MATHEMATICS, B.S.

Program Learning Outcomes

Graduates of the program will be able to:

- demonstrate facility with analytical and algebraic concepts.
- write proofs.
- apply their mathematical knowledge and critical thinking to solve problems.
- use technology to solve problems.
- speak about their work with precision, clarity, and organization.
- write about their work with precision, clarity, and organization.
- identify, locate, evaluate, and effectively and responsibly use and cite information for the task at hand.
- collaborate effectively in teams.
- understand and create arguments supported by quantitative evidence.
- understand the professional, ethical, and social issues and responsibilities with the implementation and use of mathematical models and technology.

Code	Title	Units
Lower-Division Requirements		
CSC 1043 and CSC 1043L	Introduction to Computer Programming and Introduction to Computer Programming Lab	3
CSC 1054 and CSC 1054L	Objects and Elementary Data Structures and Objects and Elementary Data Structures Lab	4
MTH 1064 and MTH 1064L	Calculus I (FE) and Calculus I Lab (FE)	4
MTH 1074 and MTH 1074L	Calculus II and Calculus II Lab	4
MTH 2033	Linear Algebra	3
MTH 2074	Calculus III	4
PHY 2044 and PHY 2044L	University Physics I (FE) and University Physics I Lab (FE)	4
Upper-Division Requirements		
CSC 3003	Python and UNIX	3
MTH 3012	Number Theory with Proofs	2
MTH 3033	Differential Equations	3
MTH 3052	History of Mathematics	2
MTH 3083	Mathematical Probability and Statistics	3
MTH 4024	Real Analysis	4
MTH 4044	Abstract Algebra	4
MTH 4081	Senior Seminar in Computer Science	1
MTH 4092	Special Topics in Mathematics	2
Choose two (2) courses from the following:		6
MTH 3043	Discrete Mathematics	
MTH 3073	Mathematical Modeling	
MTH 4013	Complex Analysis	
Choose one (1) sequence from the following:		3
HON 4098 and HON 4099	Honors Project I and Honors Project II	
MTH 4102 and MTH 4121	Independent Research in Mathematics I and Independent Research in Mathematics II	
MTH 4133	Service Learning in Mathematics	
Elective Courses		
Choose five (5) additional units from the following: [1]		5
CSC 3011	Machine Learning and Multivariate Modeling in R	
CSC 3021	Computational Tools	
CSC 3031	Data Visualization and Communication with R	
HON 4098	Honors Project I	
HON 4099	Honors Project II	
MTH 3043	Discrete Mathematics	
MTH 3073	Mathematical Modeling	
MTH 4002	Topics in Geometry	
MTH 4013	Complex Analysis	
MTH 4053	Advanced Applied Statistics	
MTH 4071	History of Mathematics Study Tour	
MTH 4072	Internship in Data Science	
MTH 4091	Independent Study in Mathematics	
MTH 4092	Special Topics in Mathematics	
MTH 4102	Independent Research in Mathematics I	
MTH 4121	Independent Research in Mathematics II	
MTH 4133	Service Learning in Mathematics	
MTH 4162	Project for Data Analytics Minors I	
MTH 4171	Project for Data Analytics Minors II	
Total Units		**64**

[1] An elective course may not count as both an upper-division requirement and a required "additional elective."

Total Non-FE Units for Degree: 59

Recommended Electives for Mathematics Tracks

Graduate School: One semester of independent study continuing Abstract Algebra or Real Analysis, Complex Analysis, Honors Project or Independent Research in Mathematics.

Industry: Complex Analysis, Mathematical Probability, and Mathematical Modeling. Additional knowledge of computer programming and software tools such as Matlab and R can be helpful in this field.

Actuary: MTH 3083 Mathematical Probability and Statistics, MTH 3043 Discrete Mathematics, MTH 3073 Mathematical Modeling will help you prepare for actuarial exams. We recommend that you take the first exam as soon as you finish MTH 3083 . The Society of Actuaries has approved (VEE) ECO 1001 Macroeconomics, ECO 1002 Microeconomics to meet their Economics requirement (you must get at least a B in each). The Society of Actuaries has also approved (VEE) the sequence: ACC 2000 (ACC 2001 Principles of Financial Accounting I can be substituted), FIN 3035 Business Finance and FIN 3085 Intermediate Finance to meet their Accounting and Finance requirement. The Society of Actuaries has approved (VEE) MTH 4053 to meet their Mathematical Statistics requirement. So with some work you can meet 4 of the 10 items required for becoming a Fellow of the Society of Actuaries before you graduate from college. It is also worth noting that by adding a few classes to this list, you can earn a minor in Finance.

If you are planning on becoming an actuary, we recommend that you earn a BS in Data Science rather than a BS in Mathematics.

Teaching: PLNU has a waiver on the CSET: Mathematics exams, if a student takes a specific set of mathematics classes as part of the BS program. These include MTH 4002 Topics in Geometry, MTH 3043 Discrete Mathematics, MTH 4013 Complex Analysis and EDU 3002 Foundations of Education and Learning Theory and EDU 4004 Foundations of Special Education. Please see your advisor for further details. PLNU does offer the option of earning a BS in Mathematics and a teaching credential in four years and the details of that can be found in the description of the Blending Single Subject Teaching Credential below.

4-Year Credential Track: Single Subject Teaching Credential

Majors in the Bachelor of Arts and Bachelor of Science degrees complete a minimum of 128 units to graduate. The following majors have the option of choosing the 4-year credential track by fulfilling additional units within the undergraduate degree in fulfillment of the Single Subject California Teaching Credential.

- Art Education, B.A. (https://pointloma-public.courseleaf.com/tug-catalog/colleges-schools-departments/cah/art/art-education-ba/) (Single Subject Art California Teaching Credential)
- Biology, B.A. (https://pointloma-public.courseleaf.com/tug-catalog/colleges-schools-departments/cnss/bio/biology-ba/) (Single Subject Science California Teaching Credential)
- Health and Human Performance, B.A. (https://pointloma-public.courseleaf.com/tug-catalog/colleges-schools-departments/chs/kin/health-human-performance-ba/) (Single Subject Physical Education California Teaching Credential)
- French, B.A. (https://pointloma-public.courseleaf.com/tug-catalog/colleges-schools-departments/cah/ljwl/french-ba/) (Single Subject World Languages: French California Teaching Credential)
- History, B.A. (https://pointloma-public.courseleaf.com/tug-catalog/colleges-schools-departments/cah/hps/history-ba/) (Single Subject Social Sciences Teaching Credential)
- Literature-English Education, B.A. (https://pointloma-public.courseleaf.com/tug-catalog/colleges-schools-departments/cah/ljwl/literature-ba/) (Single Subject English Teaching Credential)
- Mathematics, B.S. (p. 1) (Single Subject Mathematics Teaching Credential)
- Music Education, B.A. (https://pointloma-public.courseleaf.com/tug-catalog/colleges-schools-departments/cah/mus/music-education-ba/) (Single Subject Music California Teaching Credential)
- Spanish, B.A. (https://pointloma-public.courseleaf.com/tug-catalog/colleges-schools-departments/cah/ljwl/spanish-ba/) (Single Subject World Languages: Spanish California Teaching Credential)

For the 4-year credential track, the following 3000 or 4000-level credential courses are strategically added to the undergraduate degree course plan. These courses represent the required courses for the California SB2042 Single Subject Teaching Credential. Students desiring to enroll in the 4-year credential track would need to make application to the Teacher Education program before entry in the 3rd credential course, meeting all program, university and state requirements for classroom observations and tests required prior to student teaching. Students will be vetted through a screening process, which may include a faculty interview, prior to being placed in student teaching. Candidates major in the academic discipline of their choice (e.g. Kinesiology) and are co-advised by both departments throughout their undergraduate program.

Candidates may also apply to the School of Education Graduate Program to fulfill the remaining requirements toward the California Teaching Credential(s). Any 4000-level courses cross listed with the 6000-level credential courses cannot be repeated between the undergraduate and graduate programs. At the point that the requirements for the undergraduate degree are fulfilled, the candidate would apply to the Graduate School of education and complete the remaining courses required for the credential post-baccalaureate.

The following courses may be used for the credentialing purposes in the State of California. When taken prior to the posting of a baccalaureate degree, unit values may not be applied toward master's degree courses. Other appropriate master's degree-level courses must be substituted for unit values.

Requirements

Code	Title	Units
EDU 3002	Foundations of Education and Learning Theory [1]	3
EDU 3006	Principles of Language Acquisition [1]	3
EDU 4004	Foundations of Special Education [1]	3
EDU 4009	Classroom Assessment and Research Practices	3
EDU 4017	Teaching and Learning Capstone: Contemporary Issues in the Vocation of Education	2
EDU 4020	Literacy Instruction for Secondary Teachers [1]	3
EDU 4021	General Methods for Secondary Teachers [1]	3
EDU 4050	Secondary Clinical Practice I	4
EDU 4055	Secondary Clinical Practice II	4
EDU 40CP3	Secondary Clinical Practice Seminar I	1
EDU 40CP4	Secondary Clinical Practice Seminar II	1
Choose one (1) course from the following based on major:		3
EDU 4033	Methods for Teaching Secondary Mathematics (Mathematics Majors)	
EDU 4034	Methods of Teaching Secondary Science (Biology Major) [2]	
EDU 4035	Methods of Teaching Secondary Social Science (History Majors)	
EDU 4036	Methods for Teaching Secondary Foreign Language (French/Spanish Majors)	
EDU 4037	Methods for Teaching Secondary Visual Arts (Art Education Majors) [3]	
EDU 4038	Methods for Teaching Secondary Physical Education (Exercise and Sports Science Majors)	
EDU 4039	Content-Specific Pedagogy for Secondary Teachers (Music Education Majors) [4]	
Total Units		**33**

[1] Requires 20 hours of supervised field experience working with students in a classroom setting.
[2] BIO 4063 also satisfies this credential requirement.
[3] ART 4055 also satisfies this credential requirement.
[4] MUE 4054 also satisfies this credential requirement.