

LIBERAL ARTS AND ENGINEERING STUDIES (BS)

Offered at: San Luis Obispo Campus

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.

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
- User Experience and User Interface Design
- Web Design

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 Concentrations

Computer Science

Offered at: San Luis Obispo Campus

Nearly all disciplines use the capabilities of computers. The Computer Science concentration in LAES consists of a core set of lower-division courses (8 units) that provide the foundation for LAES students to pursue individual pathways through CSSE curriculum. In consultation with the LAES co-directors, students choose an additional 18 units (10 must be upper-division) to learn topics that are relevant to their specific career goals. Such goals could include preparation for careers in game design and development, interactive entertainment, graphics, and UI/UX.

Electrical Engineering

Offered at: Cal Poly only

Understanding hardware and circuit design is important to creating and working with digital devices. The Electrical Engineering concentration in LAES consists of a core set of lower-division courses (11-12 units) that provide the foundation for LAES students to pursue individual pathways through the EE curriculum. In consultation with the LAES co-directors, students choose an additional 14-15 units (10 must be upper-division) to learn topics that are relevant to their specific career goals. Such goals could include preparation for careers in animatronics, audio engineering, and power systems.

Industrial Engineering

Offered at: San Luis Obispo Campus

Studying processes, systems, and operations to reduce waste, improve productivity, and enhance safety are crucial to all industries. The Industrial Engineering concentration in LAES consists of a core set of lower-division courses (13 units) that provide the foundation for LAES students to pursue individual pathways through the IME curriculum. In consultation with the LAES co-directors, students choose an additional 13 units (10 must be upper-

division) to learn topics that are relevant to their specific career goals. Such goals could include preparation for careers in quality assurance, industrial design, product development, and process improvement.

Engineering Individualized Course of Study

Offered at: San Luis Obispo Campus

Concentration consists of a minimum of 26 units, 10 of which must be upper-division units. The student selects from the general course offerings across the academic divisions in the College of Engineering. The concentration courses are selected by the student in consultation with the LAES program co-director. The student also provides written justification for how this collection of courses constitutes a cohesive and effective hybrid integration with the student's other concentration courses selected from the College of Liberal Arts. The agreed upon list of Engineering courses serves as a contract between the student and LAES.

Liberal Arts Concentrations

Liberal Arts Focused Course of Study

Offered at: San Luis Obispo Campus

The Liberal Arts Focused Course of Study Concentration allows students to follow the courses that constitute the approved minor for one of the Liberal Arts academic programs. The concentration consists of a minimum of 16 units, 10 of which must be upper division units.

The Liberal Arts Focused Course of Study concentration is selected by the student in consultation with the LAES program co-director. The student also provides written justification for how the chosen Liberal Arts Minor constitutes a cohesive and effective hybrid integration with the student's other concentration courses selected from the College of Engineering. The agreed upon list of Liberal Arts courses serves as a contract between the student and the Department.

Technical and Professional Communication

Offered at: San Luis Obispo Campus

The concentration in Technical and Professional Communication prepares students for careers in writing, editing, user experience and design, content strategy, and project management. The concentration uses the approved courses for the Certificate in Technical and Professional Communication offered by the English department in the College of Liberal Arts. Students choosing this concentration may want to consider completing the full certificate. The concentration consists of a minimum of 16 units, 10 of which must be upper division units.

Liberal Arts Individualized Course of Study

Offered at: San Luis Obispo Campus

The Liberal Arts Individualized Course of Study Concentration allows students to construct a specialized combination of courses that best align with their academic interests and future career goals. The concentration consists of a minimum of 16 units, 10 of which must be upper-division units. The concentration courses are selected by the student in consultation with the LAES program co-director. The student also provides written justification for how their collection of courses drawn from the College of Liberal Arts constitutes a cohesive and effective hybrid integration with the student's other concentration courses selected from the College of Engineering. The agreed upon list of Liberal Arts courses serves as a contract between the student and LAES.

Program Learning Objectives

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/academic-standards-policies/general-requirements-bachelors-degree/>) section of this catalog, including:

- 40 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. In addition, no more than 12 units of cooperative or internship courses can count towards your degree requirements.

Code	Title	Units
MAJOR COURSES		
LAES 4301	Liberal Arts and Engineering Studies Capstone I	4
LAES 4302	Liberal Arts and Engineering Studies Capstone II	4
LAES 4461	Senior Project I in Liberal Arts and Engineering Studies	3
LAES 4462	Senior Project II in Liberal Arts and Engineering Studies	3
Engineering Concentration or Individualized Course of Study		
(See list of Concentrations and Individualized Course of Study below) ^{1,2}		26
Liberal Arts Concentration or Individualized Course of Study		
(See list of Concentrations and Individualized Course of Study below) ^{1,2}		16
SUPPORT COURSES		
CHEM 1120	Fundamentals of Chemical Structure and Properties (5A & 5C) ³	4
MATH 1261	Calculus I (2) ³	4
MATH 1262	Calculus II	4
MATH 2263	Calculus III	3
PHYS 1141	General Physics I	4
PHYS 1143	General Physics II	4
STAT 3210	Engineering Statistics (Upper-Division 2/5) ³	3
Study Abroad or Upper-Division Global Perspectives ^{2,4}		5
GENERAL EDUCATION (GE)		
(See GE program requirements below)		33
FREE ELECTIVES		
Free Electives		0
Total Units		120

¹ A minimum of 10 units must be taken at the 3000-4000 level.

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.

³ Required in Major or Support; also satisfies General Education (GE) requirement.

⁴ A list of Global Perspectives courses is provided on the LAES website (<https://laes.calpoly.edu/>). All Global Perspective courses are 3000-4000 level (upper-division).

Engineering Concentrations Computer Science

Code	Title	Units
REQUIRED COURSES		
CSC 1001 & 1001L	Fundamentals of Computer Science and Fundamentals of Computer Science Laboratory	4
CSC 2001 & 2001L	Data Structures and Data Structures Laboratory	4
Electives		
LAES director approved electives in CSC, CPE, or SE courses (a minimum of 10 units must be at the 3000-4000 level) ¹		18
Total Units		26

¹ Suggested electives to pursue studies in areas such as usability studies, game design, full stack web development, or computer graphics are provided on the LAES website (<https://laes.calpoly.edu/>).

Electrical Engineering

Code	Title	Units
REQUIRED COURSES		
EE 2211	Electric Circuit Analysis I	3
EE 2212	Electric Circuit Analysis II	3
EE 2241	Electric Circuit Analysis Laboratory I	1
MATH 2341	Linear Analysis	3-4
or MATH 2343	Differential Equations	
Electives		
LAES director approved electives in CPE or EE (a minimum of 10 units must be at the 3000-4000 level) ¹		15-16
Total Units		26

¹ Suggested electives to pursue studies in areas such as animatronics, audio engineering, or power systems are provided on the LAES website (<https://laes.calpoly.edu/>).

Industrial Engineering

Code	Title	Units
REQUIRED COURSES		
CSC 1032	Programming for Scientists and Engineers	3
IME 1140	Technical Graphics Communication for Design and Manufacturing	1
IME 1143	Introduction to Design and Manufacturing	2
IME 1223	Process Improvement Fundamentals	4
IME 2212	Introduction to Enterprise Analytics and Database Systems	4
IME 2315	Financial Decision Making for Engineers	2
Electives		
LAES director approved electives in IE courses at the 3000-4000 level ¹		10
Total Units		26

¹ Suggested electives to pursue studies in areas such as project management, process improvement, or production engineering are provided on the LAES website (<https://laes.calpoly.edu/>).

Engineering Individualized Course of Study

Code	Title	Units
REQUIRED COURSES		
Electives		
LAES director approved electives ^{1,2,3}		26
Total Units		26

¹ LAES director approved electives from courses offered by the College of Engineering.

² A minimum of 10 units must be at the 3000-4000 level.

³ The student must provide written justification for how this collection of courses constitutes a cohesive and effective hybrid integration with the student's other concentration courses selected from the College of Liberal Arts.

Liberal Arts Concentrations

Liberal Arts Focused Course of Study

Code	Title	Units
REQUIRED COURSES		
College of Liberal Arts Minor Coursework		
Select from the following: ^{1,2,3,4}		16
Art History		
Asian Studies		
Child Development		

English	
Ethics, Public Policy, Science and Technology	
Ethnic Studies	
Gender, Race, Culture, Science and Technology	
Gerontology	
History	
Law and Society	
Linguistics	
Photography and Video	
Psychology	
Religious Studies	
Science Communication	
Social and Environmental Justice	
Studio Art	
Theatre	
Total Units	16

- 1 The student must provide written justification for how this minor constitutes a cohesive and effective hybrid integration with the student's other concentration courses selected from the College of Engineering.
- 2 Students must follow all requirements of an approved minor in one of the Liberal Arts academic program. However, if the Liberal Arts minor requires, for completion, more units beyond the minimum 16 units required for the LAES Liberal Arts Minor concentration, LAES students are not required to take those additional units to complete the concentration as part of the LAES degree.
- 3 A minimum of 10 units at the 3000-4000 level must be taken toward the requirements for the selected minor.
- 4 The Credit/No Credit policy for minors will not apply to minors taken to complete this concentration.

Technical and Professional Communication

Code	Title	Units
REQUIRED COURSES		
ENGL 2222	Introduction to Technical and Professional Communication	4
ENGL 4491	Practicum in Technical and Professional Communication	4
Select from the following:		4
ENGL 3310 & LAES 4400	Corporate Communication and Special Problems for Advanced Undergraduates	
ENGL 3317 & LAES 4400	Humanistic Perspectives in Technical and Professional Editing and Special Problems for Advanced Undergraduates	
ENGL 3632 & LAES 4400	Writing Grant Proposals and Fundraising Appeals and Special Problems for Advanced Undergraduates	
ENGL 3636 & LAES 4400	Copywriting and Special Problems for Advanced Undergraduates	
ENGL 3637	Designing Content and Information for the Web	
Select from the following:		4
ENGL 4428	Creative Problem-Solving for Social Impact in Technical and Professional Communication	
ENGL 4429	Writing for Nonprofits	
ENGL 4469	Advanced Topics in Technical and Professional Communication	
ENGL 4473	Designing Instructional Materials	
ENGL 4476	Digital Content Management Strategy	
ENGL 4477	Freelance Writing and Entrepreneurship	
Total Units		16

Liberal Arts Individualized Course of Study

Code	Title	Units
REQUIRED COURSES		
Electives		

LAES director approved electives ^{1,2,3} 16

Total Units 16

- ¹ LAES director approved electives from courses offered by the College of Liberal Arts.
- ² A minimum of 10 units must be at the 3000-4000 level.
- ³ The student must provide written justification for how this collection of courses constitutes a cohesive and effective hybrid integration with the student's other concentration courses selected from the College of Engineering.

General Education (GE) Requirements

- 43 units required, 10 of which are specified in Major and/or Support.
- If any of the remaining 33 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/academic-standards-policies/general-requirements-bachelors-degree/#generaleducationtext>).
- A grade of C- or better is required in one course in each of the following GE Areas: 1A (English Composition), 1B (Critical Thinking), 1C (Oral Communication), and 2 (Mathematics and Quantitative Reasoning).

Lower-Division General Education

Area 1	English Communication and Critical Thinking	
1A	Written Communication	3
1B	Critical Thinking	3
1C	Oral Communication	3
Area 2	Mathematics and Quantitative Reasoning	
2	Mathematics and Quantitative Reasoning (3 units in Support) ¹	0
Area 3	Arts and Humanities	
3A	Arts	3
3B	Humanities: Literature, Philosophy, Languages other than English	3
Area 4	Social and Behavioral Sciences (Area 4 courses must come from at least two different course prefixes.)	
4A	American Institutions (Title 5, Section 40404 Requirement)	3
4B	Social and Behavioral Sciences	3
Area 5	Physical and Life Sciences	
5A	Physical Sciences (3 units in Support) ¹	0
5B	Life Sciences	3
5C	Laboratory (may be embedded in a 5A or 5B course) (1 units in Support) ¹	0
Area 6	Ethnic Studies	
6	Ethnic Studies	3

Upper-Division General Education

Upper-Division 2/5	Mathematics and Quantitative Reasoning or Physical and Life Sciences (3 units in Support) ¹	0
Upper-Division 3	Arts and Humanities	3
Upper-Division 4	Social and Behavioral Sciences (Area 4 courses must come from at least two different course prefixes.)	3

Total Units 33

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

Coming soon