Cyber aCCredit:
Putting the CC
in
Cybersecurity Accreditation

New Horizons 2019 -VCCS
April 10, 2019
Harrison/Tyler
2:00-2:45p

Dr. Melissa Stange, Professor of Computer Science
Dr. Henry Coffman, Professor of Cybersecurity & IT

ACM Curriculum Guidelines for Undergraduate Programs

`www.acm.org/education`

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

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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 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
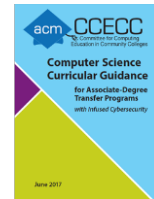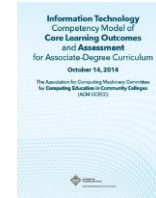
Current Projects

- Cybersecurity - CSEC2Y
- IT Transfer

ABET

CSEC2Y: Straw Dog

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

CSEC2Y Task Group

Cara Tang*+ | Portland Community College, Portland, OR

Cindy Tucker* | Bluegrass Community and Technical College, Lexington, KY

Christian Servin* | El Paso Community College, El Paso, TX

Markus Geissler* | Cosumnes River College, Sacramento, CA

Melissa Stange* | Lord Fairfax Community College, Middletown, VA

Nancy Jones | Coastline Community College, Garden Grove, CA

James Kolasa | Bluegrass Community and Technical College, Lexington, KY

Amelia Phillips | Highline College, Des Moines, WA

Lambros Piskopos | Wilbur Wright College, Chicago, IL

Pam Schmelz | Ivy Tech Community College, Columbus, IN

* Steering Committee

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CSEC2Y Advisors

Antonio Bologna | Rapid 7

Elizabeth Hawthorne | Union County College

Phil Helsel | Microsoft

Sidd Kaza | Towson University

Sepehr (Sepi) Hejazi Moghadam | Google

Bill Newhouse | NICE (National Initiative for Cybersecurity Education)

Casey O'Brien | National CyberWatch Center

Allen Parrish | Mississippi State University

John Sands | Moraine Valley Community College, CSSIA

Brian Ventura | SANS Instructor

CSEC2Y Timeline

2018 April: First Task Group Meeting

2019 February: StrawDog Released (SIGCSE)

2019 July: IronDog Released (3CS)

2019 Dec: Final Version

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

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CSEC2Y Draft - Structure
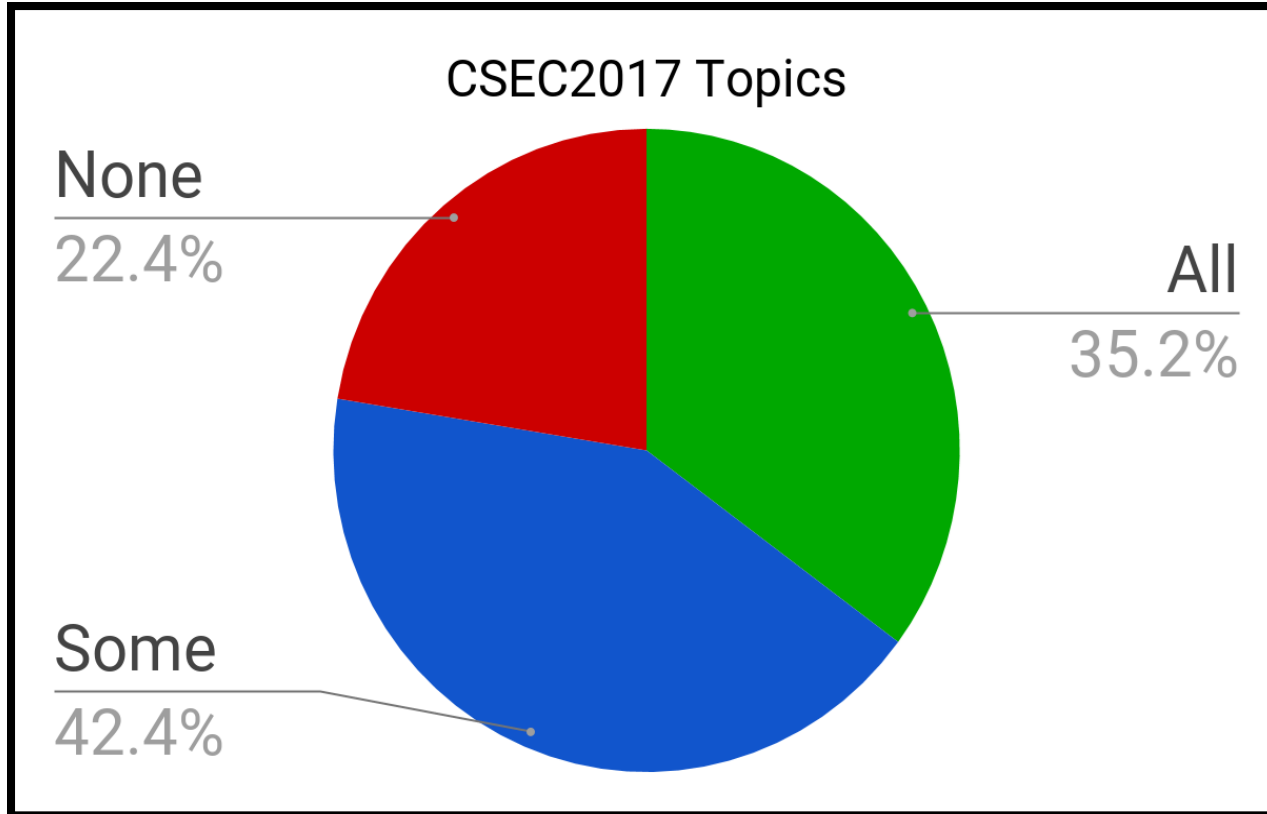
CSEC2017

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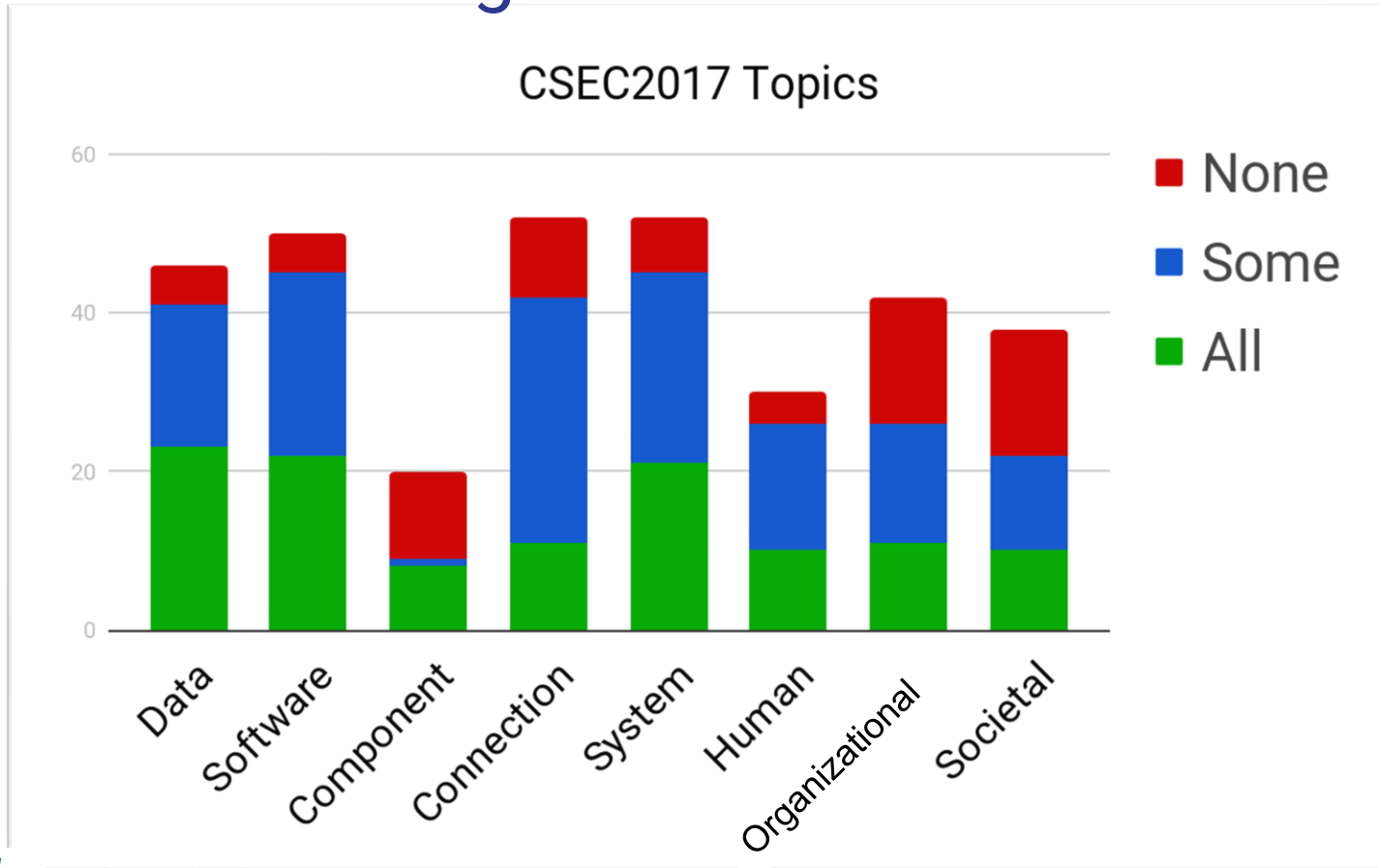- Essentials
- Knowledge Units
  - **Topics**

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 StrawDog

CSEC2Y StrawDog

CSEC2Y StrawDog - 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

Utilize Bloom's Revised Taxonomy

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

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

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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

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

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NEXT STEP for CSEC2Y StrawDog

Provide your input to shape and improve CSEC2Y

- Review StrawDog and complete a feedback survey till APRIL 15!

    StrawDog: ccecc.acm.org/files/publications/CSEC2Y-StrawDog.pdf

    StrawDog Survey:

ABET Cybersecurity Program Accreditation

ABET accredits 4-year computing programs in
- Computer Science
- Information Systems
- Information Technology
- **Cybersecurity** - new

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

ABET 2Y Cybersecurity

Criteria Development

- Joint CAC/CSAB 2YCy Criteria Subcommittee
  - Hoot Gibson – CAC EXCOM, CSAB, 4YCy Criteria, CSEC2017
  - Ed Sobiesk – CAC, 4Y Cybersecurity Criteria Co-chair
  - Cara Tang – ACM CCECC Chair, CSEC2Y Chair
  - Mary Marchegiano – ETAC 2Y Program Evaluator

- Primary reference documents
  - Cybersecurity Curricula 2017 (CSEC 2017)
  - Cybersecurity Curricular Guidance for Associate Degree Programs (CSEC2Y)
  - CAC 4-Year General and Cybersecurity program criteria
  - ETAC 2-Year Engineering Technology program criteria
  - NSA CAE-2Y requirements

ABET Accreditation Criteria

- All ABET Commissions have the following 8 Criteria **General Criteria** with the five black ("harmonized") criteria common to all

  1. Students
  2. Program Educational Objectives
  3. Student Outcomes
  4. Continuous Improvement
  5. Curriculum
  6. Faculty
  7. Facilities
  8. Institutional Support

- The Student Outcomes, Curriculum, and Faculty criteria differ between commissions (EAC, CAC, ETAC, and ANSAC)

- These three criteria also may be augmented by **Program Criteria** specific to disciplines and developed by member societies

ABET 2Y CY Pilot -Accreditation Visit
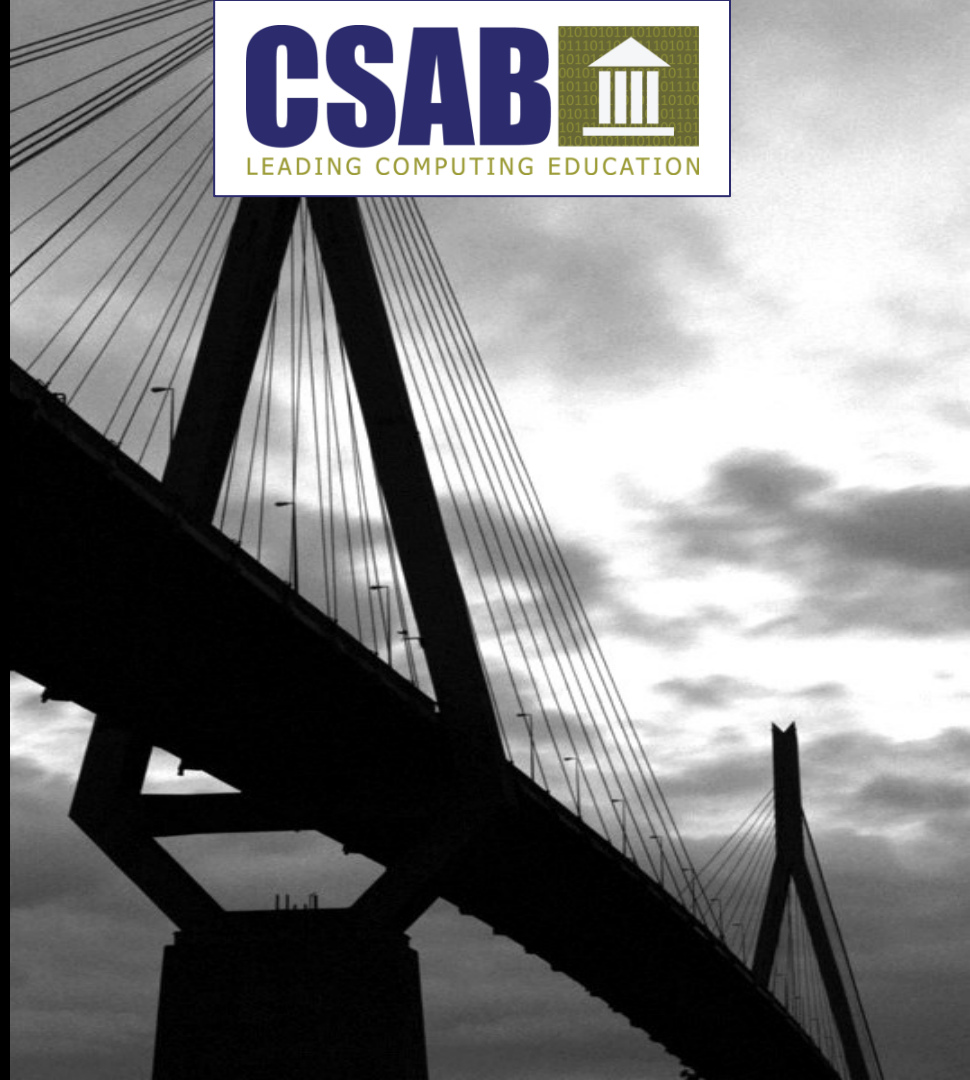
ABET Stages

- Stages
  - Template posted on ABET website by Aug 2019
  - Readiness Review, due October 1, 2019
  - Request for Evaluation (RFE), due Jan 20, 2020
  - Self-Study, due July 1, 2020
  - Site Visit, Fall 2020
  - …
  - Commission vote on accreditation action, July 2021

CSAB
LEADING COMPUTING EDUCATION

Why ABET Accreditation

Accreditation Value
Students and Parents

- Helps students select quality programs
- Helps students prepare to enter "the profession"
- Enhances employment opportunities

Accreditation Value

Institutions

- "Third-party" confirmation of quality of programs
- Prestige, recognition by "the profession"
- Attract the strongest students
- Assist with articulation pathways

Faculty

- Institution is serious and committed to improving quality
  - Facilities, financial resources, training, etc.
- Encourages "best practices" in education
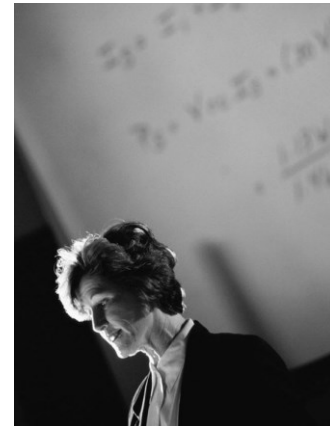
Accreditation Value

Industry

- Ensures educational requirements to enter "the profession" are met

- Aids industry in recruiting and enhances mobility

- Opportunity to help guide the educational process
  - Program's industrial advisory groups
  - Professional, technical societies

Society

- Helps ensure public safety
  - Supports professional licensure, certification

- Provides a high-leverage means for development of a country's economy.

Advantages of Cybersecurity Program Accreditation

- Accredited programs promote:
  - Continuous improvement and adaptability
  - Lifelong learning for graduates
- Programs and graduates can deal with change:
  - Technology change
  - Career growth and evolution for graduates
- Elevates cybersecurity to a first class academic discipline.
  - Same as for CS, IT, IS, SW EGR programs
- ABET has long-established brand recognition for many types of employers.
- International Recognition

Accreditation Challenges and Barriers for CCs

Concerns of Cybersecurity Program Accreditation

- Faculty time and effort required
- Cost
- Alignment with CAE
- Elevates cybersecurity to a first class academic discipline.
  - Same as for CS, IT, IS, SW EGR programs
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- International Recognition

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  StrawDog Survey:

Stay tuned for more details about ABET 2y Accreditation