

LIBERAL ARTS AND ENGINEERING STUDIES

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Academic Programs

Program name	Program type
Liberal Arts & Engineering Studies	BS

The Liberal Arts and Engineering Studies (LAES) degree is jointly offered by the colleges of Liberal Arts and Engineering. This program prepares students for a wide range of innovative careers in emerging professional fields that combine skills and interests in the arts, technology and culture, and also prepares them for further study in graduate school. This program, which only accepts students as internal transfers after the first year, is open to all students at Cal Poly. This program is not intended to be an ABET-accredited engineering program.

Undergraduate Program BS Liberal Arts and Engineering Studies

The curriculum allows Liberal Arts and Engineering Studies students, in collaboration with students from all other Cal Poly majors, to participate in development teams working on national and international technology and cultural projects. To further prepare students for work with diverse teams that include participants from across the globe, the program strongly encourages students to spend three to six months studying and/or working abroad.

The BS in Liberal Arts and Engineering Studies can lead to careers in fields such as:

- Animatronics
- Audio Engineering
- Digital Media Production and Management
- Digital Publishing
- Environmental Technology Education
- Film and Television Production
- Game Design
- Government Policy Making / Analysis
- International Technology Management
- STEM Education in School and Out-of-School Contexts
- Sustainable Community Development
- Technical Communications
- Technology Services and Management
- Web Design

Program Learning Objectives

Graduates of the Liberal Arts and Engineering Studies program receive a solid foundation in engineering and scientific principles, as well as a cultural appreciation that supports them in careers requiring significant levels of technical and cultural fluency. To support these goals, the primary learning objectives are to:

1. Think critically and creatively in the process of solving techno-social problems considering philosophical, aesthetic and expressive concerns.
2. Communicate effectively through a variety of media in diverse, multicultural perspectives and facilitate communication between technical and non-technical collaborators.
3. Use mathematics, science, and engineering principles to produce solutions to problems within the student's Liberal Arts and Engineering concentrations.
4. Function effectively as a member of interdisciplinary or international teams, formulating sustainable solutions to problems at the intersection of technology and society.
5. Demonstrate ethical and professional responsibilities associated with the creation, use and integration of technology.
6. Serve as informed and responsible citizens in a global culture and remain involved with learning and helping society improve.

Degree Requirements and Curriculum

In addition to the program requirements listed on this page, students must also satisfy requirements outlined in more detail in the Minimum Requirements for Graduation (<https://catalog.calpoly.edu/generalrequirementsbachelorsdegree/>) section of this catalog, including:

- 60 units of upper-division courses
- 2.0 GPA
- Graduation Writing Requirement (GWR)
- U.S. Cultural Pluralism (USCP)

Note: No Major, Support or Concentration courses may be selected as credit/no credit.

MAJOR COURSES

CHEM 124	General Chemistry for Physical Science and Engineering I (B1 & B3) ¹	4
LAES 301	Project-Based Learning in Liberal Arts and Engineering Studies	4
LAES 302	Advanced Project-Based Learning in Liberal Arts and Engineering Studies	4
LAES 461	Senior Project in Liberal Arts and Engineering Studies	4
LAES 462	Capstone Senior Seminar in Liberal Arts and Engineering Studies	4
MATH 141	Calculus I (B4) ¹	4
MATH 142	Calculus II (GE Electives) ¹	4
MATH 143	Calculus III	4
MATH 241	Calculus IV	4
MATH 244	Linear Analysis I	4
PHYS 141	General Physics I	4
PHYS 142	General Physics II	4
PHYS 143	General Physics III	4

STAT 312	Statistical Methods for Engineers (Upper-Division B) ¹	4
or STAT 321	Probability and Statistics for Engineers and Scientists	
or STAT 350	Probability and Random Processes for Engineers	
Study Abroad or Global Perspectives courses		
300-400 level		8
Engineering Concentration or Individualized Course of Study ²		
Minimum 12 units at 300-400 level		34-36
Liberal Arts Concentration or Individualized Course of Study ²		
Minimum 12 units at 300-400 level		24
GENERAL EDUCATION (GE)		
(See GE program requirements below.)		56
FREE ELECTIVES		
Free Electives ²		0-2
Total units		180

¹ Required in Major or Support; also satisfies General Education (GE) requirement.

² If a General Education (GE) course is used to satisfy a Major or Support requirement, additional units of Free Electives may be required to complete the total units required for the degree.

Concentrations

LAES students must select *one* concentration from Engineering and *one* from Liberal Arts. Students may choose to follow an individualized course of study in Engineering or/and in the Liberal Arts, constructed in consultation with LAES advisors.

Engineering (select one)

- Computer Graphics (<https://catalog.calpoly.edu/collegesandprograms/interdisciplinaryprograms/bsliberalartsandengineeringstudies/computergraphicsconcentration/>)
- Electrical Engineering (Power) (<https://catalog.calpoly.edu/collegesandprograms/interdisciplinaryprograms/bsliberalartsandengineeringstudies/electricalengineeringpowerconcentration/>)
- Industrial/Manufacturing Engineering - System Design (<https://catalog.calpoly.edu/collegesandprograms/interdisciplinaryprograms/bsliberalartsandengineeringstudies/systemdesignconcentration/>)
- Usability Studies (<https://catalog.calpoly.edu/collegesandprograms/interdisciplinaryprograms/bsliberalartsandengineeringstudies/usabilitystudiesconcentration/>)

Individualized Course of Study in Engineering

Consists of 34 units of an advisor approved integrated course of study from courses offered in the College of Engineering designed to meet the LAES learning objectives, with at least 12 of the units at the upper-division level. Courses must be drawn from at least two engineering disciplines.

Liberal Arts (select one)

- Interactive Communication - Cinematic Focus (<https://catalog.calpoly.edu/collegesandprograms/interdisciplinaryprograms/bsliberalartsandengineeringstudies/interactivecommunicationcinematicfocusconcentration/>)

<https://catalog.calpoly.edu/collegesandprograms/interdisciplinaryprograms/bsliberalartsandengineeringstudies/interactivecommunicationcinematicfocusconcentration/>)

- Interactive Communication - Theatrical Focus (<https://catalog.calpoly.edu/collegesandprograms/interdisciplinaryprograms/bsliberalartsandengineeringstudies/interactivecommunicationtheatricalfocusconcentration/>)
- Publishing Technology (<https://catalog.calpoly.edu/collegesandprograms/interdisciplinaryprograms/bsliberalartsandengineeringstudies/publishingtechnologyconcentration/>)
- Technical Communication (<https://catalog.calpoly.edu/collegesandprograms/interdisciplinaryprograms/bsliberalartsandengineeringstudies/technicalcommunicationconcentration/>)

Individualized Course of Study in the Liberal Arts

Consists of 24 units of an advisor approved integrated course of study from courses offered in the College of Liberal Arts designed to meet the LAES learning objectives, with at least 12 of the units at the upper-division level.

Students may complete a minor program selected from pre-approved minors. These minors include any minor offered by the College of Liberal Arts, as well as interdisciplinary, cross-college minors in which students complete a minimum of half of the units in the College of Liberal Arts (e.g., Indigenous Studies in Natural Resources & the Environment; Sustainable Environments).

General Education (GE) Requirements

- 72 units required, 16 of which are specified in Major and/or Support.
- If any of the remaining 56 units is used to satisfy a Major or Support requirement, additional units of Free Electives may be needed to complete the total units required for the degree.
- See the complete GE course listing (<https://catalog.calpoly.edu/generalrequirementsbachelorsdegree/#generaleducationtext>).
- A grade of C- or better is required in one course in each of the following GE Areas: A1 (Oral Communication), A2 (Written Communication), A3 (Critical Thinking), and B4 (Mathematics/Quantitative Reasoning).

Area A		English Language Communication and Critical Thinking
A1	Oral Communication	4
A2	Written Communication	4
A3	Critical Thinking	4
Area B		Scientific Inquiry and Quantitative Reasoning
B1	Physical Science (4 units in Major) ¹	0
B2	Life Science	4
B3	One lab taken with either a B1 or B2 course	
B4	Mathematics/Quantitative Reasoning (4 units in Major) ¹	0
Upper-Division B (4 units in Major) ¹		0
Area C		Arts and Humanities
Lower-division courses in Area C must come from three different subject prefixes.		

C1	Arts: Arts, Cinema, Dance, Music, Theater	4
C2	Humanities: Literature, Philosophy, Languages other than English	4
Lower-Division C Elective - Select a course from either C1 or C2		4
Upper-Division C		4
Area D	Social Sciences - Select courses in Area D from at least two different prefixes	
D1	American Institutions (Title 5, Section 40404 Requirement)	4
D2	Lower-Division D	4
Upper-Division D		4
Area E	Lifelong Learning and Self-Development	
Lower-Division E		4
Area F	Ethnic Studies	
F	Ethnic Studies	4
GE Electives in Areas B, C, and D		
Select courses from two different areas; may be lower-division or upper-division courses.		
GE Electives (4 units in Major plus 4 units in GE) ¹		4
Total units		56

¹ Required in Major or Support; also satisfies General Education (GE) requirement.

LAES Courses

LAES 200. Special Problems for Undergraduates. 1-4 units

Term Typically Offered: TBD

Prerequisite: Consent of department head.

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 8 units, with a maximum of 4 units per quarter.

LAES 270. Selected Topics. 1-4 units

Term Typically Offered: TBD

Prerequisite: Open to undergraduate students and consent of instructor.

Directed group study of selected topics. The Class Schedule will list topic selected. Total credit limited to 8 units. 1 to 4 lectures.

LAES 301. Project-Based Learning in Liberal Arts and Engineering Studies. 4 units

Term Typically Offered: F, SP

Prerequisite: MATH 241; PHYS 132 or PHYS 142; PHYS 133 or PHYS 143; and GE Area A with grades of C- or better.

Examination of how to define LAES as a new field of study; analysis of the creative process and team building in theory and in application. Researching, writing, revising and presenting a technical proposal suitable for submission to a national design competition seeking innovative solutions to complex technological/social problems. 2 seminars, 2 activities.

LAES 302. Advanced Project-Based Learning in Liberal Arts and Engineering Studies. 4 units

Term Typically Offered: F, SP

Prerequisite: LAES 301.

Teamwork and leadership in project-based learning. Students lead, build, and maintain project teams; guide the creative process; and use and evaluate the principles of project management in theory and practice. Development of a technical proposal suitable for submission to a national design competition seeking innovative solutions to complex technological/social problems. 2 seminars, 2 activities.

LAES 400. Special Problems for Advanced Undergraduates. 1-4 units

Term Typically Offered: F, W, SP

Prerequisite: Consent of department head.

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 8 units, with a maximum of 4 units per quarter.

LAES 411. Technology and Community Engagement. 4 units

Term Typically Offered: W, SP

Prerequisite: Completion of GE Area A with grades of C- or better; and sophomore standing.

Onsite work with community and design team to develop and evaluate the use of innovative technologies as tools for community development and empowerment. Through guided discussion with instructor, guests, and community members, work through intercultural collaboration and design issues, conduct qualitative and quantitative research, and present works-in-progress. Field trip may be required. Total credit limited to 8 units. 4 lectures. Crosslisted as ISLA/LAES 411.

LAES 430. Internship. 2-12 units

Term Typically Offered: F, W, SP

CR/NC

Prerequisite: Approval of area chair, junior standing, and a CPSLO cumulative GPA of at least 2.5 without being on academic probation.

Work experience in business, industry, government and other areas of student career interest. Periodic written progress reports, final report, and evaluation by work supervisor required. Credit/No Credit grading. Total credit limited to 12 units.

LAES 461. Senior Project in Liberal Arts and Engineering Studies. 4 units

Term Typically Offered: F, W, SP

Prerequisite: LAES 302; senior standing; and permission of instructor.

Under faculty supervision, the selection and completion of a senior project, demonstrating an interdisciplinary focus in LAES. With one-on-one format with the instructor, individual or small group work through many iterations of the senior project, with occasional showing of works in small student groups.

LAES 462. Capstone Senior Seminar in Liberal Arts and Engineering Studies. 4 units

Term Typically Offered: F, W, SP

Prerequisite: LAES 461.

The final refinement and completion of LAES senior projects and other projects. In a development workshop format, presentation of final versions of works-in-progress to combined faculty and professional review committees throughout the quarter.

LAES 470. Selected Advanced Topics. 1-4 units

Term Typically Offered: TBD

Prerequisite: Consent of instructor.

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. The Class Schedule will list topic selected. Total credit limited to 8 units. 1 to 4 lectures.

LAES 471. Selected Advanced Laboratory. 1-4 units

Term Typically Offered: TBD

Prerequisite: Consent of instructor.

Directed group laboratory study of selected topics for advanced students. Open to undergraduate and graduate students. The Class Schedule will list topic selected. Total credit limited to 8 units. 1 to 4 laboratories.

LAES 485. Cooperative Education Experience. 6 units

Term Typically Offered: F, W, SP

CR/NC

Prerequisite: Sophomore standing and consent of instructor.

Part-time work experience in business, industry, government, and other areas of student career interest. Positions are paid and usually require relocation and registration in course for two consecutive quarters. Formal report and evaluation by work supervisor required. Major credit limited to 6 units; total credit limited to 18 units. Credit/No Credit grading only.

LAES 495. Cooperative Education Experience. 12 units

Term Typically Offered: F, W, SP

CR/NC

Prerequisite: Sophomore standing and consent of instructor.

Full-time work experience in business, industry, government, and other areas of student career interest. Positions are paid and usually require relocation and registration in course for two consecutive quarters. A more fully developed formal report and evaluation by work supervisor required. Credit/No Credit grading only. Major credit limited to 6 units; total credit limited to 24 units.