such as firewalls will be needed. We expect to solicit contributions from our industrial partners towards acquiring of lab equipment.

4.3. What other materials or resources will be required to implement this course?

None.

4.4. What kind of grading or lab assistant support will this course need?

Labs and exercises are a major portion of the course, so we expect 10 hr/wk grader support.

5. How will the course be implemented?

5.1. If applicable, how will the course's curriculum be phased in?

This course is in the networking pipeline, in follow-up to CIS 677 and complementary to other networking courses. No changes to the other courses are applicable.

5.2. What are the "fall-back" positions if the changes cannot be completed as originally planned?

Not applicable.

6. How will "success" of the course be gauged?

6.1. What are the criteria to be evaluated?

We will use the student evaluations and the enrollment to judge its success.

6.2. What provisions are there to conduct the evaluation?

Standard SETS will be used to evaluate the course, along with a mid-term to examine comprehension of the material. We will also hand out a survey asking for additional feedback on the course material.