# Warming Up to the Idea of **HVAC&R** Engineering

From winter hockey to summer baseball, ice cream to silicon wafers, mechanical engineering affects your daily life in more ways than you realize. If you have ever gotten a flu shot, flown on an airplane, eaten frozen pizza, worked on a computer at school, swam in a heated pool, visited the penguins in the zoo, gone ice skating or even just stood under an air conditioning vent in your house to cool off—you've experienced a specific kind of mechanical engineering called heating, ventilating, air conditioning and refrigerating (HVAC&R) engineering.

Through the design and development of equipment and systems, HVAC&R industry professionals have created comfortable, healthy and energy-efficient indoor environments at home and at work, in schools, hospitals, cars, airplanes and even space capsules.

If you thought heating, air conditioning, ventilating and refrigerating was just a bunch of hot air before, you're about to discover how cool HVAC&R can be...

#### **Engineering Classes**

Now that you've chosen your dream college for mechanical engineering, what are some of the classes you can expect to take?

#### **Bachelor Level Courses:**

Engineering Thermodynamics Mechanics of Materials Heat Transfer Fluid Mechanics Design for Manufacturing Combustion Systems

According to the 2009 Salary Survey from the National Association of Colleges and Employers (NACE), engineers have the highest starting salaries, with mechanical engineers ranking 7th among top-earning majors with a starting salary of **\$58,766** a year.

#### Associate/Vocational/ Trade Level Courses:

Refrigeration Fundamentals Air Conditioning Principles AC Systems/Installation Commercial Air Conditioning Commercial Refrigeration HVAC&R Controls



www.ashrae.org/ashraek12 students@ashrae.org



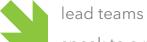
### **An HVAC&R Engineer**

### Must Be Able to ...



participate as part of a team

solve problems



speak to a public audience



impact



learn outside the classroom

conduct research

understand real-world

### Courses That Will Put You on the Path to HVAC&R Engineering

It's never too early to prepare for your future career. When choosing classes each semester, keep these tips in mind:

- → Most engineering schools require four years of math.
- → Pre-calculus, calculus and AP calculus are highly recommended.
- → When choosing science courses, physics and chemistry are suggested.
- → Remember, engineers must be able to communicate their ideas effectively. Strong writing and communication skills are a must–English and speech classes should be embraced, not avoided.

## **Cool** questions and **Hot** answers.

#### What Does a Chicken have to do with HVAC&R?

When Sir Francis Bacon, a British scientist who lived in the 1600s, wanted to see if the cold could keep food fresh, he killed and stuffed a chicken with snow. Later, people who lived near where Bacon had conducted his experiment began to hear a chicken squawking in the night and swore they saw a half-plucked bird running up and down the road, only to disappear into a brick wall. Almost 200 years later, Clarence *Bird*seye patented quick-freezing food for freshness. Coincidence? Or does the ghost of the original frozen meal live on?

#### Sick and Tired of Being Sick and Tired?

Vaccines must be kept cold in order to be effective. From the cold storage unit at the vaccine manufacturing plant to the refrigerator at your doctor's office, HVAC&R engineers help design and build the machines and systems that keep vaccines at the perfect temperature for fighting viruses.

#### What's Hot and Cold and Out of This World?

Perhaps an HVAC&R engineer's most important role in a space mission is designing the ventilation systems that provide astronauts with life support. Space shuttles also use special technology to convert sunlight into energy, while passive cooling techniques make use of reflective paints and shading. These same technologies are designed and used by HVAC&R engineers who create systems for energy efficient buildings. HVAC&R engineers increase the efficiency of resource-use such as energy and water, while reducing a building's impact on human health and the environment.

### Careers in HVAC&R: One Hot Industry

**Consulting:** Consulting engineers design air conditioning systems for new facilities and apply updated technology to existing facilities.

**Utilities:** Utility companies are involved in generating and distributing the energy that operates HVAC&R systems. Jobs in the utility sector include estimators, administrators, technicians, consultants/designers and project managers.

**Contracting and Service:** After plans for new or renovated projects are completed, HVAC&R contractors assemble, build, test and operate the HVAC&R system.

**Manufacturing:** Manufacturers develop and produce equipment and systems used in the HVAC&R industry.

**Facilities:** Facility management requires a range of engineering and management skills. Facility engineers manage the planning and construction of new buildings and oversee the renovation of existing buildings.

**Government:** Government agencies in city, state and federal government develop policy and regulations that affect the design and construction of buildings. Engineers who work in these agencies are the vital technical link between the elected officials and the construction industry.



# Which college or university is the right choice for your HVAC&R degree?

For a full list of Colleges and Universities with accredited engineering programs, please refer to the Accreditation Board for Engineering (ABET) website at www.abet.org.

For technical or vocational schools please refer to the Partnership for Air-Conditioning, Heating, Refrigeration Accreditation website at www.pahrahvacr.org. Additional information can be found at www.hvacagent.com.

#### Associate Level Programs: Technical/Vocational/ Trade Schools\*

Belmont Technical College (St. Clairsville, OH)

Blackhawk Technical College (Janesville, WI)

DeKalb Technical College (Atlanta, GA)

Eastern Maine Community College (Bangor, ME)

Elgin Community College (Elgin, IL)

Gwinnett Technical College (Lawrenceville, GA)

Massasoit Community College (Canton, MA)

Oakton Community College (Des Plaines, IL)

\*This is just a small sample of the many schools of programs offered in North America.

#### Bachelor Level Programs: 4-Year Colleges and Universities\*

Cal Poly State University (San Luis Obispo, CA)

Kansas State University (Manhattan, KS)

Milwaukee School of Engineering (Milwaukee, WI)

Penn State University (University Park, PA)

Pennsylvania College of Technology (Williamsport, PA)

Seneca College (Toronto, CAN) Texas A & M University (College Station, TX) University of Central Florida (Orlando, FL) University of Georgia (Athens, GA) University of Hartford (Hartford, CT) University of Illinois at Chicago (Chicago, IL) University of Maryland (College Park, MD) University of Minnesota (Minneapolis, MN) University of Nebraska at Omaha

(Omaha, NE) University of Oregon (Eugene, OR)

iversity of Windsor (Ontario, CAN)