September 29, 2015

Dr. Hugh Ruppersburg
Senior Associate Dean
Franklin College of Arts & Sciences
300 Old College

Subject: Proposal for Graduate Certificate in Cybersecurity

Dear Associate Dean Ruppersburg:

The Department of Computer Science fully supports the proposal for an interdisciplinary Graduate Certificate in Cybersecurity. The departmental vote by faculty on September 25, 2015 was unanimous in support of the proposal. The proposal also has my full support.

This certificate program would be useful for students from a variety of disciplines; in particular, computer and mathematical sciences, and engineering. The certificate program aims to develop expertise in various aspects of computer security and privacy, such as networking, operating systems, network and systems security, and data and communications privacy.

We believe that this program is timely and will have a very positive impact on security in the state of Georgia and on its economy by having a skillful workforce in this area of expertise.

Thank you for your consideration.

Best regards,

Thiab Taha
Professor and Head

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**OUTLINE FOR AN
INTERDISCPLINARY CERTIFICATE PROGRAM**

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I.   Basic Information

1. Institution: University of Georgia   Date: September 28, 2015

2. School/College: Franklin College of Arts and Sciences

3. Department/Division: Department of Computer Science

4. Certificate Title (as it will appear in the *Bulletin*): Cybersecurity

5. Level (undergraduate or graduate): Graduate

6. Proposed starting date for program: Fall 2016

7. Abstract of the Certificate Program (for the University Council's agenda):

> Purpose: The Computer Science Department is proposing the following new graduate certificate program in Cybersecurity. This certificate would be useful for graduate students in Computer, Mathematical Sciences, and Engineering who aim to become experts in the growing field of Computer Security and Privacy.

> Eligibility: Admission is open to Graduate Students in Computer Science, Engineering, and Mathematical Sciences.

> Curriculum: the Graduate Certificate Program in Cybersecurity requires 20 hours of coursework with 12-hours of core courses and 8 hours of electives (bold font is used to indicate new courses).

> Core Courses (12 hours):
> CSCI 6760 - Computer Networks
> CSCI 6730 - Operating Systems
> CSCI 6250 - Computer Security

> Electives (8 hours):
> CSCI 6050 Software Engineering
> **CSCI 6260 Data and Communications Privacy**
> CSCI 6370 Database Management
> CSCI 6570 Compilers
> CSCI 6720 Computer Systems Architecture
> CSCI 6780 Distributed Computing Systems

Electives continued:
CSCI 8060 Advanced Software Engineering
CSCI 8240 Software Security and Cyber Forensics
CSCI 8250 Advanced Network and Security Systems
CSCI 8260 Computer Network Attacks and Defenses
CSCI 8730 Advanced Operating Systems

8. Letters of support with signatures: See attached letter.

II.   Response to the Criteria for All Programs

1. Purpose and educational objectives

A) Purpose and objectives: The Computer Science Department is proposing a new graduate certificate program in Cybersecurity. This certificate program would be useful for students from a variety of disciplines; in particular, computer and mathematical sciences, and engineering. The certificate program aims to develop expertise in various aspects of computer security and privacy, such as networking, operating systems, network and systems security, and data and communications privacy. The need for expertise in the broad field of Cybersecurity has grown tremendously in recent years. The Forbes Magazine reports "Some estimate that between $9 and $21 trillion of global economic value creation could be at risk if companies and governments are unable to successfully combat cyber threats" (http://www.forbes.com/sites/frontline/2015/07/13/why-cybersecurity-leadership-must-start-at-the-top/). The proposed certificate program is intended to help provide a well-trained working force to meet the increasing demand for cybersecurity experts in the modern economy.

B) Interdisciplinary nature: This certificate program is open to students in Computer Science, Mathematical Sciences and Engineering.

2. There must be a demonstrated and well-documented need for the program:

A) Why this certificate program is necessary: Students majoring in several disciplines would benefit from the proposed certificate program as new courses will be designed and existing courses will be restructured to include material that will support the certificate program. This is very consistent with the "*USG Cyber Security Initiative that will focus all of the cyber education and training resources across USG in order to meet the needs of the U.S. Army Cyber Command, the National Security Agency, the financial transaction processing industry and the health informatics/electronic medical records industry. The initiative aims to create a cyber security workforce of sufficient scale, quality, and capability to meet the needs of Georgia companies, military installations, government agencies and other institutions.*" For more information please refer to: http://gov.georgia.gov/press-releases/2014-12-10/deal-state-acts-high-demand-career-initiative-report. Also note the report from ISACA: "*Cybersecurity skills are in high demand, as threats continue to plague enterprises*

around the world. An overwhelming majority of students surveyed by ISACA recognizes this and plans to work in a position that requires cybersecurity knowledge. However, one in five report that their universities do not offer cybersecurity courses and less than half feel they will have the adequate skills and knowledge when they graduate" (http://www.isaca.org/cyber/pages/cybersecurity-fundamentals-certificate/aspx).

B) Describe the expected stage of development:
1. Semester/Year of Program Initiation: Fall 2016
2. Semester/Year Full Implementation of Program: Fall 2016
3. Semester/Year First Certificates will be awarded: Spring 2017
4. Annual Number of Graduates expected (once the program is established): 30
5. Projected Future Trends for number of students enrolled in the program: Expect continued growth.

3. Evidence of student demand for program sufficient to sustain reasonable enrollments:

A) Student interest in the program: In the Department of Computer Science (with over 150 graduate students), the current courses related to the certificate program have experienced increasing enrollments. Nationally, a large number of universities have started programs in Cyber-Security. At a national level, Cyber-Security programs are experiencing an undiminished and sustained upward trend.

B) Diversity: The certificate program is expected to have diversity composition similar to those in the degree programs it draws from. Advertising and outreach to minorities will be included.

4. Design and curriculum of the program:

A) Detailed Curriculum:

Eligibility: Admission is open to graduate students across the university, but is specifically targeted towards graduate students in Computer Science, and related mathematical, and engineering disciplines.

B) Model Programs and Curricula: Georgia Tech: https://pe.gatech.edu/certificates/cyber-security-certificate. This certificate has only one core course and the rest are electives. Our proposed certificate program has 3 core courses.

University of Maryland University College: http://www.umuc.edu/cybersecurity/academics/certificates.cfm This is an online certificate.

There are a number of other universities offering graduate certificates in Cybersecurity as well as full degree programs at the Masters and Doctoral levels.

C) Program Accreditation: The undergraduate Computer Science Degree program is ABET accredit.

5. Faculty resources

   A) Full-time faculty: The current full-time faculty within the Department of Computer Science are sufficient to initiate the proposed certificate program. A good fraction of the department's faculty have taught the required or the elective courses for the certificate.

   B) List of involved faculty:

      - Hamid Arabnia, Professor, PhD, University of Kent, U.K.
      - Ismailcem Budak Arpinar, Associate Professor, PhD, Middle East Technical University, Turkey
      - Brad Barnes, Lecturer, Ph.D., The University of Georgia
      - Suchi Bhandarkar, Professor, Ph.D, Syracuse University
      - Daniel M. Everett, Assistant Professor, Ph.D., University of Wisconsin
      - Maria Hybinette, Associate Professor, Ph.D, Georgia Institute of Technology
      - Krzysztof J. Kochut, Professor, Ph.D., Louisiana State University
      - Kyu Hyung Lee, Assistant Professor, Ph.D., Purdue University
      - Kang Li, Professor, Ph.D., Oregon Graduate Institute
      - John A. Miller, Professor, Ph.D., Georgia Institute of Technology
      - Roberto Perdisci, Associate Professor, Ph.D. University of Cagliari, Italy
      - Lakshmish Ramaswamy, Associate Professor, Ph.D., Georgia Institute of Technology
      - Thiab Taha, Professor and Head, Ph.D., Clarkson University

      Note: More detailed information about the listed Faculty above can be found at: http://www.cs.uga.edu/directory/front

   C) Additional faculty: The department was authorized in August 2015 to hire a Tenure-track Assistant Professor in Data and Communications Privacy as part of the President's Informatics Hiring Initiative. The new hire will start in August 2016 and will teach courses relevant to this certificate.

6. Resources needed to support the program:

   A) Library resources: There is no need for additional library resources.

   B) Equipment: There is no need for additional equipment.

7. Physical facilities: There is no need for additional physical facilities.

8. Expense to the institution:

    A) Funding to initiate the program (first three years): No amount of funding is needed for Years 1-3.

    B) Support for students: As a graduate certificate program, a large number of students will likely have either research or teaching assistantships. Also, students in the certificate program would be well positioned for internships.

9. Commitments of financial support:

    A) Sources of additional funds: Current funding through the Department of Computer Science will be sufficient to initiate and maintain the certificate program.

    B) Long-range plans: The Department was authorized in August 2015 to hire a Tenure-track Assistant Professor in Data and Communications Privacy as part of the President's Informatics Hiring Initiative. This new hire will teach courses relevant to this certificate.

10. Administration of the program:

    The proposed graduate certificate in Cybersecurity will be administered by the Graduate Coordinator of the Computer Science Department. The administrator in conjunction with the Department Head will be responsible for coordinating course offerings, maintaining student records, promoting activities, securing additional funding, and consulting with the department's graduate program and curriculum committee regarding courses in the certificate program. The semester before completing the certificate, students will be required to fill out a certificate completion form. The graduate certificate will be awarded to the student upon the completion of her/his graduate degree.