CAL POLY

BS MATHEMATICS
2022-2026

This document displays only your course requirements at the time of publication of the catalog. You must use your Degree Progress Report to track all graduation requirements.

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

MAJOR COURSES		
MATH 141	Calculus I (B4) [1]	4
MATH 142	Calculus II (GE Electives) [1]	4
MATH 143	Calculus III	4
MATH 202	Orientation to Mathematics Major	1
MATH 206	Linear Algebra I	4
MATH 241	Calculus IV	4
MATH 242	Differential Equations I	4
MATH 248	Methods of Proof in Mathematics	4
MATH 306	Linear Algebra II	4
MATH 334	Combinatorial Math (Upper-Division B)[1]	4
MATH 412	Introduction to Analysis I	4
Select from the following: [2]		4
MATH 459	Senior Project Seminar	
MATH 460	Senior Project Applied Seminar	
MATH 461	Senior Project I	
& MATH 462	and Senior Project II	
MATH 481	Abstract Algebra I	4
CSC/CPE 101	Fundamentals of Computer Science	4
PHYS 141	General Physics I	4
Select from the following: [1]		4
PHYS 142	General Physics II (B1 & B3)	
PHYS 143	General Physics III (B1 & B3)	
General Curriculum or Concentration [3]		44/56/48/48
Total Major Units		**105/117/109/109**

GENERAL EDUCATION		
Area A	**English Language Communication & 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	Math/Quantitative Reasoning (4 units in Major) [1]	0
	Upper-Division B (4 units in Major)[1]	0
Area C	**Arts and Humanities**	
	Select lower-division courses from 3 different prefixes.	
C1	Arts	4
C2	Humanities	4
	Lower-Division C Elective - Select from either C1 or C2	4
	Upper-Division C	4
Area D	**Social Sciences**	
	Select courses from at least 2 different prefixes	
D1	American Institutions (Title 5, Section 40404 Req)	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**	
	Lower-Division F	4
GE Electives in Areas C and D		
	Select lower- or upper-division courses from 2 different areas.	
	GE Electives (4 units of Area B in Major) [1]	0
	GE Electives (Area C or D)	4
Total GE Units		**56**
FREE ELECTIVES [3,4]		**19/7/15/15**
TOTAL DEGREE UNITS		**180**

FOOTNOTES

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

[2] MATH 460 is recommended for students in the Applied Mathematics concentration.

[3] General Curriculum/Applied Mathematics concentration/Mathematics Teaching concentration/Pure Mathematics concentration.

4 **60 units must come from upper-division courses at the 300-400 level for the General Curriculum in BS Mathematics.**

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General Curriculum in Mathematics

This is the default curriculum required for students who do not declare a concentration.

STAT 301	Statistics I	4
or STAT 305	Introduction to Probability and Simulation	

Tracks 24

Choose 3 tracks from the following, with at least one track chosen from the first four tracks listed. A track consists of two paired courses representing depth of study with a particular focus. [1]

MATH 413	Introduction to Analysis II
& MATH 414	and Introduction to Analysis III
MATH 482	Abstract Algebra II
& MATH 483	and Abstract Algebra III
or MATH 406	Linear Algebra III
MATH 406	Linear Algebra III
& MATH 413	and Introduction to Analysis II
or MATH 440	Topology I
MATH 482	Abstract Algebra II
& MATH 413	and Introduction to Analysis II
or MATH 440	Topology I
MATH 304	Vector Analysis
& MATH 404	and Introduction to Differential Geometry
MATH 335	Graph Theory
& MATH 435	and Discrete Mathematics with Applications I
MATH 344	Linear Analysis II
& MATH 416	and Differential Equations II
or MATH 418	Partial Differential Equations
MATH 341	Theory of Numbers
& MATH 437	and Game Theory
MATH 410	Complex Analysis I
& MATH 411	and Complex Analysis II
MATH 442	Euclidean Geometry
& MATH 443	and Modern Geometries
MATH 451	Numerical Analysis I
& MATH 452	and Numerical Analysis II
or MATH 453	Numerical Optimization

Approved Electives, selected from the following: [2] 16

CSC/CPE 202	MATH 413	MATH 459	PHYS 211
CSC/CPE 203	MATH 414	or MATH 460	PHYS 301
CSC 349	MATH 416	MATH 461	PHYS 305
CSC 365	MATH 418	& MATH 462	PHYS 323
MATH 304	MATH 419	MATH 470	PHYS 405
MATH 335	MATH 435	MATH 475[3]	PHYS 408
MATH 341	MATH 437	MATH 476[3]	STAT 301
MATH 344	MATH 440	MATH 482	STAT 302
MATH 350	MATH 442	MATH 483	STAT 305
MATH 404	MATH 443	MATH 531	STAT 425
MATH 406	MATH 451	MATH 541	STAT 426
MATH 410	MATH 452	PHYS 142	STAT 427
MATH 411	MATH 453	or PHYS 143	

Total Units 44

1 A single course cannot be used to satisfy multiple tracks.

2 Consultation with advisor is recommended prior to selecting Approved Electives; selections may impact pursuit of post-bacc. studies and/or goals.

3 Maximum of 8 units combined between MATH 475 and MATH 476.

Applied Mathematics Concentration

MATH 304	Vector Analysis	4
MATH 344	Linear Analysis II	4
MATH 350	Mathematical Software	4
or CSC/CPE 202	Data Structures	
MATH 410	Complex Analysis I	4
MATH 413	Introduction to Analysis II	4
MATH 416	Differential Equations II	4
or MATH 418	Partial Differential Equations	
MATH 451	Numerical Analysis I	4
STAT 301	Statistics I	4
or STAT 305	Introduction to Probability and Simulation	

Tracks

Select courses from one of the following tracks. [1,2] 12

Track A

MATH 335	MATH 416	MATH 453	MATH 482
MATH 341	MATH 418	MATH 460	MATH 483
MATH 406	MATH 435	MATH 461	
MATH 411	MATH 437	& MATH 462	
MATH 414	MATH 452	MATH 476	

Track B

DATA 301	DATA 401 [3] & DATA 403 [3]	MATH 335 or MATH 453 or MATH 435

Approved Electives 12

Select three courses in one of the following categories, with at least one course at the 300-level or above. [4,5]

Physics Category:

ASTR 301	PHYS 211	PHYS 314	PHYS 408
ASTR 302	PHYS 301	PHYS 318	PHYS 425
ASTR 326	PHYS 305	PHYS 323	PHYS 428
PHYS 142	PHYS 306	PHYS/CPE 345	
or PHYS 143	PHYS 313	PHYS 405	

Statistics Category:

STAT 302	STAT 331	STAT 418	STAT 425
STAT 305	STAT 334	STAT 419	STAT 426
STAT 323	STAT 416	STAT 421	STAT 427
STAT 330	STAT 417	STAT 423	

Computer Science Category:

CSC/CPE 202	CSC 225	CSC 349	CSC 365
CSC/CPE 203	CPE 345	CSC/CPE 357	CSC 448

Mechanical Engineering Category:

ME 211	ME 302	ME 341
ME 212	ME 326	

Economics Category:

ECON 311	ECON 312	ECON 313	ECON 403

Total Units 56

1 Only students in the Applied Mathematics concentration who are pursuing a Data Science minor should select Track B.

2 Students who select Track B should select Approved Electives from the Statistics Category that will fulfill prerequisites for courses in the Data Science minor.

3 DATA 401 and DATA 403 must be taken concurrently with DATA 402.

4 Consultation with advisor is recommended prior to selecting Approved Electives; bear in mind your selections may impact pursuit of post-baccalaureate studies and/or goals.

5 Other choices are also possible, and should be pre-approved in consultation with an academic advisor. Approved Electives are to be taken oustide of the Mathematics department and should have significant applications to mathematics.

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Mathematics Teaching Concentration		
MATH 300	Technology in Mathematics Education	4
MATH 341	Theory of Numbers	4
MATH 419	Introduction to the History of Mathematics	4
MATH 423	Advanced Mathematics for Teaching	4
MATH 442	Euclidean Geometry	4
MATH 443	Modern Geometries	4
MATH 482	Abstract Algebra II	4
SCM 300	Early Field Experience [1]	4
STAT 301	Statistics I	4
STAT 302	Statistics II	4
or STAT 305	Intro to Probability and Simulation	
Select from the following:		8
CSC/CPE 202	Data Structures	
MATH 304	Vector Analysis	
MATH 335	Graph Theory	
MATH 344	Linear Analysis II	
MATH 350	Mathematical Software	
MATH 406	Linear Algebra III	
MATH 410	Complex Analysis I	
MATH 413	Intro to Analysis II	
MATH 416	Differential Equations II	
MATH 435	Discrete Mathematics with Applications I	
MATH 437	Game Theory	
MATH 440	Topology I	
MATH 451	Numerical Analysis I	
MATH 459	Senior Project Seminar	
or MATH 460	Senior Project Applied Seminar	
MATH 461	Senior Project I	
& MATH 462	Senior Project II	
MATH 470	Selected Advanced Topics	
MATH 483	Abstract Algebra III	
PHYS 142	General Physics II	
or PHYS 143	General Physics III	
PHYS 305	Classical Mechanics I	
STAT 425	Probability Theory	
Total Units		**48**

1 SCM 300 requires 45 hours of observations at local schools. Students should plan their schedules to have a four-hour block free during elementary school hours each week.

Pure Mathematics Concentration		
MATH 410	Complex Analysis I	4
MATH 413	Introduction to Analysis II	4
MATH 440	Topology I	4
MATH 482	Abstract Algebra II	4
Select from the following:		12
MATH 406	Linear Algebra III	
MATH 411	Complex Analysis II	
MATH 414	Introduction to Analysis III	
MATH 435	Discrete Mathematics with Applications I	
MATH 483	Abstract Algebra III	
Select from the following:		4
MATH 350	Mathematical Software	
STAT 301	Statistics I	
STAT 305	Intro to Probability and Simulation	
Select from the following:		16
MATH 304	Vector Analysis	
MATH 335	Graph Theory	
MATH 341	Theory of Numbers	
MATH 344	Linear Analysis II	
MATH 350	Mathematical Software	
MATH 404	Intro to Differential Geometry	
MATH 406	Linear Algebra III	
MATH 411	Complex Analysis II	
MATH 414	Introduction to Analysis III	
MATH 416	Differential Equations II	
MATH 418	Partial Differential Equations	
MATH 435	Discrete Mathematics with Applications I	
MATH 437	Game Theory	
MATH 451	Numerical Analysis I	
MATH 452	Numerical Analysis II	
MATH 453	Numerical Optimization	
MATH 459	Senior Project Seminar	
or MATH 460	Senior Project Applied Seminar	
MATH 461	Senior Project I	
& MATH 462	Senior Project II	
MATH 470	Selected Advanced Topics	
MATH 475	Advanced Topics in Mathematics	
MATH 483	Abstract Algebra III	
MATH 531	Discrete Mathematics with Applications II	
MATH 541	Topology II	
STAT 425	Probability Theory	
Total Units		**48**