Sample Learning Outcomes: Engineering

Civil Engineering

Students will be able to:

1. Identify the broad context of civil engineering problems, including describing the problem conditions, identifying possible contributing factors, and generating alternative solution strategies.
2. Design the fundamental elements of civil engineering systems, system components and processes, with a good understanding of associated safety, quality, schedule and cost considerations.
3. Undertake laboratory, field and other data collection efforts using commonly used measurement techniques to support the study and solution of civil engineering problems.
4. Employ mathematics, science, and computing techniques in a systematic, comprehensive, and rigorous manner to support the study and solution of civil engineering problems.
5. Synthesize analysis results to provide constructive and creative engineering solutions that reflect social and environmental sensitivities.
6. Exhibit good teamwork skills and serve as effective members of multidisciplinary project teams.
7. Articulate and justify technical solutions to diverse audiences through oral, written, and graphical communication.
8. Understand the importance of professional and ethical responsibilities of civil engineers, and be aware of codes of conduct and other sources of guidance for professionally ethical decision-making.
9. Understand the constantly evolving nature of civil engineering design and practice, and recognize the need to stay abreast of the latest developments in the field.

Electrical Engineering

Students will be able to

1. to understand the mathematical and physical foundations of electrical engineering and how these are used in electronic devices and systems. An understanding that engineering knowledge should be applied in an ethically responsible manner for the good of society.
2. to critically evaluate alternate assumptions, approaches, procedures, tradeoffs, and results related to engineering problems.
3. to design a variety of electronic and/or computer-based components and systems for applications including signal processing, communications, computer networks, and control systems.
4. to lead a small team of student engineers performing a laboratory exercise or design project; to participate in the various roles in a team and understand how they contribute to accomplishing the task at hand.
5. to use written and oral communications to document work and present project results.

1 “BS Civil Engineering Educational Outcomes,” Department of Civil Engineering, College of Engineering, University Texas at Austin, [http://www.ce.utexas.edu/ABET-CE.cfm](http://www.ce.utexas.edu/ABET-CE.cfm)

2 Modified from Electrical Engineering Objectives and Outcomes,” Department of Electrical and Computer Engineering, University of Rhode Island, [http://www.ele.uri.edu/ugprog/electrical/objectives.html](http://www.ele.uri.edu/ugprog/electrical/objectives.html)
Sample Learning Outcomes: Engineering, cont.

Mechanical Engineering³
What students are expected to know at the time of graduation
1. Apply energy, momentum, continuity, state and constitutive equations to thermal, fluids and mechanical systems in a logical and discerning manner.
2. Design and perform laboratory experiments for thermal, fluid and mechanical systems to gather data and test theories.
3. Design thermal, fluid, mechanical and control systems to meet specifications.
4. Participate effectively in the same-discipline and cross-disciplinary groups.
5. Identify, formulate, and solve thermal, fluid and mechanical engineering problems by applying first principles, including open-ended problems.
6. Develop practical solutions for mechanical engineering problems under professional and ethical constraints.
7. Communicate effectively with written, oral, and visual means in a technical setting.
8. Recognize the fact that solutions may sometimes require non-engineering considerations such as art and impact on society.
10. Recognize environmental constraints and safety issues in engineering
11. An ability to use modern modeling and simulation techniques, and computing tools.

Bioengineering⁴
1. Desired outcomes of the Bioengineering program are:
2. The ability to apply knowledge of life sciences, advanced mathematics (including differential equations and statistics), physical sciences, and engineering to biological and medical systems
3. The ability to design, conduct and document laboratory experiments involving biological or medical systems
4. The ability to design systems, devices and processes for use in medicine, health care or biological applications
5. The ability to function on multidisciplinary teams consisting of engineers, clinicians, medical researchers, biologists and non-technical personnel
6. An ability to identify, formulate, and solve problems at the interface of engineering and biology
7. An understanding of professional and ethical responsibilities in biology and medicine
8. The ability to communicate effectively their work and ideas in oral and written forms
9. An understanding of the economics, technical aspects, and societal impact of biomedical research, process development or product development
10. A recognition of the need for and the ability to engage in life-long learning
11. A knowledge of contemporary issues in biology and medicine
12. The ability to use modern techniques, skills and tools necessary for bioengineering practice and for disseminating the results of their work
13. An understanding of biology and physiology
14. The ability to obtain, analyze and interpret data from living systems, addressing the problems associated with the interaction between living and non-living materials and systems
15. An understanding of intellectual property and patents, marketing, the regulatory environment and quality control issues for products and processes used in medicine and health care


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