Systems Engineering

Starting salary (for industrial engineering): $58,581
Median Income (for industrial engineering): $78,860

According to the systems engineering department at George Mason University, "Systems Engineering is the 'people-oriented engineering profession.' Systems Engineers determine the most effective ways for an organization to use all of a given system's components – people, machines, materials, information, and energy.

Systems engineers plan, design, implement and manage complex systems that assure performance, safety, reliability, maintainability at reasonable cost and delivered on time." Systems engineers take pieces or parts from several different sectors and integrate them into a complete unit or process. For example, a systems engineer working in the telecommunications industry may work with computer or software engineers to develop a program, with mechanical engineers to design the parts, and with electronic engineers to design the circuit boards for a new disposable cell phone or telephone system. Most systems have mechanical or electrical aspects and may include one or more computers as well. A systems engineer is a specialist in integrating the pieces of a system into a process or into an effective whole. For example, an automobile is an integrated system. Electrical engineers create the electrical aspects such as the ignition and dashboard; materials engineers work with the materials aspects such as designing for aerodynamics or developing puncture resistant tires; mechanical engineers deal with the mechanical aspects such as creating high performance suspensions or lubrication systems. The systems engineer is responsible for bringing all of these components together to produce a car. The challenge associated with a complex system is to foresee or handle side effects that may occur when separate parts are brought together. The dashboard or suspension may not meet the aerodynamics specifications of the materials engineer, and the tires may not meet the suspension specifications of the mechanical engineer. The individual products may need to be redesigned to work together.

Job Outlook

Employment of Systems Engineers, similar to industrial Engineers is projected to grow 5 percent from 2012 to 2022, slower than the average for all occupations. This occupation is versatile both in the kind of work it does and in the industries in which its expertise can be put to use.

Industries with the highest levels of employment in this occupation:

1. Aerospace product and parts manufacturing
2. Machinery manufacturing
3. Architectural, engineering, and related services
4. Motor vehicle parts manufacturing
5. Management of companies and enterprises

Top paying industries for this occupation:

1. Aerospace product and parts manufacturing
2. Management of companies and enterprises
3. Architectural, engineering, and related services
4. Machinery manufacturing
5. Motor vehicle parts manufacturing

Source: US Bureau of Labor Statistics

Have you ever wondered how supermarkets and large stores keep their inventories of goods in balance? How they deliver those goods on time? How computers and automobiles are manufactured with quality and at competitive prices? How 1-800 and calling-card calls are handled and routed automatically through the telephone network? How thousands of airplanes and millions of travelers are scheduled and managed efficiently on a daily basis? The answer is systems engineering.

For more information, contact the control systems technical division of the society of the IEEE at www.ieeecss.org.

Glossary of Terms

Analyze - to study (something) closely and carefully : to learn the nature and relationship of the parts of (something) by a close and careful examination

Automate – to run or operate (something, such as a factory or system) by using machines, computers, etc., instead of people to do the work

Communications – the ways of sending information to people by using technology

Efficient – capable of producing desired results without wasting materials, time, or energy

Fabricate - to make or build (something)

Microprocessor - the device in a computer that manages information and controls what the computer does

Productivity – the rate at which goods are produced or work is completed

Streamline - to make (something) simpler, more effective, or more productive

System – a group of related parts that move or work together

ABET Accredited Programs in Systems Engineering			
School Name	**Location**	**Website**	**Program and Degree Name**
Air Force Institute of Technology	Wright-Patterson Air Force Base, OH, US	www.afit.edu	Systems Engineering, MS
Auburn University	Auburn, AL, US	www.auburn.edu	Industrial and Systems Engineering, BISE
Case Western Reserve University	Cleveland, OH, US	www.case.edu	Systems and Control Engineering, BS
George Mason University	Fairfax, VA, US	www.gmu.edu	Systems Engineering, BS-SYST
Lehigh University	Bethlehem, PA, US	www.lehigh.edu	Information & Systems Engineering, BS
Naval Postgraduate School	Monterey, CA, US	www.nps.navy.mil	Systems Engineering, MSSE
Northern Illinois University	Dekalb, IL, US	www.niu.edu	Industrial and Systems Engineering, B.S.
Oakland University	Rochester, MI, US	www.oakland.edu	Industrial and Systems Engineering, BSE
Oakland University	Rochester, MI, US	www.oakland.edu	Industrial and Systems Engineering, BSE
Ohio University	Athens, OH, US	www.ohiou.edu	Industrial and Systems Engineering, BS
Philadelphia University	Philadelphia, PA, US	www.philau.edu	Industrial and Systems Engineering, B.S.E.
Philadelphia University	Philadelphia, PA, US	www.philau.edu	Industrial and Systems Engineering, B.S.E.
San Jose State University	San Jose, CA, US	www.sjsu.edu	Industrial and Systems Engineering, BS
State University of New York at Binghamton	Binghamton, NY, US	www.binghamton.edu	Industrial and Systems Engineering, BS
The Ohio State University	Columbus, OH, US	www.osu.edu	Industrial and Systems Engineering, BSIE
The University of Alabama in Huntsville	Huntsville, AL, US	www.uah.edu	Industrial and Systems Engineering, BSE
United States Air Force Academy	USAFA, CO, US	www.usafa.af.mil	Systems Engineering, BS
United States Military Academy	West Point, NY, US	www.usma.edu	Systems Engineering, BS
United States Naval Academy	Annapolis, MD, US	www.usna.edu	Systems Engineering, BS
University of Arizona	Tucson, AZ, US	www.arizona.edu	Systems Engineering, BSSE
University of Arkansas at Little Rock	Little Rock, AR, US	www.ualr.edu	Systems Engineering, BS
University of Florida	Gainesville, FL, US	www.ufl.edu	Industrial and Systems Engineering, BS
University of Michigan-Dearborn	Dearborn, MI, US	www.umd.umich.edu	Industrial and Systems Engineering, BSE
University of Pennsylvania	Philadelphia, PA, US	www.upenn.edu	Systems Science and Engineering, BSE
University of San Diego	San Diego, CA, US	www.acusd.edu	Industrial and Systems Engineering, BS/ BA
University of Southern California	Los Angeles, CA, US	www.usc.edu	Industrial and Systems Engineering, BS
University of Virginia	Charlottesville, VA, US	www.virginia.edu	Systems Engineering, BS
Virginia Polytechnic Institute and State University	Blacksburg, VA, US	www.vt.edu	Industrial and Systems Engineering, BS
Washington University	St. Louis, MO, US	www.wustl.edu	Systems Science and Engineering, BS
Wright State University	Dayton, OH, US	www.wright.edu	Industrial and Systems Engineering, BS
Youngstown State University	Youngstown, OH, US	www.ysu.edu	Industrial and Systems Engineering, BE