

# Information Assurance Education in Two and Four-Year Institutions

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## ABSTRACT

We propose a working group to build on the work of the 2009 and 2010 working groups on information assurance (IA) education. The focus of the 2011 working group is the examination of the educational missions and curricula of two and four-year institutions with respect to IA education. More specifically, this working group will define and describe the distinct and complementary missions of two and four-year institutions with respect to IA education, describe the differences and similarities of the educational programs at two and four-year institutions, and document the challenges and opportunities for IA course articulation between two and four-year institutions.

## Categories and Subject Descriptors

K.3.2 [Computers and Education]: Computer and Information Science Education - Curriculum

## General Terms

Security, Standardization.

## Keywords

Information Assurance, Information Security, Curriculum.

## 1. INTRODUCTION

In the Cyberspace Policy Review [1], the report to President Obama, Melissa Hathaway presents a call to arms to address the nation's vulnerabilities with respect to information assurance. In response to this review, several US government agencies have

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dramatically increased their efforts in IA education development and the US Congress is currently considering legislative action to significantly increase the funding available for IA education. IA educational programs are now being created and reinvigorated at two-year community colleges, four-year colleges and universities, and four-year research intensive universities. Recently, the US National Security Agency (NSA) created a new IA Center for Academic Excellence – Two Year (CAE-2Y) designation specifically for two-year community colleges excelling in IA education [2]. In just one year, six community colleges have applied for and received this designation. Two-year colleges now represent over five percent of the institutions that have received a CAE designation from the NSA. It is expected that many more community colleges will receive the CAE designation this year.

## 2. RESULTS FROM THE 2009 AND 2010 IA WORKING GROUPS

At ITiCSE 2009, fifteen faculty, researchers, and government officials from Australia, Sweden, the UK and the US got together to review the current state of IA education throughout the world. The working group looked at three aspects of IA: 1) a history of IA education efforts, 2) current academic, government and industry guidelines, standards, and recommendations with respect to IA and computing education, and 3) how the quality of IA programs might be assessed. The group also suggested themes for future work, and this working group proposal is a direct result of some of these recommendations. The complete working group report is available from [3]. This report has generated considerable interest from the international IA community. The group's efforts have been presented at the NSA annual IASP CAE PI meeting as well as at the NSF SFS PI meeting [5].

At ITiCSE 2010, ten faculty, researchers and government officials from Sweden, Turkey, the UK and the US met to The ultimate goal of this project is to develop a model of curricular guidelines

for IA education much as Computing Curriculum 2001 [4] helps to define a series of curricular guidelines for undergraduate CS programs. The working group began its effort by conducting a survey of the 123 CAEs, including the recent added CAE-2Y designees, within the US and several dozen IA programs abroad to define the space of IA educational subjects. These results were used to develop a comprehensive description of the body of knowledge used in the many distinct instantiations of IA education. The group then developed a complete curricular model for the subject of Secure Coding that includes a comprehensive list of student learning outcomes and corresponding assessment rubrics. This paper is available in the ITiCSE 2010 conference proceedings. The 2010 working group's efforts have also been presented at the NSA annual IASP CAE PI meeting and the NSF SFS PI meeting.

### 3. THE CURRENT EFFORT

The focus of the 2011 working group is the examination of the educational missions and curricula of two and four-year institutions with respect to IA education. More specifically, this working group will define and describe the distinct and complementary missions of two and four-year institutions with respect to IA education, describe the differences and similarities of the educational programs at two and four-year institutions, and document the challenges and opportunities for IA course articulation between two and four-year institutions. By doing this now, the working group should lay a foundation for cooperation and coordination between two and four-year institutions offering IA degrees.

The first topic this working will address is to define and describe the distinct and complementary missions of two and four-year institutions with respect to IA education. This effort will look at the constituencies served by these institutions and who employs their graduates. The demographics and educational backgrounds of the students served will also be examined. We anticipate that this effort will lead to a better understanding of the educational needs of the employers of IA graduates and will have a significant impact on future curricular reforms.

The second topic this working group will address is to compare and contrast the educational programs offered by two and four-year institutions. The goal here will be to determine the similarities and differences between the curricular structure and course content of various IA educational programs. This effort is expected to determine the relative importance that is placed on training in specific tools versus an emphasis on conceptual knowledge.

The third and final effort of the working group will be to examine the possibilities and challenges for course articulation between community colleges and four-year institutions. Course articulation is always a challenge and it will benefit all institutions if this issue is considered early in the development of IA educational programs. Also, economic considerations are making community colleges more attractive during the first two years even to students who are ultimately pursuing four-year degrees.

As the world moves to produce dramatically more IA professionals in the next decades, it is paramount that two and

four-year institutions cooperate and coordinate their efforts. This working group will lay the foundation for this cooperation. The ACM is also in the process of updating CC2001 and CC2008 and the topic of this working group is of great relevance to that effort.

Prior knowledge expected of participants: Participants should have an interest in, and experience with IA education.

It is anticipated that many of the following leaders in the IA education field will have a vested interest in this effort: John Sands, Moraine Valley Community College (PI CSSIA), Amelia Phillips, Highline Community College, Ken Dewey (Rose State), Ali Abdallah (South Bank, University of London), Matt Bishop (University of California, Davis), Wayne Boone (Precision Security Consulting, Canada), Joel Brynielsson (Royal Institute of Technology), Bill Caelli (Queensland University of Technology), Bill Chu (University of North Carolina at Charlotte), Melissa Dark (Purdue University), Ron Dodge (United States Military Academy), Sy Goodman (Georgia Institute of Technology), Lance Hoffman (George Washington University), Cynthia Irvine (Naval Postgraduate School), Lorie Liebrock (New Mexico Institute of Mining and Technology), Margaret Leary (Northern Virginia Community College), Anton Ljubic (IT Security Learning Center, Canada), Mark Loepker (CNSS Secretariat), Kara Nance (University of Alaska Fairbanks), Charles Pfleeger (Pfleeger Consulting), Rick Raines (Air Force Institute of Technology), Arkady Retik (Microsoft Research), Sujeet Sheno (University of Tulsa), Eugene Spafford (Purdue University), Cory Schou (Idaho State University), Raj Sharman (University at Buffalo), and Susanne Wetzel (Stevens Institute of Technology).

In order to broaden the participants in the working group and to leverage the conference location, a special effort is being made to recruit faculty from Germany's "Universities of Applied Sciences" formerly referred to as Fachhochschule (FH).

### 4. ACKNOWLEDGMENTS

A request for support for attendees has been submitted to NSF. If funded, \$4,000 will be covered for up to 7 working group members who otherwise do not have the ability to attend.

### 5. REFERENCES

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