COMPUTER SCIENCE CURRICULA 2023: COMMUNITY ENGAGEMENT BY THE ACM/IEEE-CS/AAAI JOINT TASK FORCE

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VISION STATEMENT

- Knowledge model
- Competency model
  - Consistency between the two
- Online version
- Curricular practices – State of the practice
KNOWLEDGE MODEL

• Knowledge Model = \sum \text{Knowledge Areas}
• Knowledge Area = \sum \text{Knowledge Units}
• Knowledge Unit = \sum \text{Topics} + \text{Learning Outcomes}
• Core Topics
AL – Algorithmic Foundations
AR - Architecture and Organization
AI – Artificial Intelligence
DM - Data Management
FPL – Foundations of Programming Languages
GIT – Graphics and Interactive Techniques
KNOWLEDGE AREAS - 2

- HCI - Human-Computer Interaction
- MSF – Mathematical and Statistical Foundations
- NC - Networking and Communication
- OS - Operating Systems
- PDC - Parallel and Distributed Computing
- SEC – Security
KNOWLEDGE AREAS - 3

- SEP - Society, Ethics and Professionalism
- SDF - Software Development Fundamentals
- SE - Software Engineering
- SPD - Specialized Platform Development
- SF - Systems Fundamentals
KNOWLEDGE MODEL
CORE TIERS COVERAGE – CS 2013
CS 2013 → CS 2023
CS 2023

Diagram:

- KA Core
- KA 1
- KA 2
- KA 3
- KA 4
- KA 5

CS 2023
PROGRAM COVERAGE – CS 2023

CS 2023
Coverage of a program
COHERENT COVERAGE ➔ COMPETENCY AREA

Knowledge Model

CS 2023

KA 1
KA 2
KA 3
KA 4
KA 5

Software
Systems
Applications
COMPETENCY AREAS

- **Software**: SDF, AL, PL, SE, SEP
- **Systems**: SF, AR, OS, PDC, NC, SEC, DM, SEP
- **Applications**: GIT, AI, SPD, HCI, SEC, DM, SEP
COMPETENCY MODEL = KNOWLEDGE + SKILLS + DISPOSITIONS
COMPETENCY = KNOWLEDGE + SKILLS + DISPOSITIONS

- Knowledge Model = \( \sum \) Knowledge Areas
- Knowledge Area = \( \sum \) Knowledge Units
- Knowledge Unit = \( \sum \) Topics + Learning Outcomes
COMPETENCY = KNOWLEDGE + **SKILLS** + DISPOSITIONS

- Learning Outcomes – Skills
- **CS 2013:**
  - Familiarity, Usage, Assessment [CS 2013]
  - All the topics
- **CS 2023:**
  - Explain, Apply, Evaluate, Develop [CS 2023]
  - CS core topics → CS core hours [Core hours Worksheets]
COMPETENCY = KNOWLEDGE + SKILLS + DISPOSITIONS

- Cultivated behaviors desirable in the workplace
- Willingness and intent to apply knowledge + skills
  - Teachable → Learnable
  - Measurable → Observable
  - Summative → Formative
  - Discipline-specific
    - Task-specific
DISPOSITIONS [CC 2020]

• Adaptable
• Collaborative
• Meticulous
• Persistent
• Responsive
• Self-Directed
MODIFICATIONS TO COMPETENCY MODEL [ITICSE WG 20]

- **Task:**
  - Separated from Competency Statement
  - Higher level authentic tasks

- **Dispositions:** Migrated to knowledge area

- **Competency Units:**
  - Design/Development/Documentation/Evaluation/Maintenance/Acceptance/Improvement
• **Task:** non-technical, high level

• **Competency statement:** technical

• **Competency area:** Software / Systems / Applications / Theory

• **Competency unit:** Design / Development / Documentation / Evaluation ...

• **Required knowledge areas and knowledge units:** KA / KU

• **Required skill level:** Explain / Apply / Develop / Evaluate

• **Core level:** CS core / KA core
INTEGRATED MODEL
CS 2013 VERSUS CS 2023

• KA Core → Competency Areas
• Core hours worksheet
• Competency model
• Course packaging
• Expansion of math
• SEP in every knowledge area
ARTICLES ON CURRICULAR PRACTICES

▶ Accessibility
▶ Ethics
▶ Ethics in the Global Souths
▶ CS 4 Good
▶ CS+X
▶ Future of Educational Materials
▶ Liberal Arts Perspective
▶ Community College Perspective
▶ Geographic Regions:
  ▶ Arab World / Africa / China / Philippines
NEXT STEPS

- Competency areas: Cross-KA
  - Course packaging
  - Competency specifications
- Curriculum packaging
- Characteristics of CS graduates
- Challenges for CS programs

Version Gamma
CURRICULUM CURATORS, NOT CREATORS

csed.acm.org/sigcse23