Engineering Academy

PREPARE AND PROPEL

Over two years of Engineering Academy, students (ages 15 to 18) learn to think and act like engineers and prepare to advance to post-secondary education. With 180 hours outside of school, the Academy includes a series of immersive engineering design challenges, interactive career skill building activities, and dedicated time for postsecondary planning to develop engineering habits of mind, strengthen their engineering identity, foster their agency, and equip them with the skills needed to pursue an engineering career. Students who complete the Engineering Academy and enroll in a postsecondary engineering degree program or apprenticeship will receive a partial scholarship from the GE Aerospace Foundation.

Overview

The purpose of Next Engineers is to increase the number of young people pursuing engineering career paths by implementing three discrete but complementary programs – Engineering Discovery, Engineering Camp, and Engineering Academy. This document describes the **Next Engineers: Engineering Academy**.

Engineering Academy is designed to deepen students' awareness of and solidify their interest in engineering while developing students' engineering habits of mind and employability skills. The objective is to develop in students a stronger engineering identity and sense of self-efficacy, and ultimately the agency to pursue postsecondary engineering education and an engineering career.

FACILITATORS

At least two facilitators per cohort are required to lead the Engineering Academy sessions. This facilitation team should have experience in working with youth, STEM education, and academic advising or career development.

Academy Structure

The Engineering Academy's 180 hours of programming are divided into five Learning Units to be completed over two years. The expected duration of each unit is indicated below.

Unit	Employability Skills hours	Design Challenge hours	Pathways Planning hours	Total Unit hours	
1	6	11	4	±21	180 hours
2	8	11	4	±23	
3	6	20	4	±30	
4	9	30	4	±43	
5	10	45	4	±59	
			Graduation and buffer	±4	

Students are required to attend at least 80% of the scheduled programming and submit all mandatory work pieces to successfully complete the Engineering Academy. Students who successfully complete the Academy and enroll into a postsecondary engineering program will receive a partial scholarship from the GE Aerospace Foundation.

Each of the five Learning Units consists of the following elements:

1. Unit Introductions

At the beginning of each unit, students are introduced to the key themes and skills that they will be developing through the unit activities. Each unit is designed to build on the previous set of activities and encourages students to reflect on their growth. A recommended schedule of activities and guides are provided to facilitators.

2. Engineering Design Challenges

Students get the opportunity to explore the process of engineering by completing increasingly open and complicated design challenges. Through these, students become more proficient in using the engineering design process, working productively in teams, communicating and presenting their ideas, and managing their time and resources.

These design challenges also teach students a set of engineering habits of mind - dispositions and ways of thinking at the heart of engineering practice as defined by the Royal Academy of Engineering[1].

- **Systems thinking**: the ability to stand back and see the whole picture, understanding how the different elements interrelate and interact and identifying important patterns in these interactions.
- **Adapting**: the ability to change an existing product, service, material or technique to suit different purposes and the willingness and ability to adjust and modify one's approach.
- **Problem Finding**: the ability to identify, investigate, analyze, and articulate underlying needs or issues that lead to a problem.
- **Creative Problem Solving**: the ability to think creatively and innovatively to solve problems, often by working collaboratively to experiment with new ideas and integrate different perspectives.
- **Visualizing**: the ability to explore, develop, represent, understand, and communicate ideas, systems, and processes effectively by means of words, sketches and/or models (including mock-ups or prototypes).
- **Improving**: the ability to continuously enhance processes, products, systems, and solutions with a commitment to optimization, iteration, learning from experience, and striving for excellence, accuracy and precision.

VOLUNTEERS

To enrich the Academy experience, professional engineers can volunteer their time to support students by offering insight and guidance. Volunteers can participate in a variety of roles:

- Design Challenge Advisor
- Guest Speaker
- Tour Guide
- Presentation Audience Member or Reviewer

[1] Thinking like an engineer: Implications for the education system, https://raeng.org.uk/media/brjjknt3/thinking-like-an-engineer-full-report.pdf

Developing and practicing these habits of mind helps students develop an engineering identity, recognized as a key driver for deciding to actively pursue engineering and possessing the necessary resilience to persevere in these studies.

3. Employability Skills Activities

To prepare young people for the next step in their education and career journeys, the Engineering Academy includes activities to help students develop in five areas – called Employability Skills. Universities[2] and employers[3] from around the world have identified these skillsets as essential for entry into the workforce and long-term success:

- **Academic & Career Development Skills**: the ability to pursue goals, identify strengths and weaknesses, and navigate education and career opportunities.
- **Communication Skills**: the ability to effectively express ideas and receive and comprehend information.
- **Thinking Skills**: the ability to analyze situations, identify problems, and use information and creativity to develop solutions.
- **Self-Management Skills**: the ability to effectively regulate one's thoughts, emotions, and behaviors.
- **People Skills**: the ability to work effectively and productively with others to achieve a common goal.

In each unit, students will participate in a set of interactive activities to put these skills into practice. They will also hear from and engage with volunteers to learn how these skills are applied in the engineering workplace.

4. Pathways Planning Sessions

Each unit includes dedicated time for students to plan for postsecondary opportunities, including college, university, and apprenticeship. Meeting in small groups, students and their facilitators will collaborate to choose discussion topics, seek out resources, and work on applications.

Student selection

Each year, each site offering Engineering Academy will invite 30 students to participate in the program. Students' eligibility to participate will be based on a set of minimum criteria defined by each site. Details regarding student eligibility and the application process will be shared on each city's location page.

Students are required to apply via an online or paper form and final participants will be selected at random from a list of all eligible applicants.

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[2] National Association of Colleges and Employers, What is Career Readiness?, https://www.naceweb.org/career-readiness/competencies/career-readiness-defined/

[3] World Economic Forum, The Future of Jobs Report 2023, https://www.weforum.org/publications/the-future-of-jobs-report-2023/

Application to Engineering Academy is open to all students. However, community partners will target marketing through Engineering Discovery and Engineering Camp channels.

For more information about Next Engineers visit www.NextEngineers.org.

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