



Educational Objectives for ECSE Programs:

Within this department, students may obtain the Bachelor of Science degree in three disciplines: electrical engineering, computer and systems engineering, or electric power engineering. The department also encourages students to consider graduate study in any of these three curricula. A professional program option, which leads to both the B.S. and M.Eng. degree, is also open to qualified students.

Graduates of our programs will be prepared to:

1. Obtain entry-level engineering positions in industry and/or admission to graduate study programs in their areas of interest.
2. Establish themselves as problem-solvers and innovators, having a solid foundation in electrical, computer and systems, or electric power engineering and the ability to apply this background to solve real-world problems.
3. Function effectively in a professional environment, having the necessary communication and leadership skills and the ability to view their own work in a broader context.
4. Continue to develop professionally through life-long learning.

Mission

These objectives are fully consistent with the mission of the Rensselaer School of Engineering:

To educate leaders of tomorrow for technology-based careers; to celebrate discovery, and the responsible application of technology; to create knowledge and global prosperity. (http://www.eng.rpi.edu/soe/profile_mission.cfm)

Educational Outcomes for ECSE Programs:

Electrical Engineering:

Traditionally the largest and most diverse in all of engineering, this curriculum offers courses with various degrees of emphasis on theory, design, experimental work, and computer simulation. Subject matter ranges from semiconductors and electromagnetics to circuits and electronics, and to large-scale control, computer, communication, and information processing systems.

To achieve the Programmatic Educational Objectives, students in Electrical Engineering will have:

1. A foundation in mathematics, science and engineering and an ability to apply these to practical use.
2. Broad exposure to the basic disciplines within Electrical Engineering, including circuits, electronics, electromagnetics, systems, and computer hardware.
3. Depth in at least one discipline within Electrical Engineering.
4. An ability to design and conduct experiments and to analyze and interpret data.
5. An ability to identify, formulate and solve engineering problems.
6. An ability to design a system, component, or process to meet desired needs.
7. An ability to communicate in a professional, technical manner, both in written and oral form.
8. An understanding of how to function as part of a multidisciplinary team, both as a leader and team member.
9. Preparation for life-long learning including experience in independent learning using web, textbook and/or journal resources.
10. An awareness of ethical issues related to engineering and the fact that engineering decisions can have important safety, health and public welfare implications.
11. An exposure to several areas, and depth in at least one area, of the humanities and social sciences.
12. Experience using state-of-the-art laboratory equipment and software tools.
13. A variety of instruction formats, including those that incorporate innovative delivery approaches.

Computer and Systems Engineering:

This field is one of the fastest-growing branches of engineering. Strong course sequences in software, hardware, and systems engineering are available. Students consider the digital computer as a system in itself, as a tool for modeling and design, and as an online element within a real-time system. There is the flexibility to study in depth automatic control, communications, or information processing, in addition to computer software, systems, and hardware.

To achieve the Programmatic Educational Objectives, students in Computer and Systems Engineering will have:

1. A foundation in mathematics, science and engineering and an ability to apply these to practical use.
2. Broad exposure to the basic disciplines within Computer and Systems Engineering, including computer hardware, architectures, operating systems, networks, data structures and software.
3. Depth in at least one discipline within computer and systems engineering.
4. An ability to design and conduct experiments and to analyze and interpret data.
5. An ability to identify, formulate and solve engineering problems.
6. An ability to design a system, component, or process to meet desired needs.
7. An ability to communicate in a professional, technical manner, both in written and oral form.
8. An understanding of how to function as part of a multidisciplinary team, both as a leader and team member.
9. Experience in independent learning, using web, textbook and/or journal resources.
10. An awareness of ethical issues related to engineering and the fact that engineering decisions can have important safety, health and public welfare implications.
11. An exposure to several areas, and depth in at least one area, of the humanities and social sciences.
12. Experience using state-of-the-art laboratory equipment and software tools.
13. Provide instruction using a variety of formats and incorporating innovative delivery approaches.

Electric Power Engineering:

The traditional place for electric power studies in a university is in the electrical engineering program, where the power option is offered as one of several concentrations; at Rensselaer, electric power is a separate degree program. It maintains strong ties to industry and is dedicated to preparing students for careers in power generation, delivery, or equipment; power electronics applied to drives and power conditioning; or at the intersection of electric power, economics, and management.

To achieve the Programmatic Educational Objectives, students in Electric Power Engineering will have:

1. A foundation in mathematics, science and engineering and an ability to apply these to practical use.
2. A foundation in electromagnetics, electromechanics and power semiconductor applications.
3. Knowledge of the characteristics and behavior of power systems.
4. Knowledge of the essentials of electrical energy conversion both through machines and power electronics.
5. An ability to design and conduct experiments and to analyze and interpret data.
6. An ability to identify, formulate and solve engineering problems.
7. An ability to design a system, component, or process to meet desired needs.
8. An ability to communicate in a professional, technical manner, both in written and oral form.
9. An understanding of how to function as part of a multidisciplinary team, both as a leader and team member.
10. Experience in independent learning, using web, textbook and/or journal resources.
11. An awareness of ethical issues related to engineering and the fact that engineering decisions can have important safety, health and public welfare implications.
12. An exposure to several areas, and depth in at least one area, of the humanities and social sciences.
13. Experience using state-of-the-art laboratory equipment and software tools.
14. Provide instruction using a variety of formats and incorporating innovative delivery approaches.