Outline

ACM CCECC and Curricular Guidelines for 2-Year Colleges

- ACM CCECC
- CSEC2Y History and Timeline

CSEC2Y

- Introduction to StrawDog
- Overview of KAs and KUs

Breakout and Feedback on KA/KUs

Group Report and Next Steps
ACM CCECC
and
Curricular Guidelines
Introduction to ACM CCECC

Committee for Computing Education in Community Colleges

- 40++ years of service to computing education
- Standing committee of the ACM Education Board for 25+ years

Global Mission
Serve and support community and technical college educators in all aspects of computing education

Engage in curriculum and assessment development, community building, and advocacy in service to this sector of higher education

ccecc.acm.org
ACM Curriculum Guidelines for Undergraduate Programs

CC2005 (Computing Curricula 2005): The Overview Report

- Computer Engineering – CE2016
- Computer Science – CS2013
- Information Systems – IS2010
- Information Technology – IT2017
- Software Engineering – SE2014
- Cybersecurity – CSEC2017

Under Development

- CC2020
- Data Science

www.acm.org/education
ACM Curriculum Guidelines for Associate-Degree Programs

Produced by the CCECC

- Information Technology - IT Competency Model 2014
  - Guidelines for the core of A.A.S. / career programs
  - Infused with cybersecurity

- Computer Science - CSTransfer2017
  - Guidelines for A.S. / transfer programs
  - Infused with cybersecurity

Current Projects

- Cybersecurity - CSEC2Y
- IT Transfer
CSEC2Y
CSEC2Y Project Scope

- Curriculum guidelines for associate degree programs (2 years)
  - Transfer programs (A.S. degree)
  - Career programs (A.A.S. degree)
- Based on ACM CSEC2017
- Updated for currency & appropriateness at the two-year college level
- Other influences:
  - CAE2Y knowledge units (KUs) - 2019 Foundational + Technical Core
  - NICE Cybersecurity Workforce Framework
  - Others
Vision: The CSEC2017 curricular volume will be the leading resource of comprehensive cybersecurity curricular content for global academic institutions seeking to develop a broad range of cybersecurity offerings at the post-secondary level.

Organization

- Knowledge areas, knowledge units, topics
- Cross-cutting concepts
- Disciplinary lenses
Community College Exemplars

- Curriculum exemplar: Portland Community College, OR
- 4-Course exemplar: El Paso Community College, TX
- Course exemplar: Cosumnes River College, CA
CSEC2Y Task Group

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Bill Newhouse | NICE (National Initiative for Cybersecurity Education)
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John Sands | Moraine Valley Community College, CSSIA
Brian Ventura | SANS Instructor
CSEC2Y Timeline

2018 April: First Task Group Meeting
2019 February: StrawDog (SIGCSE)
2019 July: IronDog (3CS)
2019 Dec: Final Version

Project overview and status:
ccecc.acm.org/guidance/cybersecurity
CSEC2Y Draft

Maintain CSEC2017 organization into 8 Knowledge Areas (KAs)

- Data Security
- Software Security
- Component Security
- Connection Security
- System Security
- Human Security
- Organizational Security
- Societal Security
CSEC2Y Draft

CSEC2017 Structure

Within each of the 8 Knowledge Areas
- Essentials
- Knowledge Units
  - Topics

CSEC2Y

Each CSEC2017 topic marked as one of
- **All**: appropriate for all 2-year cyber programs -> Essential
- **Some**: appropriate for some 2-year cyber programs -> Supplemental
- **None**: not included in 2-year guidance
CSEC2Y Draft

CSEC2017 Topics

- None: 22.4%
- Some: 42.4%
- All: 35.2%
CSEC2Y Draft - Learning Outcomes

- Learning outcomes for each KU and topic
- Focus on student achievement
- Focus on what students can do rather than what students know
- Avoid traditional body of knowledge focus on topics and contact hours

Essential
- 8 Knowledge Areas
  - Knowledge Units (KUs)
    - Learning Outcomes

Supplemental
- 8 Knowledge Areas
  - Knowledge Units (KUs)
    - Learning Outcomes
Learning Outcomes Approach

Learning Outcomes (LOs) are

- **Active** - action verbs describe what students should be able to do
- **Aligned** - with the rest of the curriculum; LOs contribute to achievement of course outcomes, which in turn contribute to program outcomes
- **Achievable** - written at the threshold level for a pass, not aspirational
- **Assessed** - measurable; possible to assess several learning outcomes with one assignment and can also be assessed informally, based on classroom tasks or discussions

Utilize Bloom’s Revised Taxonomy
Bloom’s Revised Taxonomy

Six levels of thinking skills in cognitive domain
- Creating
- Evaluating
- Analyzing
- Applying
- Understanding
- Remembering
StrawDog Layout

Introduction
- Overview
- How to use the Guideline
- Two-year/Community College Environment
- Diversity in the Computing Profession
- Ethics and Professionalism
- Mathematics Requirement*
- The Cybersecurity Discipline

Knowledge Areas (for each...)
- Essential Learning Outcomes
- Supplemental Learning Outcomes
Mathematics for Cybersecurity

A variety of mathematics courses may be appropriate for undergraduate cybersecurity majors.

Feedback Opportunity: What is most appropriate?

- Discrete mathematics
- Statistics
- Linear algebra
- College algebra
- Pre-calculus
- Calculus
- Other?
Breakout

Review the Essential LOs in StrawDog by KA/KU

Questions to consider:

● What is missing

● Should an essential LO be removed or become supplemental (only for some cybersecurity programs)

● How can/should an essential LO be updated
Breakout

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- Software Security
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- Connection Security
- System Security
- Human Security
- Organizational Security
- Societal Security

Questions to consider:

- What is missing
- Should an essential LO be removed or become supplemental (only for some cybersecurity programs)
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Report Out

- Group 1
- Group 2
- Group 3
- Group 4

Summary of Breakout
Next Steps for CSEC2Y
NEXT STEP for CSEC2Y StrawDog

Provide your input to shape and improve CSEC2Y

- Review StrawDog and complete a feedback survey


StrawDog Survey:
Related Cybersecurity Initiatives
ABET Cybersecurity Program Accreditation

ABET accredits 4-year computing programs in
- Computer Science
- Information Systems
- Information Technology
- **Cybersecurity** - new; first 4 schools accredited in pilot round 2017-2018

ABET has begun a project to develop criteria for accrediting **2-year cybersecurity programs**.
- Criteria will be based on CSEC2Y
Visit the ACM CCECC Website

ccecc.acm.org