Certified Automation Professional

CERTIFIED AUTOMATION PROFESSIONAL®

ISA

What is CAP®?

Being a member of the automation industry—and an automation professional yourself—you've probably heard the term CAP. But what does CAP mean?

Before we can define CAP, we need to first explain how we define "automation" and who we see as "automation professionals."

"Automation is the creation and application of technology to monitor and control the production of goods and services," says Kim Miller Dunn, CAP, Dir. Sales Development & Support, Emerson Process Management, Rosemount Analytical Liquid Division.

"Plants that run efficiently with greater throughput, consistent high quality, and lower energy costs do so primarily because of automation professionals," said former ISA Society President Bob Ives. Automation professionals are responsible for the direction, definition, design, development/application, deployment, documentation, and support of systems, software, and equipment used in control systems, manufacturing information systems, systems integration, and operational consulting.

A CAP is a Certified Automation Professional®. This means that CAPs are professionals in the automation industry with third party endorsement and documentation of their skills and understanding of a broad body of knowledge.

"This is an individual who can talk to a mechanical engineer, an electrical engineer—sometimes a chemical engineer—and a software engineer, and bring all of these things together."

—Jacob Jackson, CAP, Control Systems Engineer, Waveguide Consulting

What can CAP® mean for you?

CAP can provide you, as a busy manager, with …

• Better trained employees

• Confidence in your employees' knowledge and skills

• A competent staff that stands out in the market place

• A documented commitment to excellence in automation, to safety, and to continued education

• The ability to meet clients' requests for CAPs to work on their automation projects

• 3rd party endorsement of your employees' knowledge, experience, and understanding of the automation body of knowledge

• Worldwide recognition of your employees

• Improved credibility for services companies

• People who are interested in self-advancement

• A way to motivate your employees to do more continuing education

• A method of recognizing top employees

• A recruiting tool

• Greater levels of efficiency, safety, productivity, and throughputs, and a higher ROI to your plant

Why should you hire or request CAP®s for your jobs?

Whether you do your own engineering and automation related work in-house or contract it out, you should hire or request that your vendors provide CAPs to do these tasks for you. Why?

Because, with CAPs, you get …

Proven Experience

"If you pass the CAP exam, you have a good, broad background in the automation industry."
—Paul Galeski, CAP, President, Maverick Technologies

Commitment to Safety

"You can almost say—I think I can say—that you cannot pass the CAP exam unless you have a strong understanding of safety instrumented systems—and safety, of course."
—Vernon Trevathan, CAP, Consultant, Monsanto (Retired)

Commitment to Continued Education

"With the CAP's requirement for continuing education, or professional development hours, I've got to stay up on the new technologies."
—Greg Lehmann, CAP, Control Systems Specialist, Washington Division of URS Corporation

Confidence

"It gives you an edge. You know that you are among the best engineers in the world."
—Hamad Balhareth, CAP, Engineer III, Saudi Aramco

Motivating and recognizing with CAP®

How can you encourage your employees to become CAPs?

- Employers who simply state their support for certification will encourage their employees to investigate certification
- Favoring CAPs for promotion and larger salary increases, and publicizing that approach, will give a strong incentive to your employees to become certified
- Send the message out that becoming a CAP means the individual is valuable to the organization
- Some employers require certification for advancement to selected positions
- Many employers pay for the CAP application and pay for CAP review courses and materials
- Some employers give one-time bonuses to individuals who become CAPs
- Some employers give preference to certified employees to attend automation conferences and exhibitions

Making a recently certified employee feel valued and satisfied with their efforts ...

Attaining certification requires time and effort on the part of the individual—and maintaining that certification requires an ongoing commitment to professional development. Recognizing your employees for their efforts will enhance job satisfaction. There are many opportunities to recognize those who are certified:

- Send a congratulatory letter from an upper manager to each new Certified Automation Professional
- Host a luncheon, dinner, or other social event to honor Certified Automation Professionals
- Provide opportunities for Certified Automation Professionals to participate in teaching or mentoring activities

"If I see a CAP certification on a resume, that to me is the indication that person is interested in developing themselves and reaching their potential. That's one of the key characteristics I look for when making a hiring decision."

—Nick Sands, CAP
Process Control Technology Manager, DuPont

Certification
ISA certification provides an objective, third-party assessment and confirmation of a person's skills, and gives them the opportunity to stand out from the crowd and be recognized. ISA currently offers two certification programs: Certified Automation Professional® (CAP®) and Certified Control Systems Technician® (CCST®).

Founded in 1945, the International Society of Automation (www.isa.org) is a leading, global, nonprofit organization that is setting the standard for automation by helping over 30,000 worldwide members and other professionals solve difficult technical problems, while enhancing their leadership and personal career capabilities. Based in Research Triangle Park, North Carolina, ISA develops standards; certifies industry professionals; provides education and training; publishes books and technical articles; and hosts conferences and exhibitions for automation professionals. ISA is the founding sponsor of the Automation Federation (www.automationfederation.org).

Where can I learn more about CAP?

Call: **(919) 549 – 8411**
Visit: **www.isa.org/CAP**
Email: **cap@isa.org**

ISA

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Know the difference: Certificates vs. Certification

Though certificates and certifications both involve awarding the individual a piece of paper (a "certificate"), credentials that are **certificates** are very different from those that are **certifications**.

Certificate programs are typically associated with mastery of specific course content and may or may not require work experience. Certification programs are based on a job analysis that identifies specific knowledge, skills, and attributes to perform a specific job and require that successful candidates demonstrate identified knowledge, skills, and attributes beyond any educational program.

Certificates recognize that a person has taken one or a series of courses and possibly passed a test specifically on the material covered in those courses. ISA offers a Leadership Development Certificate that recognizes accumulation of 50 points (roughly 50 hours) of seminars and activities about leadership; and certificates that indicate competence on specific standards like the ISA84 Safety Instrumented Systems Certificate Programs. Certificates typically require attendance at one or more courses; and any exams are based just on the material in that course. Some credentials that are called certifications are really certificates.

Certifications recognize a person's accumulated knowledge, require significant experience, and require passing a comprehensive exam based on the job description being recognized. Once obtained, certifications are usually renewed to last throughout the individual's career. While review courses and other study materials are often available, certifications do not require attendance at any course. An arm's length relationship is maintained between any review material or instructors and the exam so any courses or review material cannot cover nearly all of the material on the exam.

True certifications follow the ANSI and NOCA procedures for certification that require:

a) An extensive job analysis done by a number of experienced people in hundreds of hours of effort

b) Validation of that job analysis by questionnaires to thousands of people working in that job

c) Careful question writing that follows ANSI and NOCA guidelines for test development, and that are reviewed at least twice by other teams for validity (Each of the CAP exam questions takes about eight man-hours of effort by subject matter experts to create and validate.)

d) Evaluation and editing of questions by professional Psychometricians

e) Tracking exam question responses to determine their statistical validity

f) Multiple exams and careful management of questions for security

g) Continual updating of questions to remain current with changing technology

h) Isolation of the exam questions from any review course instructors to avoid teaching to the specific exam items. This means that any review material can focus on the subjects in the exam, but cannot address the specific questions in the exam.

Contact: **+1 919 549 8411**
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Setting the Standard for Automation™

What qualifications are needed to become a CAP®?

To qualify to become a CAP ...
1) You must meet minimum requirements for work experience and education.
2) You must pass a multiple choice exam.

The following are acceptable work experience and education requirements:

If you hold a four-year technical degree:
1) **Four-year academic degree** from an accredited educational institution in a technical or technology field, including engineering, chemistry, physics, math, etc., documented with an official transcript.
2) **Related work experience**
   - Minimum of five (5) years documented work experience during the five-year period immediately prior to your application date. One year of work experience means at least 1500 hours of active employment.

If you hold a two-year degree or do not have a degree:
1) **Related work experience**
   - Minimum of ten (10) years documented work experience during the ten-year period immediately prior to your application date. One year of work experience means at least 1500 hours of active employment.
   - An Associate Degree in automation or a related technology from an accredited educational institution will count as two (2) years of work experience, when documented with an official transcript.

2) **Evidence of responsible charge position†**
   Two (2) work-related references demonstrating that the applicant has had at least two (2) years experience in automation in a position of responsible charge.

   † The span of control necessary to be considered in a position of responsible charge includes:
   - Personally makes critical automation project decisions or reviews and approves proposed decisions prior to implementation, including consideration of alternatives.
     OR
   - Judges the quality of other technical specialists and the validity and applicability of their recommendations before such recommendations are incorporated into the work.

Work experience and educational periods may not overlap when compiling the total number of years required for this certification. For a more detailed description of the CAP requirements, **visit www.isa.org/CAP.**

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Setting the Standard for Automation

What is the CAP® body of knowledge?

The automation body of knowledge is broad and covers basic continuous control; discrete, sequencing, and manufacturing control; advanced control; reliability, safety, and electrical; integration and software; deployment and maintenance; and project work structure.

For a person to pass the CAP exam, he/she must have a strong knowledge of these technical areas:

- **Basic Continuous Control:** Instrumentation, analyzers, and control valves; PID control; tuning controllers; control documentation; and DCS systems
- **Discrete and Manufacturing Control:** Manufacturing sensors, actuation, discrete, and sequencing control; PLCs and motors and drives; and motion control
- **Advanced Control:** Process modeling and simulation, ISA88 batch, advanced process control, environmental monitoring, and building automation

- **Reliability, Safety, and Electrical:** Alarm management, safety instrumented systems, electrical installations, and electrical safety
- **Integration and Software:** Digital communication concepts, industrial communication protocols, manufacturing execution systems and business integration, security, operator interface, and data management
- **Deployment and Maintenance:** Operator training, checkout, testing, startup, troubleshooting, and maintenance concepts
- **Work Structure:** Project definition and justification, project management, interpersonal relationships, and working with teams

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"The CAP exam is about more than theoretical knowledge. It's about having experience."

— Kim Miller Dunn, CAP, Dir. Sales Development & Support, Emerson Process Management, Rosemount Analytical Liquid Division

Setting the Standard for Automation™

How can ISA help candidates prepare for the CAP® exam?

ISA encourages all exam applicants to visit **www.isa.org/CAP** to ...

- Familiarize themselves with the exam format and topic areas
- Read common FAQ's
- Take advantage of the various CAP-related resources, including:
  — *Certified Automation Professional (CAP) Study Guide*
  — *A Guide to the Automation Body of Knowledge*
  — Certified Automation Professional (CAP) Review Course
  — Automation Professionals Training Path, built around the technical topics covered on the CAP Exam
  — CAP Learning System (self-directed and online, instructor-assisted options available)
  — Relevant publication resources, such as standards and books

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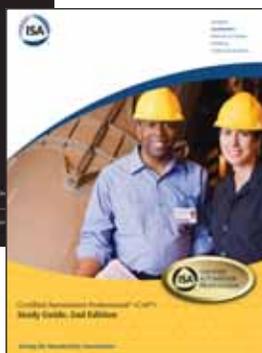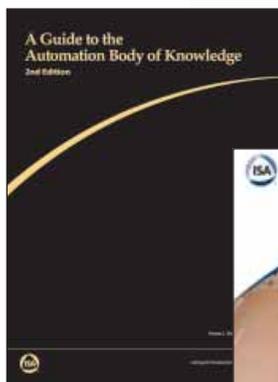
How do you become a CAP®?

CAP®

CERTIFIED AUTOMATION PROFESSIONAL®

To become a CAP …
- Visit the ISA website at **www.ISA.org/CAP** to download a copy of the CAP Handbook and application. Note that applications can be submitted online.
- Review the list of study resources for exam preparation, including the CAP Study Guide, CAP Review Course, and CAP Learning System.

- Submit your completed application to ISA by the next testing window application deadline. For details on testing windows visit **www.isa.org/examschedule**.
- Take and pass the CAP exam.
- Recertify every three years to maintain your CAP certification.

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"This is an elite group that truly gets the full picture. And that's really what CAP is all about."
—Dean Ford, CAP, Director of Enterprise Application Integration, Maverick Technologies

Setting the Standard for Automation

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