

CAP Exam Going Electronic

Beginning this fall, the CAP exam will be available around the world in electronic form. This will greatly increase the accessibility of the exam to automation professionals worldwide. The process will be easy.

- 1.** Just submit your CAP application to ISA for the eligibility review. If you are eligible, ISA will notify you and give you a unique access code.
- 2.** Use your access code to locate and register online for a convenient exam date and time at any Thomson Prometrics testing center in your area. With over 240 testing centers in the United States and over 100 international centers, there's sure to be one near you.
- 3.** When you complete the four hour CAP exam in the proctored test center, there is no waiting to receive exam results. You will receive immediate feedback on your pass/fail status.

Thompson Prometrics, the leader in online testing, delivers over six million exams each year.

Stay tuned to *CAPacity* and www.isa.org/CAP for future updates on taking the CAP exam electronically.

ISA
67 Alexander Drive, P.O. Box 12277, Research Triangle Park, NC 27709 USA
Online: www.isa.org/CAP
E-mail: CAP@isa.org
Phone: (919) 549-8411

ISA's CAP Review Course Takes Off

As a way to help practicing automation professionals prepare for the CAP exam, the ISA Training Institute has developed a three-day review course. This course has been offered several times over the past months, and will be scheduled regularly throughout the year (see page 2 for a list of currently scheduled dates).

Participants have come from all types of manufacturing companies, including Leviton (lighting devices), Gallo Wine, a natural pharmaceutical company, Clorox (Glad trash bags, Kingsford charcoal, etc.), and several pharmaceutical and utility companies.

A quick survey on the first day of the course helps the instructor tailor the class material to cover the topics most needed by the students. According to instructor Vernon Trevathan, "in some courses most of the students knew more about system integration than they did about continuous control, safety instrumented systems (SIS), or

batch control," so he knew to spend more time on those topics.

All of the CAP review course participants said they planned to take the CAP exam. Of those who have since taken the

"This course was a good comprehensive review of automation fundamentals and practices."

exam, most felt that the exam had good coverage and depth and said that the course was a big help.

More information on the course, including a complete outline, pricing and information on bringing it to your location, is available online at www.isa.org/training or by calling (919) 549-8411.

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

New ISA CAPs

Congratulations to the newest CAPs!

Arkansas
 Tony R. Gunderman
 Eastman Chemical Co.
 Batesville, AR

Joseph A. Puszkur, IV
 Maverick Technologies
 Saint Charles, MO

Illinois
 Michael Gavin
 Maverick Technologies
 Columbia, IL

New York
 Peter R. Craan
 Hazen & Sawyer
 Smithtown, NY

Louisiana
 Andy Schexnider
 Columbia Gulf
 Transmission Co.
 Lafayette, LA

Oklahoma
 Robert W. Dickey
 Nelson Electric Supply
 Tulsa, OK

Michigan
 Steve Biela
 PAC Solutions
 Ida, MI

Pennsylvania
 Scott W. Sommer
 Jacobs Engineering
 Conshohocken, PA

Minnesota
 Andy Mobley
 3M Co.
 Minneapolis, MN

South Dakota
 Jeffrey White
 Interstate Control
 Systems, Inc.
 Canton, SD

Missouri
 John Forbis
 Solutia Inc.
 St. Louis, MO

To find a CAP in your area visit
www.isa.org/CAP & click on
 "Search for CAPs".

2005 ISA Certification Exam Locations and Dates

Public Exam Dates

ISA Certification exams are scheduled throughout the year at 40+ selected test sites across the US.

- 8 October 2005
applications due 26 August 2005
- 10 December 2005
applications due 28 October 2005

Exams scheduled after the CAP Review Course

- **Course: 19-21 July** **Exam: 22 July**
 County College of Morris at Headquarters Plaza, Morristown, NJ
applications due 10 June 2005
- **Course: 23-25 August** **Exam: 26 August**
 San Jacinto College Central, Pasadena, TX
applications due 15 July 2005
- **Course: 27-29 September** **Exam: 30 September**
 ISA Training Institute Headquarters, Research Triangle Park, NC
applications due 16 September 2005
- **Course: 24-26 October** **Exam: 27 October**
 ISA EXPO 2005, McCormick Center, Chicago, IL
applications due 16 September 2005

Private Exams

We can also bring the exam to your location on a date and time convenient for you, as long as you have 4 or more people who want to test. Contact ISA at (919) 549-8411 for more information.

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: _____

Phone: _____

Fax: _____

E-Mail Address: _____

CAP Job Analysis

The CAP exam is designed to assess competence in automation professionals, and a passing score indicates that you have achieved a level of skill and 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 covered on the

exam reflect the actual tasks performed in a range of industries 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 3: System Design**. In the next issue of *CAPacity*, we'll detail Domain 4. ➔

CAP Domain 3: System Design

Task	RATINGS				
	Importance	Criticality	Frequency	% of Items on Exam	# of Items on Exam
1	3.31	3.26	2.16	3.15%	5
2	2.83	2.42	1.98	2.61%	5
3	3.04	2.69	2.22	2.87%	5
4	2.80	2.41	2.02	2.61%	5
5	2.79	2.45	1.97	2.60%	4
6	3.13	2.76	2.21	2.92%	5
7	2.86	2.59	1.97	2.68%	5
8	2.97	2.66	2.26	2.85%	5
9	2.80	2.59	2.01	2.67%	5
TOTALS				24.94%	44

Task 1: Perform safety and/or hazard analyses, security analyses, and regulatory compliance assessments by identifying key issues and risks in order to comply with applicable standards, policies, and regulations.

Knowledge of:

1. Applicable standards (e.g., ISA S84, IEC 61508, 21 CFR Part 11, NFPA)
2. Environmental standards (EPA)
3. Electrical, electrical equipment, enclosure, and electrical classification standards (e.g., UL/FM, NEC, NEMA)

Skill in:

1. Participating in a Hazard Operability Review
2. Analyzing safety integrity levels
3. Analyzing hazards
4. Assessing security requirements or relevant security issues
5. Applying regulations to design

Task 2: Establish standards, templates, and guidelines as applied to the automation system using the information gathered in the definition stage and considering human-factor effects in order to satisfy customer design criteria and preferences.

Knowledge of:

1. Process Industry Practices (PIP) (Construction Industry Institute)
2. IEC 61131 programming languages
3. Customer standards
4. Vendor standards
5. Template development methodology
6. Field devices
7. Control valves
8. Electrical standards (NEC)
9. Instrument selection and sizing tools
10. ISA standards (e.g., ISA-88)

Skill in:

1. Developing programming standards
2. Selecting and sizing instrument equipment
3. Designing low-voltage electrical systems
4. Preparing drawing using AutoCAD software

Task 3: Create detailed equipment specifications and instrument data sheets based on vendor selection criteria, characteristics and conditions of the physical environment, regulations, and performance requirements in order to purchase equipment and support system design and development.

Knowledge of:

1. Field devices
2. Control valves
3. Electrical standards (NEC)
4. Instrument selection and sizing tools
5. Vendors' offerings

6. Motor and drive selection sizing tools

Skill in:

1. Selecting and sizing motors and drives
2. Selecting and sizing instrument equipment
3. Designing low-voltage electrical systems
4. Selecting and sizing computers
5. Selecting and sizing control equipment
6. Evaluating vendor alternatives
7. Selecting or sizing of input/output signal devices and/or conditioners

Task 4: Define the data structure layout and data flow model considering the volume and type of data involved in order to provide specifications for hardware selection and software development.

Knowledge of:

1. Data requirements of system to be automated
2. Data structures of control systems
3. Data flow of controls systems
4. Productivity tools and software (e.g., InTools, AutoCAD)
5. Entity relationship diagrams

Skill in:

1. Modeling data
2. Tuning and normalizing databases

Task 5: Select the physical communication media, network architecture, and protocols based on data requirements in order to complete system design and support system development.

Knowledge of:

1. Vendor protocols
2. Ethernet and other open networks (e.g., Devicenet)
3. Physical requirements for networks/media
4. Physical topology rules/limitations
5. Network design
6. Security requirements
7. Backup practices
8. Grounding and bonding practices

Skill in:

1. Designing networks based on chosen protocols

Task 6: Develop a functional description of the automation solution (e.g., control scheme, alarms, HMI, reports) using rules established in the definition stage in order to guide development and programming.

Knowledge of:

1. Control theory
2. Visualization, alarming, database/reporting techniques
3. Documentation standards
4. Vendors' capabilities for their hardware and software products

5. General control strategies used within the industry
6. Process/equipment to be automated
7. Operating philosophy

Skill in:

1. Writing functional descriptions
2. Interpreting design specifications and user requirements
3. Communicating the functional description to stakeholders

Task 7: Design the test plan using chosen methodologies in order to execute appropriate testing relative to functional requirements.

Knowledge of:

1. Relevant test standards
2. Simulation tools
3. Process Industry Practices (PIP) (Construction Industry Institute)
4. General software testing procedures
5. Functional description of the system/equipment to be automated

Skill in:

1. Writing test plans
2. Developing tests that validate that the system works as specified

Task 8: Perform the detailed design for the project by converting the engineering and system design into purchase requisitions, drawings, panel designs, and installation details consistent with the specification and functional descriptions in order to provide detailed information for development and deployment.

Knowledge of:

1. Field devices, control devices, visualization devices, computers, and networks
2. Installation standards and recommended practices
3. Electrical and wiring practices
4. Specific customer preferences
5. Functional requirements of the system/equipment to be automated
6. Applicable construction codes
7. Documentation standards

Skill in:

1. Performing detailed design work
2. Documenting the design

Task 9: Prepare comprehensive construction work packages by organizing the detailed design information and documents in order to release project for construction.

Knowledge of:

1. Applicable construction practices
2. Documentation standards

Skill in:

1. Assembling construction work packages

Dated Material—Open Immediately!

Please share this publication with others in your company:

- Automation Engineer
- Plant Manager
- Control Systems Engineer
- Systems Integrator

Frequently Asked Questions about the CAP Program

In each issue we'll provide answers to some of the most commonly asked questions about an aspect of the CAP program. This month focuses on the day of the exam.

What should I bring with me to the exam?

The following is a listing of items you need to bring to the exam site:

- Your Confirmation Notice from ISA
- Photo identification such as a driver's license or employer-issued badge
- At least two #2 pencils (The Proctor will NOT have a supply of pencils)
- A soft eraser suitable for cleanly erasing incorrect markings
- Self-powered or battery operated, non-programmable calculator
- Technical books and manuals, standards, and other bound publications are permitted, as are dictionaries

Are there any materials I cannot bring to the exam?

These items are **not permitted** in the exam room:

- Computers such as palmtop, laptop, notebook, portable or desktop
- Programmable calculators
- Electronic devices including telephones, cameras, signaling devices, pagers, alarms, tape players, radios, cellular phones, walkie talkie radios, or similar devices
- Food or drinks
- Loose papers which may fall off your desk and create a disturbance when you try to retrieve them
- CAP Study Guides

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.

