Proposal

Graduate Certificate in Cybersecurity
Department of Computer Science
College of Charleston

Credit Hours: 12 (4 courses)

Rationale:
The College of Charleston and The Citadel began offering a specialization in cybersecurity as part of its joint CofC/Citadel MS in Computer and Information Sciences program in Fall 2013. The computer science department recognizes an immediate need for cybersecurity workforce development in the Lowcountry. To serve this need, we propose to offer a twelve (12) credit-hour, graduate certificate program in cybersecurity jointly with The Citadel. (This same proposal is being made at the Citadel.)

The certificate program will attract people in the local workforce who already hold a Bachelor’s, Master’s or Ph.D. degree in computing, who now see a need for further education in the area of cybersecurity.

Students enrolled in our MS program may opt to complete the certificate in addition to their chosen specialization.

Overview of the Certificate
The graduate certificate in cybersecurity is designed to provide its students with the knowledge, skills, and abilities associated with cybersecurity. The Certificate is composed of four courses and completion of any prerequisites required of those courses.

CSIS 614 Advanced Operating Systems (requires an undergrad course in OS or completion of CSIS 604)
CSIS 631 Privacy and Security Issues
CSIS 632 Data Communications and Network
CSIS 641 Advanced Cybersecurity (requires CSIS 631)

Learning Outcomes
Students completing the graduate certificate program in cybersecurity will attain an ability to:
1. Describe basic components of cybersecurity
2. Characterize the security profile of different types of networks
3. Analyze and use classical and public key cryptography algorithms
4. Secure a system from different kinds of attacks
5. Analyze security and perform risk assessment of a cybersystem
6. Discuss legal and ethical issues relating to cybersecurity

Admission Requirements
1. A completed application form – certificate admission status.
2. Official copy of transcripts from each institution of higher learning attended, including documentation of graduation from an accredited four-year institution.
3. Scores from Graduate Record Examination (GRE) with a minimum combined score of 300 on the verbal and quantitative sections of the general test (minimum of 1000 under the old grading system) and a minimum score of 4.0 on the writing assessment. The GRE must be current within five years of the application for admission to the program.

Last update: December 5, 2013
4. International students must demonstrate proficiency in the English language and fulfill other admissions requirements as set forth by the policies of The Graduate School of the College of Charleston.
5. Coursework or work experience in computer science and mathematics satisfying the core competencies of basic computer architecture, object-oriented programming, discrete mathematics, and data structures.
6. Completion of an undergraduate course in operating systems or CSIS 604.
7. Approval from the Program Director or Department Head before registering for any graduate Computer Science (CSCI) courses.

Curriculum and Course Descriptions Curriculum
Students enrolled in the graduate certificate in cybersecurity must complete the following four courses:

**CSIS 614 Advanced Operating Systems** Three Credit Hours
*Prerequisite: CSIS 604 or an undergraduate course in operating systems.*
This course covers a broad range of advanced operating systems concepts including protection, security, memory management, kernels, file systems, synchronization, naming, networks, and distributed systems as well as recent trends in operating systems design. Specific aspects of operating systems which support distributed computing will be emphasized.

**CSIS 631 Privacy and Security Issues** Three Credit Hours
A survey of the principles and practices related to computer security. The course concentrates on the problems of security associated with computer systems and emphasizes the application of cryptography to address those problems.

**CSIS 632 Data Communications and Networking** Three Credit Hours
An introduction to data communications and computer networking. Topics include LAN topologies, transmission media, error detection, packet switching networks, internetworking of heterogeneous network technologies, Internet protocol suites (with emphasis on TCP/IP), the client/server paradigm, the BSD socket interface, network security, and network applications.

**CSIS 641 Advanced Cybersecurity** Three Credit Hours
*Prerequisite: CSIS 631.*
This course will cover the techniques used to secure cybersystems. Topics covered will include security policies, computer security management and risk assessment, secured network protocols, software security issues, ethical and legal aspects of cybersecurity, and disaster recovery. Special emphasis will be given to designing, deploying, and managing complete secured cybersystems.

**Resources Required**
All of the required courses are already in place and being taught as part of the MS in CSIS program. No additional resource requirements anticipated.

*Last update: December 5, 2013*
GRADUATE CERTIFICATE PROGRAM APPROVAL

The proposal for a new certificate program in Cybersecurity in the Graduate School of the College of Charleston has been reviewed and approved by the following groups or individuals:

1. Graduate Program Director: MS in Computer and Information Sciences
   
   [Signature]
   
   Date 11-7-2013

2. Chair, Department of Computer Science
   
   [Signature]
   
   Date 12/6/13

3. Dean, School of Sciences & Mathematics
   
   [Signature]
   
   Date 12/6/13

4. Provost Review:
   
   [Signature]
   
   Date 12/30/13

5. Budget Review: 
   Date

6. Faculty Committee on Graduate and Continuing Education:
   
   [Signature]
   
   Date

7. Graduate Council:
   
   [Signature]
   
   Date

8. Faculty Senate:
   
   [Signature]
   
   Date

Graduate School Office – 08/0