Workforce Education & Training (WET)

DHS SwA Forum March 1-3, 2011

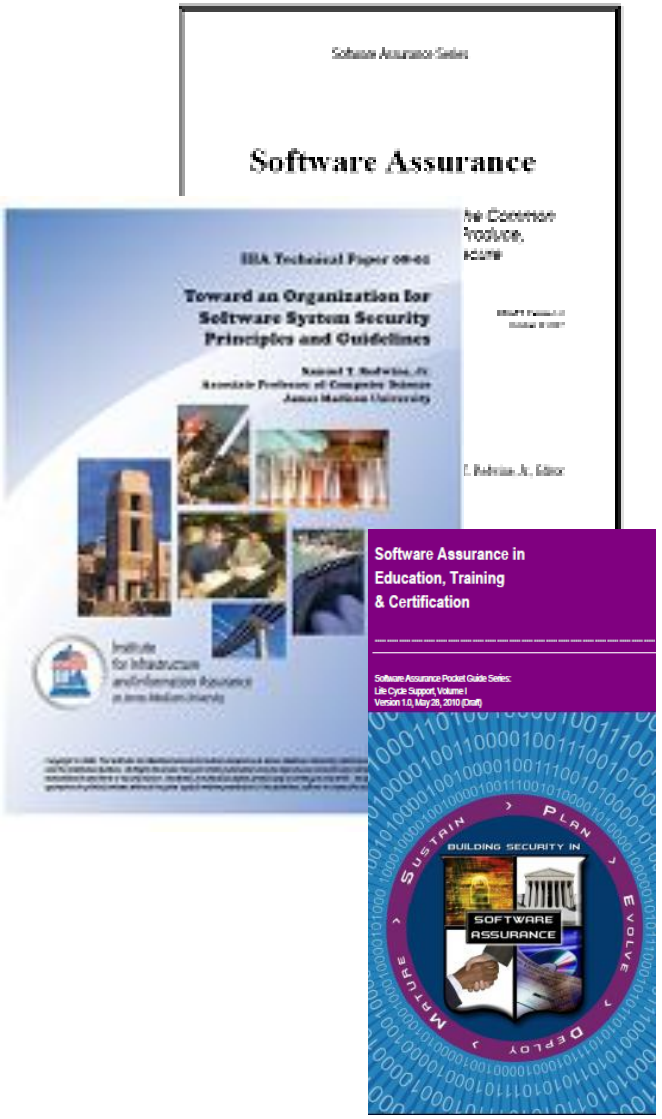
Workforce Education & Training Products

Software Assurance Curriculum Guide to the Common Body of Knowledge

Software System Security Principles and Guidelines

Secure Software Engineering Education (example courses)

Software Assurance In Education, Training & Certification Pocket Guide



Assurance Principles

Principles of software assurance

A set of principles to guide learners in understanding the WHY as well as the WHAT and HOW of software assurance

- Easy to learn
- Easy to remember
- First step for learning software assurance

7 Principles for Software Assurance[1]

1. **RISK**: Perception of risk drives all assurance decisions
2. **INTERACTIONS**: Highly connected systems (e.g. Internet) require alignment of risk across all stakeholders otherwise critical threats will be unaddressed (missed, ignored) at different points in the interactions
3. **TRUSTED DEPENDENCIES**: Your assurance depends on other people's assurance decisions and the level of trust you place on these dependencies
4. **ATTACKER**: There exists a broad community of attackers with growing technology capabilities able to compromise the confidentiality, integrity, and availability of any and all of your technology assets - there are no perfect protections and the attacker profile is constantly changing

7 Principles for Software Assurance[2]

5. **EVERYONE IS INVOLVED**: Assurance requires effective coordination among all technology participants and their governing bodies
6. **DYMANIC**: The threat is always changing. Assurance implementation must represent a balance among governance, construction, and operation and is highly sensitive to changes in each of these areas
7. **MEASURABLE**: A means to measure and audit overall assurance must be built in. If you can't measure it you can't manage it

Curriculum Development

Architectural Structure of an MSwA2010 Degree Program

Preparatory Materials	Computing Foundations Software Engineering Security Engineering
MSwA Core	Assurance Across Life Cycles Risk Management Assurance Assessment Assurance Management System Security Assurance Assured Software Analytics System Operational Assurance
Electives	Courses Related to Assurance in Selected Domains
Capstone Experience	Project

New MSwA Curriculum Materials

The MSwA course syllabi for all nine core courses have been published for external review on the MSwA website: http://www.cert.org/mswa/.

The repository of lecture material on the MSwA site includes

- lectures on security requirements engineering, developed by Nancy Mead at Carnegie Mellon University (CMU)
- course material on secure coding, developed by Robert Seacord at Carnegie Mellon University (CMU)
- course material on secure software management, taught by Dan Shoemaker at the University of Detroit Mercy (UDM)

An SEI technical note on the inclusion of SwA into the Master of Science in Information Systems (MSIS) curricula has been written by Dan Shoemaker, Nancy Mead, and Jeff Ingalsbe (UDM).

Professional Society Recognition

IEEE Recognition

The MSwA curriculum was recognized by the IEEE Computer Society. Its notification follows:

> *At the meeting of the IEEE Computer Society Board of Governors it was passed: MOVED, that the IEEE Computer Society Board of Governors recognizes the SEI CMU/SEI-2010-TR-005 Reference Curriculum as appropriate for a Masters Program in Software Assurance for a period of 5 years beginning in 1 August 2010.*
>
> ***Statement:*** The curriculum recommendation could contain a statement similar to *"The IEEE Computer Society recognizes this curriculum recommendation as appropriate for a Masters Program in Software Assurance,"* signifying that the Society considers it suitable for its stated purpose. If the curriculum recommendation is appropriate as a model for similar efforts, the statement should indicate that designation.

IEEE published an article about its recognition of the MSwA curriculum at http://www.computer.org/portal/web/pressroom/20101213MSWA.

ACM Recognition

The MSwA curriculum was also recognized by the Association for Computing Machinery (ACM) Education Board. This is identical to the IEEE recognition.

LEARNING OBJECTIVES	PRINCIPLES ADDRESSED
Assurance Across Life Cycles	6: Dynamic
Risk Management	1: Risk 2: Interactions 3: Trusted Dependencies
Assurance Assessment	1: Risk 2: Interactions 7: Measurable
Assurance Management	1: Risk 2: Interactions 5: Everyone is involved
System Security Assurance	3: Trusted Dependencies 4: Attacker 6: Dynamic
System Functionality Assurance	3: Trusted Dependencies 4: Attacker 6: Dynamic 7: Measurable
System Operational Assurance	4: Attacker 6: Dynamic

MSwA Publications & Presentations

The MSwA curriculum was selected for inclusion in the 2010 SEI Year in Review publication.

A new paper on the MSwA curriculum has been published: Nancy R. Mead, Julia H. Allen, Mark Ardis, Thomas B. Hilburn, Andrew J. Kornecki, Rick Linger, & James McDonald. “Development of a Master of Software Assurance Reference Curriculum,” *International Journal of Secure Software Engineering 1*(4), 18-34, Oct - Dec 2010.

The STSC proposal for the presentation of SwA Education initiatives by Dan Shoemaker, Mark Ardis, Linda Laird, and Nancy Mead has been accepted.

A proposal for the presentation of SwA Education initiatives at FISSEA was made by Dan Shoemaker, Mark Ardis, Linda Laird, and Nancy Mead. Dan Shoemaker of UDM and Linda Laird of Stevens Institute of Technology will be presenting.

Joe Jarzombek and Nancy Mead share a keynote slot on June 14, 2010 at CISSE.

2011 Educational Outreach

Newly released MSwA syllabi & comment form distribution

Posted on BSI and CERT SwA websites

Sent directly to:

- 1359 individuals on DHS SwA mailing list
- 100 faculty (in 20 states & D.C.) at
  - colleges and universities (including 2 year community colleges),
  - principal investigators at 15 National Science Foundation (NSF) Advanced Technological Education (ATE) Centers,
- ~150 individuals within the Department of Defense (DoD) and others that work with the DoD (with request to further distribute to faculty)
- 130+ members of LinkedIn SwA Education discussion group
- Additionally, information was sent or posted to 9 relevant faculty e-mail lists, discussion group or security related sites

Additional Outreach Activities

There were 552 downloads of the MSwA curriculum model document as of December 2010

The LinkedIn group for SwA Education now has over 130 members

Faculty members at several universities have contacted Nancy Mead, SwA Education team lead, for information about how to build a BS or MS program with an SwA concentration.

The Service academies have been contacted to raise awareness of the curriculum and syllabi, and discuss ways to incorporate the material into their curricula.

Interested Universities & Educators

Stevens Institute of Technology

Hampton University

Team for Research in Ubiquitous Secure Technology (TRUST)

Gunter Air Force Base(AFB)

Southeast Missouri State University

U.S. Air Force Academy

Cleveland State University

University of Detroit Mercy

ISC2

Additional Plans - Community College Report

Work has started on the Community College report. An ACM committee on two-year degree programs, led by Elizabeth Hawthorne, will be partnering with the SEI team. The planned report will include

- identification of software security curricula that are suitable for community colleges
- course outlines
- identification of materials from Virtual Training Environment (VTE) offerings and the National Software Assurance Repository (NSAR)