Computing Curricula 2005

An Overview Report

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Report Covers Five Program Areas

Undergraduate Degree Programs

- Computer Engineering
- Computer Science
- Information Systems
- Information Technology
- Software Engineering
CC2004 Task Force

Representatives of:

• ACM
• IEEE Computer Society
• Association for Information Systems
• ACM SIG Information Technology Education
• British Computer Society
• International Federation for Information Processing
• ABET and CSAB

Active participants from Curricula Task Forces:

• CE2004
• CS2001 (formerly known as CC2001)
• IS2002
• IT2006
• SE2004
Context (1)

- Based on the *Body of Knowledge* from each
- Report on commonalities and differences
- A users’ guide to the computing disciplines
- A larger project to create a map of computing
Context (2)

- **CS2001**
  - “Computing Curricula 2001” (CC2001)
  - Joint task force of IEEE-CS and ACM
  - Original goal: Update CC’91

- **CS2001 goal changed early in the process**

- **Explosion of computing in the 1990s:**
  - Changed the world
  - Changed the computing education world
  - Made the original CS2001 goal archaic
CS2001 (CC2001) saw a need for different reports

- It produced the CS Report

- It called for distinct reports for each of:
  - Computing Engineering
  - Information Systems
  - Software Engineering
  - New computing disciplines as required

- It called for an Overview Report
  - A guide to the computing field
  - A summary on commonalities and differences
Five Curricular Reports

- **Computer Science**  
  CS2001 (CC2001)
- **Information Systems**  
  IS2002
- **Software Engineering**  
  SE2004
- **Computer Engineering**  
  CE2005
- **Information Technology**  
  IT2006

- **The Overview Report**  
  CC2005
  - Based on the *Body of Knowledge* from each of the above
  - Report on commonalities and differences
  - A users’ guide to the computing disciplines
  - A larger project to create a map of computing
Organizational Structure

CC2005
The Guide to Undergraduate Degree Programs in Computing

CS2001 (CC2001) Computer Science Curriculum Report

IS 2002 Information Systems Curriculum Report

SE 2004 Software Engineering Curriculum Report

CE 2005 Computer Engineering Curriculum Report

IT2006 Information Technology Curriculum Report

Other Curriculum Reports as needed for emerging disciplines
How Computing Education Changed

Computing - a family of disciplines

- **Pre-1990s:**
  - *Computer Science* on the technical side
  - *Information Systems* on the business side

- **During the 1990s:**
  - *Computer Engineering* became a strong discipline
  - *Software Engineering* sometimes thought as an area within CS and began its own identity
  - *Information Technology* programs was common worldwide but began emerging in the US in the 1990s
Computing Degree Programs

Pre-1990s:

- EE
- CS
- IS

Hardware | Software | Business

Post-1990s:

- EE
- CE
- SE
- CS
- IT
- IS
Computing Degree Programs

Pre-1990s:

- EE (Hardware)
- CS (Software)
- IS (Business)

Post-1990s:

- EE (Hardware)
- CE
- SE
- CS
- IT
- IS
Computing Degree Programs

Pre-1990s:

- EE: Hardware
- CS: Software
- IS: Business

Post-1990s:

- EE
- CE
- SE
- CS
- IT
- IS

Software
Computing Degree Programs

Pre-1990s:
- EE (Hardware)
- CS (Software)
- IS (Business)

Post-1990s:
- EE
- CE
- SE
- CS
- IT
- IS

Organizational Needs
Difference Between IT and IS

Both focus on using “Information Technology”

- Information Systems programs:
  - Focus on the Information side of IT

- Information Technology programs:
  - Focus on the Technology side of IT
Computing Degree Programs

Pre-1990s:

EE  CS  IS
Hardware  Software  Business

Post-1990s:

EE  CE  SE  CS  IT  IS
Hardware  Software  Organizational Needs
Growing Diversity in Computing

Localized diversity

- A home for hardware
  - It was only EE; now has become EE and CE

- A home for business
  - Information Systems

- Increased diversity occurs between computer systems and application
  - Yesterday: CS programs traditionally filled the gap
  - Tomorrow: Many other meaningful choices available
Computer Engineering Makeup

- Design and construction of computers, and computer based systems.
- Design of digital hardware/software systems
- Development of devices that have embedded systems
- Integration of hardware and software
Computer Science Makeup

- Ranges from theoretical foundations to cutting-edge developments
- Develop effective ways to solve computing problems
- Devise new ways to use computers
- Designing and implementing software
Information Systems Makeup

- Satisfy informational needs of businesses and organizations
- Emphasis on *information* rather than *technology*
- Concerned with information provided by computer systems
- Determines requirements and design of an organization’s information systems
Information Technology Makeup

- Combination of knowledge and practical applications with hands-on expertise
- Maintain an organization’s information technology structure
- Installation and maintenance of computer systems
- Current emphasis on networks
Software Engineering Makeup

- Develop and maintaining large-scale software systems
- Evolved in response to the increased importance of software in safety-critical situations
- Integrates the science of computer science with engineering principles and practices
- More applied and less theoretical than computer science
## Relative Emphases in Programs of Study

<table>
<thead>
<tr>
<th>Knowledge/Skill Area</th>
<th>CE MIN</th>
<th>CE MAX</th>
<th>CS MIN</th>
<th>CS MAX</th>
<th>IS MIN</th>
<th>IS MAX</th>
<th>IT MIN</th>
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## Other Knowledge/Skill Areas

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<td>Legal/Professional/Ethics/Society</td>
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<td>General Systems Theory</td>
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# Performance Capability of Graduates

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<th>Performance Capability</th>
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<td>Manage databases</td>
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<td>Train and support database users</td>
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<td>Do large-scale programming</td>
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<td>Do systems programming</td>
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# Other Areas and Performance Capabilities

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<th>Design an application program</th>
<th>Algorithms</th>
<th>Prove theoretical results</th>
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<td>Implement an application program</td>
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<td>Develop ways to attack problems</td>
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<td>Develop proof-of-concept software</td>
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<td></td>
<td>Train and support application users</td>
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<td>Determine if better solutions possible</td>
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<tr>
<td>Application Infrastructure</td>
<td>Manage websites</td>
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<td></td>
<td>Create e-commerce software</td>
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<td>Create multimedia systems</td>
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<td>Develop health-related info system</td>
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<td>Create e-learning software</td>
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<td>Develop business applications</td>
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<td>Evaluate new forms of search engine</td>
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<td>Design complex sensor system</td>
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<td>Implement automated reasoning systems</td>
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<td>Design a computer</td>
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Computing Visualized

- Organizational System Issues
- Application Technologies
- Software Development
- Systems Infrastructure
- Computer Hardware and Architecture

Developing

- Theory Principles Innovation
- More Theoretical
- More Applied

- Application Deployment Configuration
Computer Engineering Visual

Organizational System Issues
Application Technologies
Software Development
Systems Infrastructure
Computer Hardware and Architecture

Theory Principles Innovation
DEVELOPMENT
Application Deployment Configuration
More Theoretical
More Applied

CE
Computer Science Visual

- Organizational System Issues
- Application Technologies
- Software Development
- Systems Infrastructure
- Computer Hardware and Architecture

DEVELOPMENT

Theory Principles Innovation More Theoretical

More Applied Application Deployment Configuration
Information Systems Visual

- Organizational System Issues
- Application Technologies
- Software Development
- Systems Infrastructure
- Computer Hardware and Architecture

IS

DEVELOPMENT

More Theoretical
More Applied

Theory
Principles
Innovation

Application
Deployment
Configuration
Information Technology Visual

- Organizational System Issues
- Application Technologies
- Software Development
- Systems Infrastructure
- Computer Hardware and Architecture

DEVELOPMENT

IT

More Theoretical  More Applied

Theory Principles Innovation  Application Deployment Configuration
Software Engineering Visual
Two Overview Projects (1)

- **Computing Curricula 2005 Project is:**
  - The smaller project
  - Focused on the *commonalities*
  - Characterizing the *differences*

- **Computing Curricula 2005 is a guide for:**
  - Students, parents, guidance counselors
  - Administrators
  - Faculty
Two Overview Projects (2)

- **Computing Ontology Project** is:
  - The larger project
  - Focused on the *union* of disciplines
  - Characterizing the *problem space* of areas

- **Computing Ontology is a *map* for**:
  - Curriculum revision
  - Discipline definition
  - Topic classification
  - Accreditation
More Information

For available drafts, follow the curriculum link at

www.acm.org/education/
Gracias!

¿Alguna Pregunta?