

MASTER OF ARTS IN MATHEMATICS

Admission to Program

In addition to the general requirements for admission, applicants to the master's program must have a 3.0-grade point average in the following three courses or their equivalents:

| Code | Title | Units |
|----------|-----------------|-------|
| MATH 325 | Linear Algebra | 4 |
| MATH 335 | Modern Algebra | 3 |
| MATH 370 | Real Analysis I | 3 |

Applicants who fail to satisfy this requirement but who are qualified in all other respects may be admitted on the condition that they bring their grades in these courses up to the 3.0 average during their first two semesters of graduate study (these three courses, however, may not be counted as electives toward the M.A. degree).

Program Learning Outcomes

- Formulate and analyze mathematical conjectures, construct proofs in sound mathematical English, and use these skills to write proofs of statements in advanced linear algebra, abstract algebra, and real and complex analysis.
- Use technological tools for computation, for locating and retrieving technical information and conducting literature searches, and for typesetting mathematical documents.
- Achieve knowledge integration in content and practice by synthesizing various mathematical tools to understand mathematical phenomena, mathematical models, and solutions to mathematical problems.
- Communicate effectively to a variety of audiences using oral, written, and visual modes.

Written English Proficiency Requirement

All students in graduate programs at SF State must demonstrate Level One (entry) and Level Two (exit) writing proficiency in accordance with University, departmental, and or programmatic guidelines.

Level One

- Prior to admission: Minimum score of 4.0 on the Analytical Writing Analysis (AWA) on the GRE test.
- Conditional Admission: Applicants who do not satisfy Level I prior to admission must pass SCI 614 or MATH 729 with a grade of B-minus or better not later than the second semester. (Students should note that SCI 614 can be taken only through the College of Professional & Global Education and may not count as units toward the degree. MATH 729 is only offered in spring semesters.)

Level Two

Satisfactory completion of the Master's Thesis (MATH 898), or take two comprehensive examinations and write an expository paper.

Upper-division courses acceptable on the Advancement to Candidacy form will be determined by the student with approval of the graduate coordinator.

Mathematics (M.A.) – Minimum 30 units

Core (18 units)

| Code | Title | Units |
|----------|-------------------------------------|-------|
| MATH 735 | Modern Algebra II | 3 |
| MATH 770 | Real Analysis II: Several Variables | 3 |

Select three:

| | | |
|---|-------------------------|--|
| MATH 710 | Measure and Integration | |
| MATH 711 | Functional Analysis | |
| or MATH 730 Theory of Functions of a Complex Variable | | |
| MATH 725 | Advanced Linear Algebra | |
| MATH 850 | Algebra | |

Select an additional 3 units from unpaired graduate courses other than MATH 898 or MATH 899

Upper-Division/Graduate Mathematics or Related Courses (9-12 units)

MATH 730 must be included among these units unless the student had earned a B or higher grade in an undergraduate complex analysis course. No more than 9 units may be selected from approved unpaired undergraduate upper-division courses. Students must complete either a thesis with oral defense (MATH 898) or take the comprehensive examinations and write an expository paper (MATH 896). Students who plan to take MATH 898 must complete 9 units of elective courses. Students who plan to take MATH 896 must complete 12 units of elective courses, including at least 3 units of unpaired graduate courses.

Culminating Experience (0-3 units)

Candidates for the M.A. in Mathematics must complete a Culminating Experience. Two options are available:

| Code | Title | Units |
|-------------|------------------------------------|-------|
| MATH 896EXM | Culminating Experience Examination | 0-3 |
| MATH 898 | Master's Thesis | 3 |

Thesis Option – MATH 898

Students may choose to write a thesis and present an oral defense. Students considering the thesis option should contact the department chair or graduate advisor for further details. A master's thesis should contain new theorems or algorithms, a novel application, or an original approach to an established result. The resulting manuscript must be prepared according to university guidelines following a style similar to that used by the *Notices of the American Mathematical Society*. Each MA thesis has a principal advisor and two additional readers. The expected time to completion for this paper is one academic year. Thesis guidelines are available from the mathematics graduate coordinators.

Comprehensive Examinations/Expository Paper Option – MATH 896EXM

Students selecting this option take two written examinations and write an expository paper. Students must take two examinations selected from algebra, analysis, and statistics. Written examinations are administered during the last two weeks of each semester. Examinations last two and a half hours, and a student takes no more than one examination per day. Departmental syllabi for the examinations are available at least four months in advance of each administration. Each examination requires students to integrate material from several undergraduate and graduate courses, to demonstrate their ability to write short proofs in correct mathematical English, and to demonstrate the falsity of propositions by counter-examples. Students who fail an examination may repeat it at

least once, with additional attempts requiring the written approval of the graduate coordinators.

The expository paper is completed in two stages. First, students must complete a departmental proposal form, including: the title and abstract of the proposed paper, the what-why-how aspects of the research in question, a brief preliminary bibliography, and the approval of the proposal by a committee consisting of a faculty advisor and one additional reader from the Mathematics faculty. Once students have an approved proposal, they may begin work on the project under the guidance of the faculty advisor. Completion of the paper is subject to signed approval by all members of the committee.

Further information about these options can be obtained from the department website: <http://math.sfsu.edu>.