STATISTICS (BS)

Offered at: San Luis Obispo Campus

The statistics degree program requires students to develop a strong foundation in mathematics, computer science, and communication. Coursework in the statistics program can be classified into four areas. Some courses provide mathematical background in probability and theoretical statistics. Others focus on computational thinking and coding skills with software packages. Most courses teach particular statistical methods for various types of data analysis such as regression, experimental design, categorical data analysis, time series techniques, multivariate methods, and survival analysis. Finally, some courses specifically develop students' skills with oral and written communication and consulting with clients.

Throughout the program students encounter the entire process of conducting statistical investigations, from asking questions and designing studies through drawing conclusions and communicating results. Statistics students repeatedly process and analyze real data from genuine studies and also acquire extensive experience coding, using statistical software, and writing technical reports of their analyses and findings for varied audiences.

Program Learning Objectives

1. Have good working knowledge of the most commonly used statistical methods, including statistical modeling and omnipresent role of variability, efficient design of studies and construction of effective sampling plans, exploratory data analysis, and formal inference process.
2. Have background in probability, statistical theory, and mathematics, including especially calculus, linear algebra and symbolic and abstract thinking.
3. Be able to synthesize and apply knowledge of common inferential methods, understanding the limitations of procedures and appropriate conclusions.
4. Communicate effectively (written and oral) with skills in collaboration (within and between disciplines) and teamwork, and in organizing and managing projects.
5. Have a good mastery of several standard statistical software packages and facility with data management strategies.
6. Have a focused concentration in an area of application outside the discipline of statistics.

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/#generaleducationtext) section of this catalog, including:

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

Note: No course with a STAT prefix 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		
DATA 1000	Statistical and Data Literacy (2) [1]	3
DATA/STAT 1810	Introduction to Statistical Computing with R	3
DATA/STAT 3820	Intermediate Statistical Computing with R	3
STAT 1510	Statistics I	3
STAT 2610	Introduction to Probability and Simulation	3
STAT 3520	Statistics II	3
STAT 3530	Applied Linear Models	4
STAT 3540	Statistical Methods for Study Design and Analysis	4
DATA/STAT 3800	Introduction to Statistical Computing with SAS and SQL	3-4
or DATA 3301	Introduction to Data Science	
STAT 4610	Probability Theory	3
STAT 4620	Statistical Theory	3
STAT 4366	Statistical Communication, Collaboration, and Consulting	5
STAT 4460	Senior Project: Statistics Capstone	2
Statistics Electives:		
List A		

Select from the following:		9
STAT 4740	Multilevel and Mixed Modeling	
STAT 4750	Bayesian Reasoning and Methods	
STAT 4760	Statistical Analysis of Time Series	
STAT 4770	Survival Analysis Methods	
STAT 4780	Categorical Data Analysis	
STAT 4790	Applied Multivariate Statistics	
STAT 5530	Generalized Linear Models	
STAT 5710	Applied Stochastic Processes	
STAT 5740	Advanced Design and Analysis of Experiments	
DATA/STAT 5550	Statistical Learning with R	
List B		
Select from the following:		9
Select any course from List A that was not taken to satisfy the requirement listed above		
STAT 3710	Teaching Statistics: Pedagogy, Content, Technology, and Assessment	
DATA/STAT 3800	Introduction to Statistical Computing with SAS and SQL	
DATA/STAT 4810	SAS Certification Preparation: Base Programming	
DATA/STAT 4820	SAS Certification Preparation: Advanced Programming	
DATA 3301	Introduction to Data Science	
DATA 3302	Data Visualization	
DATA 4401	Data Science Process and Ethics	
DATA 4610	Fundamentals of Machine Learning	
DATA 4620	Foundations and Applications of Deep Learning	
CSC 2001 & CSC 2001L	Data Structures and Data Structures Laboratory	
CSC 3449	Algorithms and Complexity	
CSC 3665	Introduction to Database Management Systems	
MATH 2031	Transition to Advanced Mathematics	
MATH 2343	Differential Equations	
MATH 2621	Introduction to Mathematical Optimization	
MATH 3051	Combinatorics I	
MATH 3055	Graph Theory	
MATH 3152	Advanced Linear Algebra	
MATH 3651	Introduction to Numerical Analysis	
MATH 4264	Real Analysis I	
MATH 4653	Numerical Optimization	
MATH 4911	Game Theory	
ITP 3303	Lean Six Sigma Green Belt	
SUPPORT COURSES		
CSC 1001 & CSC 1001L	Fundamentals of Computer Science and Fundamentals of Computer Science Laboratory	4
MATH 1151	Linear Algebra	3
MATH/DATA 1264	Calculus for Data Science I	4
MATH/DATA 1265	Calculus for Data Science II	4
GENERAL EDUCATION (GE)		
(See GE program requirements below)		40
FREE ELECTIVES		
Free Electives [2]		4-5
Total Units		**120**

[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 needed to complete the total units required for the degree.

General Education (GE) Requirements

General Education (GE) Requirements

- 43 units required, 3 of which are specified in Major and/or Support.
- If any of the remaining 40 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 Major) [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
5B	Life Sciences	3
5C	Laboratory (may be embedded in a 5A or 5B course)	1
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
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		**40**

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

Statistics

Suggested Four-Year Flowcharts are planning guides and do not represent a required course sequence. Courses may be completed in a different order, provided requisite requirements are satisfied.

First Year		
Term 1		**Units**
DATA/STAT 1000	Statistical and Data Literacy (2) [1]	3
STAT 1510	Statistics I	3
MATH/DATA 1264	Calculus for Data Science I	4
General Education Requirement (1A)		3
General Education Requirement (1C)		3
	Units	**16**
Term 2		
DATA/STAT 1810	Introduction to Statistical Computing with R	3
STAT 3520	Statistics II	3
MATH/DATA 1265	Calculus for Data Science II	4

General Education Requirement (1B)		3
General Education Requirement		3
General Education Requirement		1
	Units	**17**
Second Year		
Term 1		
STAT 3540	Statistical Methods for Study Design and Analysis	4
DATA/STAT 3820	Intermediate Statistical Computing with R	3
MATH 1151	Linear Algebra	3
General Education Requirement		3
General Education Requirement		3
	Units	**16**
Term 2		
STAT 2610	Introduction to Probability and Simulation	3
STAT 3530	Applied Linear Models	4
CSC 1001 & 1001L	Fundamentals of Computer Science and Fundamentals of Computer Science Laboratory	4
General Education Requirement		3
General Education Requirement		3
	Units	**17**
Third Year		
Term 1		
DATA/STAT 3800 or DATA 3301	Introduction to Statistical Computing with SAS and SQL or Introduction to Data Science	3-4
STAT 4610	Probability Theory	3
STAT Electives List A		3
General Education Requirement		3
General Education Requirement		3
	Units	**15**
Term 2		
STAT 4366	Statistical Communication, Collaboration, and Consulting	5
STAT 4620	Statistical Theory	3
STAT Elective List B		3
General Education Requirement		3
	Units	**14**
Fourth Year		
Term 1		
STAT 4460	Senior Project: Statistics Capstone	2
STAT Elective List A		3
STAT Elective List A		3
General Education Requirement		3
Free Elective [2]		1-2
	Units	**13**
Term 2		
STAT Elective List B		3
STAT Elective List B		3
General Education Requirement		3
Free Elective [2]		3
	Units	**12**
	Total Units	**120**

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 needed to complete the total units required for the degree.