

Mapping of Program Educational Objectives and Student Learning Outcomes for the School of Biomedical Engineering, Science and Health Systems Undergraduate Program to ABET Standards and Drexel Learning Priorities

I. PEO – Professional Presence. As a result, within a few years, the graduate has established an Internet presence, either through professional organizations, social networking and/or other activities which demonstrate an appreciation and use of modern technological capabilities.

SLO - Communication – The graduate employs an understanding of audience, purpose and context to communicate effectively in a range of situations using appropriate media while displaying a significant aptitude for presenting scientific and technical materials to diverse audiences.

Supported By

- a. **ABET g** Ability to communicate effectively
- b. **Drexel Learning Priority - Communication:** Employ an understanding of audience, purpose and context to communicate effectively in a range of situations using appropriate media

SLO - Technological Skills – The graduate makes appropriate use of technologies to communicate, collaborate, solve problems, make decisions, and conduct research, as well as foster creativity and life-long learning. The graduate is able to use state-of-the-art technological resources and tools and keeps up on advancements in her or her field of study and/or practice.

Supported By

- a. **ABET k:** Ability to use the techniques, skills and modern engineering tools necessary for engineering practice
- b. **Drexel Learning Priority - Technology Use:** Make appropriate use of technologies to communicate, collaborate, solve problems, make decisions, and conduct research, as well as foster creativity and life-long learning

II. PEO – Workforce Skilled in Integrating Engineering, Design, and Life Sciences

As a result, graduates will identify opportunities to contribute to society from a variety of positions, ranging from biomedical engineering, biotechnology design and development to practicing physicians, lawyers, innovators, entrepreneurs and business managers. The graduate may also pursue further education in the form of graduate and professional degrees.

SLO - Innovation and Design – The graduate often asks questions and makes observations that lead to new ideas or hypotheses. He or she formulates highly original solutions while moving beyond the conventional to new methods blending creative and practical approaches, methods and designs which may involve pioneering applications along the interface of engineering and biology. The graduate has the ability to create quality products and processes that are state-of-the-practice in his or her field.

Supported By

- a. **ABET b - modified:** Ability to design and conduct experiments as well as to analyze and interpret data using statistical, computational or mathematical methods
- b. **ABET c – modified:** Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, entrepreneurial, environmental, intellectual property rights, social, political, health and safety, manufacturability and sustainability
- c. **Drexel Learning Priority - Creative and Critical Thinking:** Use divergent (e.g., generation of novel ideas, thinking out of the box, brainstorming) and convergent thinking (e.g., critical thinking, evaluation of ideas, quantitative/qualitative analysis, scientific reasoning) to generate novel and relevant ideas, strategies, approaches, or products

SLO - Problem-Solving Abilities– The graduate is able to creatively solve problems from both analytic and synthetic perspectives using multiple approaches, integrating the life sciences, engineering, and the humanities. The graduate is able to recognize, incorporate and adapt to the limitations and consequences of applying various problem solutions.

Supported By

- a. **ABET a:** Ability to apply knowledge of mathematics, science and engineering to solve problems at the interface of engineering and biology
- b. **ABET e:** Ability to identify, formulate, and solve engineering problems

- c. **Drexel Learning Priority - Creative and Critical Thinking:** Use divergent (e.g., generation of novel ideas, thinking out of the box, brainstorming) and convergent thinking (e.g., critical thinking, evaluation of ideas, quantitative/qualitative analysis, scientific reasoning) to generate novel and relevant ideas, strategies, approaches, or products

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- b. **Drexel Learning Priority - Technology Use:** Make appropriate use of technologies to communicate, collaborate, solve problems, make decisions, and conduct research, as well as foster creativity and life-long learning

III. PEO - Leadership in Research, Innovation and Design. As a result, within a few years of graduation, the graduate will have made significant or meaningful contributions in his or her chosen field, either through research publications and/or presentations, the development of a product or process, obtaining patents for new products and/or processes, or other evidence of contributing to the advancement of knowledge, particularly in fields integrating engineering and the life sciences.

SLO - Innovation and Design – The graduate often asks questions and makes observations that lead to new ideas or hypotheses. He or she formulates highly original solutions while moving beyond the conventional to new methods blending creative and practical approaches, methods and designs which may involve pioneering applications along the interface of engineering and biology. The graduate has the ability to create quality products and processes that are state-of-the-practice in his or her field.

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SLO - Leadership – The graduate is able to articulate a vision or goal in such a manner as to promote collaboration and successful implementation. The graduate displays a willingness to overcome adversity and work diligently in pursuit of goals, thus serving as a role model for others.

Supported By

- a. **Drexel Learning Priority - Research, Scholarship and Creative Expression:** Make meaningful contributions in their chosen field, participating in

- use-inspired research, scholarship or creative activity as an individual or in a collaborative effort
- b. **Drexel Learning Priority - Professional Practice:** Apply knowledge and skills gained from a program of study to the achievement of goals in a work, clinical, or other professional setting
 - c. **Drexel Learning Priority - Leadership:** Develop a vision, translate that vision into shared goals, and effectively work with others to achieve these goals

SLO - Research Abilities – The graduate is able to collect and process data, information and knowledge to answer specific questions or generate new conceptual models and hypotheses. The graduate evaluates these models and hypotheses using the appropriate experimental, mathematical and statistical approaches.

Supported By

- a. **ABET b - modified:** Ability to design and conduct experiments as well as to analyze and interpret data using statistical, computational or mathematical methods
- b. **ABET Program Requirement:** Ability to make measurements on, and interpret data from, living systems addressing problems associated with the interaction between living and non-living materials and systems.
- c. **ABET i:** Recognition of the need for, and ability to engage in, life-long learning
- d. **Drexel Learning Priority - Information Literacy:** Possess the skills and knowledge to access, evaluate and use information effectively, competently, and creatively
- e. **Drexel Learning Priority - Research, Scholarship and Creative Expression:** Make meaningful contributions in their chosen field, participating in use-inspired research, scholarship or creative activity as an individual or in a collaborative effort

IV. PEO – Ethical Reasoning, Behavior and Professionalism. As a result, within a few years of graduation, the graduate will demonstrate adherence to the professional codes of conduct appropriate to his or her field of study and/or practice, as well as exhibit behavior consistent with accepted standards of fiduciary responsibility, risk/benefit analysis and professional accountability

SLO - Ethical Reasoning, Behavior and Professionalism – The graduate recognizes ethical issues, considers multiple points of view, and uses critical ethical reasoning to determine the appropriate behavior to follow. The graduate thus demonstrates a high level of integrity and a positive work ethic combined with a thorough understanding of the ethical implications and obligations associated with the practice of biomedical engineering.

Supported By

- a. **ABET f:** Understanding of ethical and professional responsibilities
- b. **ABET c** – modified: Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, entrepreneurial, environmental, intellectual property rights, social, political, health and safety, manufacturability and sustainability
- c. **Drexel Learning Priority - Ethical Reasoning:** Assess their own ethical values and the social context of ethical problems, recognize ethical issues in a variety of settings, think about how different ethical perspectives might be applied to an ethical problem, and consider the consequences of alternative actions
- d. **Drexel Learning Priority - Global Competence:** Engage in, reflect upon, and demonstrate open mindedness toward all issues of diversity at the local, national and international level.

V. PEO - Communication. As a result, graduates will have outstanding communication skills as evidenced by their professional presentations, and in their productive interactions with co-workers. The graduates may also use their communication skills to foster collaborative effort among co-workers and/or may represent his or her company, institution and/or laboratory to other interested parties.

SLO - Communication – The graduate employs an understanding of audience, purpose and context to communicate effectively in a range of situations using appropriate media while displaying a significant aptitude for presenting scientific and technical materials to diverse audiences.

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- c. **Drexel Learning Priority - Leadership:** Develop a vision, translate that vision into shared goals, and effectively work with others to achieve these goals

SLO - Human Resources and Interactions – The graduate is able to work either independently or in diverse groups to effectively and efficiently to respond to academic and work requirements.

Supported By

- a. **ABET d:** Ability to function on multi-disciplinary teams
- b. **Drexel Learning Priority - Leadership:** Develop a vision, translate that vision into shared goals, and effectively work with others to achieve these goals

- c. **Drexel Learning Priority - *Self-Directed Learning*:**
Establish goals and monitor progress toward them by developing an awareness of the personal, environmental and task-specific factors that affect attainment of the goals

VI. PEO – Personal Engagement . As a result, within a few years, the graduate will be working independently and in diverse groups to effectively and efficiently achieve personal and organizational goals, engage in community or public service, create a product or process that fills a social need, and/or participate in educating individuals about an issue of societal concern.

SLO - Engagement – The graduate uses his or her knowledge and skills, including those associated with engineering and life science, to make a positive difference on issues of public concern.

Supported By

- a. **ABET h**: Ability to understand the impact of engineering solutions in a global, economic, environmental and societal contexts.
- b. **ABET j**: Knowledge of contemporary issues.
- c. **Drexel Learning Priority - Responsible Citizenship**: Create and sustain a healthy, engaged, public life

SLO - Human Resources and Interactions – The graduate is able to work either independently or in diverse groups to effectively and efficiently to respond to academic and work requirements.

Supported By

- a. **ABET d**: Ability to function on multi-disciplinary teams
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- c. **Drexel Learning Priority - Self-Directed Learning**: Establish goals and monitor progress toward them by developing an awareness of the personal, environmental and task-specific factors that affect attainment of the goals

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- b. **Drexel Learning Priority - Professional Practice**: Apply knowledge and skills gained from a program of study to the achievement of goals in a work, clinical, or other professional setting

- c. **Drexel Learning Priority - Leadership:** Develop a vision, translate that vision into shared goals, and effectively work with others to achieve these goals

Maps of the Relationships between the School’s Program Educational Objectives (PEOs) and Student Learning Outcomes (SLOs) to ABET criteria and Drexel Student Learning Priorities (DSLPs)

Figure 1: Relationship between ABET criteria, School SLOs and School PEOs.

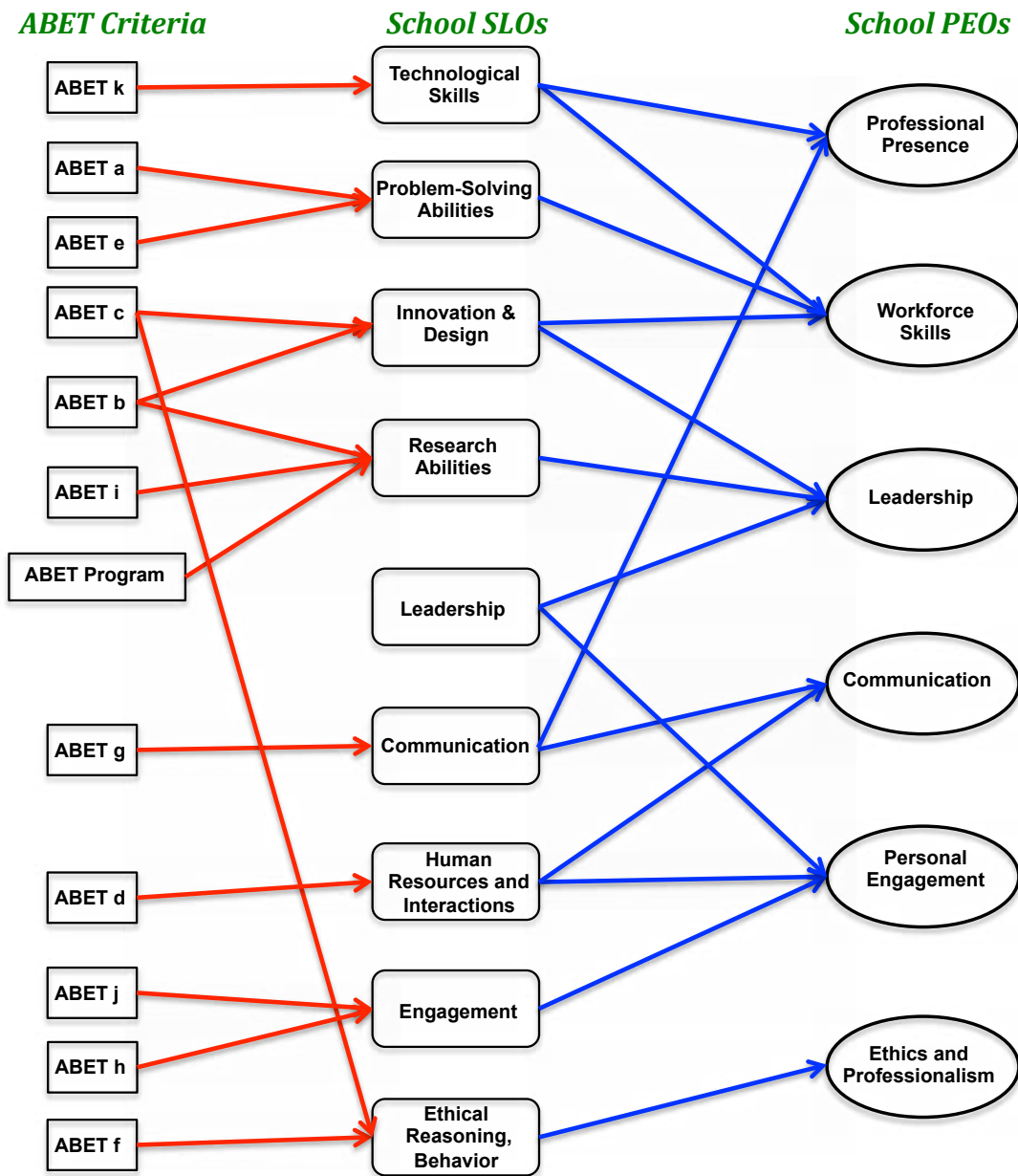


Figure 2: Relationship between Drexel Student Learning Priorities (DLSPs), School SLOs and School PEOs

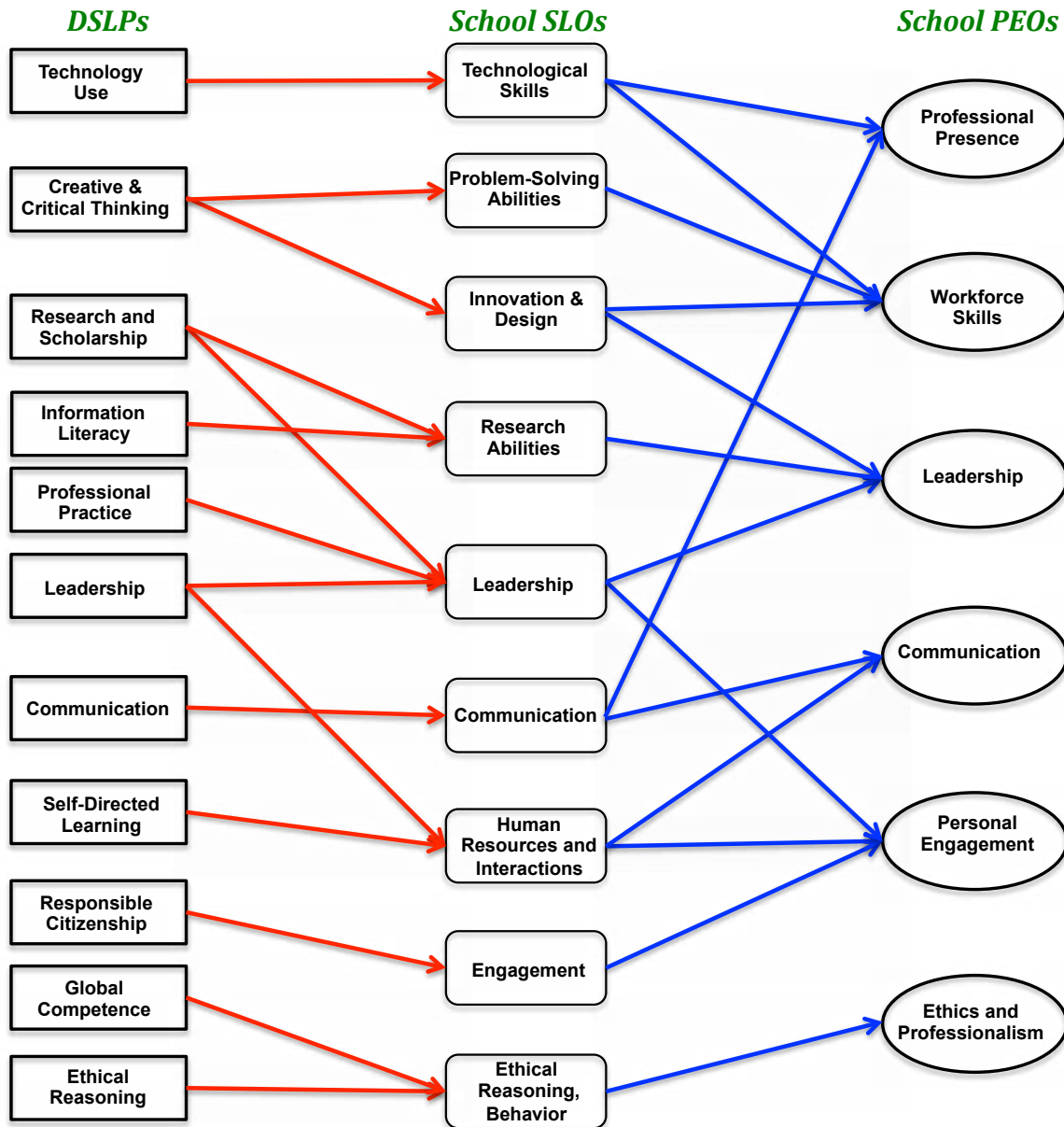


Figure 3: Relationship between ABET criteria, School SLOs and Drexel Student Learning Priorities (DSLPLs)

