What is automation?

What type of education do I need?

Show me the money!

What type of work would I do?

Where would I work?

Start now!

What is automation A to Z?

What are people saying?

Are you ready?

What type of education do I need?

Show me the money!
This brochure is sponsored by:

The International Society of Automation (www.isa.org) is a nonprofit professional association that sets the standard for those who apply engineering and technology to improve the management, safety, and cybersecurity of modern automation and control systems used across industry and critical infrastructure. Founded in 1945, ISA develops widely used global standards; certifies industry professionals; provides education and training; publishes books and technical articles; hosts conferences and exhibits; and provides networking and career development programs for its 36,000 members and 350,000 customers around the world.

ISA owns Automation.com, a leading online publisher of automation-related content, and is the founding sponsor of The Automation Federation (www.automationfederation.org), an association of non-profit organizations serving as “The Voice of Automation.” Through a wholly owned subsidiary, ISA bridges the gap between standards and their implementation with the ISA Security Compliance Institute (www.isasecure.org) and the ISA Wireless Compliance Institute (www.isa100wci.org).
Be “in control” of your future!
Have you watched a TV, driven a car, used running water, listened to an iPod, played games on your Wii, or sent text messages on your cell phone lately? Nearly every modern convenience is the result of complex processes. Without talented individuals to design, build, improve, and maintain these processes, our world and our future would be very different. Automation and control professionals literally control the world.

What is automation?
Automation is the creation and application of technology to monitor and control the production of goods and services.
A solid educational background is essential for success in this dynamic career field. Each job type also has specific educational requirements.

**Engineering and Design Jobs**
- Degree from a 4-year accredited college or university
- Suggested degrees:
  - Engineering degree in a process-oriented discipline such as chemical, electrical, control systems, or mechanical engineering
  - Physics, mathematics, chemistry, or computer science can also provide a sound background
- Courses offering hands-on training are important
- Engineers usually must be registered and licensed in order to work

**Manufacturing, Research, and Sales Jobs**
- Solid technical background
- Marketing and business courses
- Research positions require an advanced degree in engineering or an applied science

**Automation Technician and Maintenance Jobs**
- Graduation from technical, vocational, or community college program; or equivalent military training; or several years of related experience
- Appropriate degree programs include:
  - Instrumentation technology
  - Electronics
  - Mechanics
  - Robotics
  - Electromechanical technology
- Applied math and science courses and courses offering hands-on experience are recommended
- Industry certifications—like ISA’s Certified Control Systems Technician® (CCST®) certification—may also be required

Many colleges and schools offer training for these careers. Check with your guidance counselor and/or with professional organizations such as ISA for information on educational programs in your area.

No matter which path you choose, your education will continue throughout your career in automation and control. Continuing professional development and training are a must in this rapidly changing field.
Show me the money!

Face it, not all of us can become NFL players making an average of $1.1 million per year. Nor will many of us have an opportunity to perform in Oscar-nominated movies making millions of dollars.

Most of us will need to find a real job in the “regular” world. While you might not get multi-million dollar endorsements or perform in front of thousands of fans, a career in automation can offer you a great salary and really cool job opportunities.

And, with a retiring workforce of more than 80 million Baby Boomers, there are and will be plenty of fun and rewarding job opportunities in automation and control waiting for you.

How much do automation professionals make?

<table>
<thead>
<tr>
<th>Salary Range</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>$30,000 or below</td>
<td>4%</td>
</tr>
<tr>
<td>$30,001-$50,000</td>
<td>6%</td>
</tr>
<tr>
<td>$50,001-$70,000</td>
<td>17%</td>
</tr>
<tr>
<td>$70,001-$90,000</td>
<td>21%</td>
</tr>
<tr>
<td>$90,001-$110,000</td>
<td>23%</td>
</tr>
<tr>
<td>$110,001-$130,000</td>
<td>14%</td>
</tr>
<tr>
<td>$130,001 and above</td>
<td>15%</td>
</tr>
</tbody>
</table>

Source: InTech, October 2008

Personal Qualifications

If you’ve read this far, you’ve already demonstrated one of the most important qualifications—an interest in technology, science, and math. To be successful in automation and control, you’ll need a desire to learn how things work, as well as a desire to make them work better!

Other personal characteristics may include:

- Mechanical ability
- Ability to work with others
- Ability to think logically
- Good oral and written communication skills
- Self-confidence
- Coolness under pressure
- Willingness to accept responsibility
- Leadership ability
- Adaptability
- Self-discipline and ability to focus on the task at hand
Where would I work?

The better question is: “Where do you NOT want to work?” Automation and control professionals can be found in just about any industry, company type, and geographic location.

You could find yourself working in industries like:
- Oil, wind, and solar power production
- Food and beverage manufacturing
- Computer software and networking
- Cybersecurity and national defense
- Government, military, and defense
- NASA and space programs
- Automotive industry, including the racing industry
- Amusement parks and roller coaster design
- Pharmaceutical and chemical manufacturing

Did you know?

…automation professionals are responsible for designing many of the various shows, including Cirque du Soleil, in Las Vegas?

…many aspects of amusement parks, such as temperature control, rides, and light and water shows, involve the work of automation professionals?
While it might be more fun right now to spend time hanging with friends, playing video games, or discussing the latest TV shows, don’t forget to spend some time planning your future—after all, you’re in control of it!

Discuss this information with your school’s guidance counselor or your career advisor. Ask for information on appropriate educational programs related to this area. Find out what these programs offer and the requirements for admission. Your counselor might also know of courses that you can take now to prepare for a career in automation.

**Don’t let college costs scare you away from what you want!**

There are tons of options out there for anyone looking to go to college, it might just require some time and research. Many colleges and universities, as well as private industry, offer scholarship programs and financial aid. Consider a community college—many of them offer technical programs. The International Society of Automation (ISA) offers scholarships to students currently studying in an automation degree program. Student loan and government assistance programs might also be available. Veterans and members of the armed forces should also investigate special educational assistance programs available to them.

**Get more information about automation and control.**

ISA, a professional organization and founding member of the Automation Federation, has student and professional sections throughout the world. Members active in these sections can be good sources of information and advice. Visit [www.isa.org](http://www.isa.org) for more information.
A. **Automation**
The creation and application of technology to monitor and control the production of goods and services.

B. **Bus**
A group of wires or conductors, considered as a single entity, which interconnects part of a system.

C. **Control**
Frequently, one or more of the components in any mechanism responsible for interpreting and carrying out manually initiated directions.

D. **Deflector**
A device for changing direction of a stream of air or of a mixture of pulverized fuel and air.

E. **Electroscope**
An instrument for detecting an electric charge by observing the effects of mechanical force exerted between two or more electrically charged bodies.

F. **Flowmeter**
A device that measures the rate of flow or quantity of a moving fluid in an open or closed conduit.

G. **Gauge**
A device for determining dimensions such as thickness or length.

H. **Hygrometer**
An instrument for directly indicating humidity.

I. **Instrument**
A device used directly or indirectly to measure and/or control a variable.

J. **Job Control Language (JCL)**
A language for identifying a job and requesting action from a computer operating system.

K. **Kirchoff’s Law**
The sum of the voltage across a device in a circuit series is equal to the total voltage applied to the circuit.

L. **Loop**
A combination of two or more instruments or control functions arranged so that signals pass from one to another for the purpose of measurement and/or control of a process variable.

M. **Monolithic**
An integrated circuit that has had all of its components formed on a single piece of semi-conductor material.

N. **Network Management**
The facility by which network communication and devices are monitored and controlled.

O. **Optimization**
Making a design, process, or system as nearly perfect in function or effectiveness as possible.
P. Poka yoke
A Japanese term that means “fail-safing” or “mistake-proofing.” A poka-yoke is any mechanism in a Lean manufacturing process that helps an equipment operator avoid (yokeru) mistakes (poka).

Q. Quality Assurance
A set of systematic actions intended to provide confidence that a product or service will continually fulfill a defined need.

R. Robotics
The area of artificial computer intelligence as applied to the use of industrial robots.

S. Standardization
The adoption of generally accepted uniform procedures, dimensions, materials, or parts that directly affect the design of a product or facility.

T. Test Point
A process connection to which no instrument is permanently connected, but which is intended for the temporary or intermittent connection of an instrument.

U. User Interface
The way a program communicates with an operator.

V. Valve
A device used for the control of fluid flow.

W. Wireless
The transfer of information over a distance without the use of electrical conductors or wires.

X. XML (Extensible Markup Language)
A set of rules for encoding documents electronically.

Y. Yield
The amount of a substance produced.

Z. Zero a device
To erase all the data stored on a volume and reinitialize the format of the volume.

"If you’ve ever heard the statement, ‘I get paid to do a very fun job,’ this is it! Automotive controls engineering is extremely rewarding. We have a slogan in our department, ‘We make things work!’"

James J. Abramczyk
Automotive Body Shop Controls Engineer
General Motors Corporation

"Though I actually started over to get into this field, I was always interested, from a young age, in the electrical field. It always amazed me how something you can’t see can make a mixer turn or operate a TV."

Rick Schiesl
Electrical engineer
WILD FLAVORS, Inc.

"I’ve always had a curiosity for how things are made and how they work."

Neil Green
Sales Engineer
CIMTEC Automation, LLC.

"Joining the Navy introduced me to this field as a Nuclear Electrician’s Mate aboard a fast-attack submarine."

David Akins
Automation professional
Lucite International, Inc.

"I was so impressed that he (programmer at a facility) could add a valve in the field and then add it to a computer screen and operate it. I thought, ‘man that is so cool!’"

Jeanine Gordon, P.E.
Controls engineer
BASF Catalysts, LLC.

Don’t just fall into a job—dream, choose, and DO it!

Get more information at www.automationfederation.org/cool.
You MIGHT be an (aspiring) automation professional if...

...you rebuilt the playground swings to include a remote controlled swing mechanism for those not able to swing themselves

...you, by third grade, helped your brother with his high school algebra homework

...you, after successfully spelling the word piezospectroscopy, explained the meaning of it to the judges during first grade’s spelling bee

...you saw the flaw in the steering mechanism of your father’s soap box car before he stubbornly insisted on taking it for a test drive and missed the turn

...your high school’s theater production of Titanic included a sensor-controlled floor that opened up and swallowed the ship after it hit the temperature- and remote-controlled iceberg that you designed, built, and programmed

...you programmed your town’s Independance Day fireworks show to go off in sync with your favorite playlist
About the Automation Federation
The Automation Federation is a global umbrella organization of sixteen (16) member organizations and six working groups engaged in automation activities. The Automation Federation enables its members to more effectively fulfill their missions, advance the science and engineering of automation technologies and applications, and develop the workforce needed to capitalize on the benefits of automation. The Automation Federation is the “Voice of Automation.” For more information about the Automation Federation, visit www.automationfederation.org.