

CAP Learning System Paves Way to Exam

by Ellen Fussell PolICASTRO

Reprinted from *ISA News & Views*

So, you want to be certified as an automation professional. It's a lofty goal, but you've been in the automation business for years, so you know you're up for it. There's just one hitch, you aren't quite as up on some of the latest technologies. And you aren't sure whether your knowledge matches up with the broad scope of the CAP program. Don't worry. Beginning this fall, there will be a new self-study educational program to help you prepare for the CAP exam. ISA is establishing this print and web-based learning system so potential test takers can study independently for as long as it takes before taking the plunge.

The impetus for the learning system lies in ISA's response to automation professionals preparing for the CAP exam. "We've had numerous requests for additional study resources from potential candidates who want to feel confident they're prepared, before they actually commit to taking the CAP exam," said Dale Lee, Director of Convention, Education, and Certification Services. "These professionals want more tools to prepare with, and to help them identify areas of technology that they need more preparation on before taking the exam," she said. "The CAP program is not a certificate program whereby if you study and know everything in the learning system or any other single study aid, you'll pass the exam, but

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Certification: The More the Merrier?

The *CAPacity* staff has recently noticed that more and more people are seeking or currently hold multiple certifications. For instance, we've seen people who have a CAP certification and a Certified Control Systems Technician® (CCST®) certification. We've also spoken to people with CAP and CCST certifications who are working towards their Control Systems Engineer (CSE) PE license.

Is this a sign of increased employer support for certification and licensing? Or is it more a personal drive to prove what you know? We spoke with Steve Biela and Henrik Christiansen, who hold both CAP and CCST designations, to find out what's behind this trend.

Steve Biela currently works on electrical projects for an engineering consulting firm in Michigan. He started his career as an electrician, then went to school for a degree in electrical engineering. While working as an electrician he saw that many of the company's clients, especially municipalities, wanted anyone working on their projects to be certified. It was a plus for instrumentation technicians in particular to be CCST certified, so he applied and got certified. As his career moved out of the

hands-on in the field work, into more of a project management role, Biela says he saw the need for some way to prove his increased skill level and expanded knowledge. The CAP certification seemed to be a good place to start. He's also planning to sit for the CSE license exam this fall, and hopes the CAP exam, and the process of studying for it, will be good practice.

Henrik Christiansen felt CAP was a natural fit with what he does in his job with Total Petrochemical USA, so pursuing it just made sense. And since his company supports certification, he was able to do so. He also holds CCST certification, even though that sort of work isn't what he does on a daily basis. He values the CCST certification as a way to prove that he can do the work of the people who report to him, and also enable him to pitch in when needed. He also plans to pursue "grandfathering" for his CSE license, under Texas Board of Engineering rules. He sees the certification programs as a way to track his career progression.

What do you think? Write to us at CAP@isa.org and tell us why you're seeking CAP certification, and if you hold any others.

au·to·ma·tion (n) - The implementation of processes by automatic means. **2.** The theory, art, or technique of making a process more automatic. **3.** The investigation, design, development, and application for methods for rendering processes automatic, self-moving, or self-controlling. **4.** The conversion of a procedure, a process, or equipment to automatic operation.

Source: *The Automation, Systems, and Instrumentation Dictionary, 4th Edition* ISA - The Instrumentation, Systems, and Automation Society

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it will be a great study aid covering the key content areas of the CAP exam.

While ISA offers a comprehensive three day review course for the exam, “not everyone can attend the course because of the timing and location,” Lee said. “With the learning system, students can study at their own pace, there’s no travel expense or time away from the office. Plus, students can follow individual study plans – focusing on areas where they need the most work,” she said. In addition to text material, there will be 500 interactive practice questions in the learning system. The user will get feedback on any wrong answers and be directed to additional text material for further study.

What’s inside?

The learning system includes a diagnostic pretest, practice questions specific to automation technologies, application exercises, a glossary, and diagnostic post test. “We’re planning to have five or six self-study print modules with the practice tests and questions online,” Lee said. ISA plans to assign continuing education unit credits for those who successfully complete the post test.

“The most valuable part is it’s a system; it actually has a print-based and web-based component,” said Mary Beth Anderson, Chief Operating Officer from ISA’s collaborating developers, Holmes Corporation, a company specializing in designing educational programs, out of Eagan, Minn.

The web-based portion of the system helps to reinforce the learning process, she said. “So there’s a pretest incorporated into the components. It helps direct [students] where they need to spend their energies. Then there are reinforcement exercises within each module itself. The post test helps them assess how much knowledge they’ve gained,” Anderson said.

Preparation is key

The learning system (as opposed to just a review course) can be “self-directed or instructor-led,” Anderson said. “Some learners like to learn by themselves and others would prefer to learn in an instructor-led environment.” ISA plans to begin offering the learning system in an instructor-led environment through universities beginning in 2006.

“The fact that the learning system is based on a body of knowledge for automation means it’s all encompassing to help you prepare for the exam,” Anderson said. As ISA builds this, we’ll make sure it covers the information and the scope of knowledge

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CAP Job Analysis

The ISA Certified Automation Professional (CAP) exam is designed to assess competence in the automation professionals, and a passing score indicates that the CAP has achieved a level of ability consistent with requirements for competence on the job. The job analysis study is an integral part of ensuring that the aspects of industrial automation cov-

ered on the exam reflect the tasks performed in the range of practice settings throughout the United States and Canada.

The following is an excerpt from the job analysis study that details the specific tasks and knowledge included in **Domain 4: Development**. In the next issue of *CAPacity*, we’ll detail Domain 5.

Performance Domain IV: Development

RATINGS					
Task	Importance	Criticality	Frequency	% of Items on Exam	# of Items on Exam
1	2.99	2.61	2.33	2.82%	5
2	2.75	2.35	2.18	2.59%	4
3	3.23	3.08	2.56	3.15%	6
4	2.78	2.53	2.09	2.63%	5
5	3.00	2.87	1.95	2.78%	5
6	2.95	2.65	2.13	2.75%	5
7	3.17	2.91	2.11	2.91%	5
8	2.73	2.22	1.86	2.42%	4
			TOTALS	22.04%	39

Task 1: Develop Human Machine Interface (HMI) in accordance with the design documents in order to meet the functional requirements.

Knowledge of:

1. Specific HMI software products
2. Tag definition schemes
3. Programming structure techniques
4. Network communications
5. Alarming schemes
6. Report configurations
7. Presentation techniques
8. Database fundamentals
9. Computer operating systems
10. Human factors
11. HMI supplier options

Skill in:

1. Presenting data in a logical and aesthetic fashion
2. Creating intuitive navigation menus
3. Implementing connections to remote devices
4. Documenting configuration and programming
5. Programming configurations

Task 2: Develop database and reporting functions in accordance with the design documents in order to meet the functional requirements.

Knowledge of:

1. Relational database theory
2. Specific database software products
3. Specific reporting products
4. Programming/scripting structure techniques
5. Network communications
6. Structured query language
7. Report configurations
8. Entity diagram techniques
9. Computer operating systems
10. Data mapping

Skill in:

1. Presenting data in a logical and aesthetic fashion
2. Administrating databases
3. Implementing connections to remote applications
4. Writing queries
5. Creating reports and formatting/printing specifications for report output
6. Documenting database configuration
7. Designing databases
8. Interpreting functional description

Task 3: Develop control configuration or programming in accordance with the design documents in order to meet the functional requirements.

Knowledge of:

1. Specific control software products
2. Tag definition schemes
3. Programming structure techniques
4. Network communications
5. Alarming schemes
6. I/O structure
7. Memory addressing schemes
8. Hardware configuration
9. Computer operating systems
10. Processor capabilities
11. Standard nomenclature (e.g., ISA)
12. Process/equipment to be automated

Skill in:

1. Interpreting functional description
2. Interpreting control strategies and logic drawings
3. Programming and/or configuration capabilities
4. Implementing connections to remote devices
5. Documenting configuration and programs
6. Interpreting P&IDs
7. Interfacing systems

Task 4: Implement data transfer methodology that maximizes throughput and ensures data integrity using communication protocols and specifications in order to assure efficiency and reliability.

Knowledge of:

1. Specific networking software products (e.g., I/O servers)
2. Network topology
3. Network protocols
4. Physical media specifications (e.g., copper, fiber, RF, IR)
5. Computer operating systems
6. Interfacing and gateways
7. Data mapping

Skill in:

1. Analyzing throughput
2. Ensuring data integrity
3. Troubleshooting
4. Documenting configuration
5. Configuring network products
6. Interfacing systems
7. Manipulating data

Task 5: Implement security methodology in accordance with stakeholder requirements in order to mitigate loss and risk.

Knowledge of:

1. Basic system/network security techniques
2. Customer security procedures
3. Control user-level access privileges

4. Regulatory expectations (e.g., 29 CFR Part 11)
5. Industry standards (e.g., ISA)

Skill in:

1. Documenting security configuration
2. Configuring/programming of security system
3. Implementing security features

Task 6: Review configuration and programming using defined practices in order to establish compliance with functional requirements.

Knowledge of:

1. Specific control software products
2. Specific HMI software products
3. Specific database software products
4. Specific reporting products
5. Programming structure techniques
6. Network communication
7. Alarming schemes
8. I/O structure
9. Memory addressing schemes
10. Hardware configurations
11. Computer operating systems
12. Defined practices
13. Functional requirements of system/equipment to be automated

Skill in:

1. Programming and/or configuration capabilities
2. Documenting configuration and programs
3. Reviewing programming/configuration for compliance with design requirements

Task 7: Test the automation system using the test plan in order to determine compliance with functional requirements.

Knowledge of:

1. Testing techniques

2. Specific control software products
3. Specific HMI software products
4. Specific database software products
5. Specific reporting products
6. Network communications
7. Alarming schemes
8. I/O structure
9. Memory addressing schemes
10. Hardware configurations
11. Computer operating systems
12. Functional requirements of system/equipment to be automated

Skill in:

1. Writing test plans
2. Executing test plans
3. Documenting test results
4. Programming and/or configuration capabilities
5. Implementing connections to remote devices
6. Interpreting functional requirements of system/equipment to be automated
7. Interpreting P&IDs

Task 8: Assemble all required documentation and user manuals created during the development process in order to transfer essential knowledge to customers and end users.

Knowledge of:

1. General understanding of automation systems
2. Computer operating systems
3. Documentation practices
4. Operations procedures
5. Functional requirements of system/equipment to be automated

Skill in:

1. Documenting technical information for non-technical audience
2. Using documentation tools
3. Organizing material for readability

Tell Us Your Story

Sharing your story with non-certified automation professionals is the best way to increase the recognition and strength of the ISA CAP program. We'd like to help you tell your story. Fax (919-549-8288) or e-mail (CAP@isa.org) us your answers to the following questions.

Has being an ISA CAP helped you?

- a raise?
- be more valuable to your employer?
- get a better job?
- get a promotion?
- save the company money?
- feel better about your profession?
- bring in new business for the company?

Name: _____

Certification No.: _____

Company: _____

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needed to study for the exam. It's a training tool and learning system, not just a review, she said.

Lee said ISA has high expectations for the learning system because it will help potential test takers prepare and build skills in areas they're not as well versed in. "It will make them more confident in their weaker areas when it's time to actually take the test," Lee said. In fact, just getting feedback from the questions in the modules will be a big help she said. "CAP requires a broad understanding in a lot of technology areas," she said, "and if applicants have worked in one specific area of automation for much of their career, they may not be as confident

in all the areas the CAP covers. The CAP learning system will give them a better understanding of where they need more study and provide study resources."

CAP Learning System Features, Benefits

Features

- Content based on the CAP automation body of knowledge
- Self-study print modules and web-based testing
- Pre- and post-test review after each module
- Links to help you understand the correct answer
- Web-based reports to track progress on tests
- Application exercises and multiple-choice questions
- Electronic glossary with key terms

Benefits

- Helps prospective CAP candidates prepare for the CAP exam with tests and feedback
- Gives more information on technology areas covered on CAP exam
- Increases confidence of prospective CAP candidates
- Builds competencies and productivity
- Provides continuing education units (CEU) after successful completion
- Increases access to CAP preparation material

Join us for Lunch and meet your fellow CAPs Face-to-Face

ISA will host the first ever CAP Luncheon at ISA EXPO 2005 in Chicago, on Wednesday, 26 October.

Enjoy this special event with your fellow CAPs and others who are interested in becoming CAP certified. Expand your personal and professional network and take advantage of this great opportunity.

Tickets are just \$33 per person. Register online today at www.isa.org/isaexpo2005.

