

# Master of Arts in Mathematics

The Master of Arts degree in Mathematics is a flexible program that allows students to tailor their studies to individual career goals. It emphasizes mathematical content courses and communication of mathematics. It is appropriate not only for college teaching but also for students considering further graduate work or work in industry. There are two possible culminating experiences: a thesis, or, a set of comprehensive exams. See below for more information on these.

## Admission to the Program

In addition to the general requirements of the university, which include a baccalaureate degree from an accredited college, specific requirements for admission to the program are:

1. Successful completion with a grade of at least "B" (3.0) of course work in abstract algebra, real analysis, in addition to upper division course work in pure, applied, and advanced mathematics deemed equivalent to the core of the mathematics major at California State University, San Bernardino. More specifically, course work in pure mathematics must include one of number theory, geometry, combinatorics, or graph theory. Course work in applied mathematics must include one of ordinary differential equations, numerical analysis, Fourier analysis, or mathematical modeling. Course work in advanced mathematics must include one of topology, complex analysis, or differential geometry. Substitutions may be made in certain circumstances at the discretion of the MA coordinator. In addition, an overall GPA of at least 3.0 is required;
2. In some cases, students who do not meet these criteria may be admitted as conditionally classified graduate students following review by the Department of Mathematics Graduate Committee;
3. Submission of a completed M.A. in Mathematics application form, including all undergraduate transcripts;
4. Three letters of recommendation submitted to the Department of Mathematics main office;
5. A letter of not more than three pages, outlining background, interest in this program, and career goals.

## Advising

Each graduate student is encouraged to seek advising information from the Department of Mathematics either before enrolling or soon after being admitted to the program where they will develop an appropriate course of study based on their preparation and interests. The specific program must be approved by the department graduate committee at Advancement to Candidacy.

## Advancement to Candidacy

In order to be advanced to candidacy, the student must:

1. Achieve classified status;
2. Complete between 11 and 15 units of applicable work as a graduate student, with a grade point average of at least 3.0 ("B");
3. Complete MATH 6000 with a grade of B or better. (This is the Writing Requirement for Graduate Candidacy.)

4. Submit a formal program of graduate work as part of Advancement to Candidacy prepared in consultation with and approved by the departmental graduate committee;
5. Gain final approval of the program and of the candidacy itself by the Dean of Graduate Studies.

## Requirements for Graduation

1. Advancement to candidacy for the degree;
2. A minimum of 31 semester units of acceptable graduate level work as specified below in the formal program;
3. No less than 22 units completed in residence at this university;
4. Completion of a thesis or successfully pass all comprehensive exams (see below for more on these options);
5. A grade point average of at least 3.0 in the program, with no course grade being less than "B-;"
6. The Graduate Writing Assessment requirement is met through successful completion of MATH 6000;
7. Any additional general requirements not cited above and listed in Graduate Degree and Program Requirements (<http://bulletin.csusb.edu/graduate-degree-programs/graduate-degree-program-requirements/>).

## Degree Requirements (31 units)

(Program Code: MTHM)

### Core courses (10)

MATH 6000	Communicating Mathematics	2
MATH 6016	Graduate Algebra	4
MATH 6018	Analysis in Several Variables	4

### Electives (15)

5 elective courses for at least 15 units. At least 6 units must be at the 6000 level. The 6000-level electives may be chosen from Math 6110, 6145, 6178, or any of the independent study courses.

Approved 5000- or 6000-level courses in mathematics not used to satisfy any other requirement

Approved 4000-level courses in mathematics not in the core of the major

**Culminating Experience (6) 6**

**Total Units 31**

## Culminating Experience (6 units)

The student may choose as their culminating experience to either write a thesis or pass three comprehensive examinations. This decision is made when the student advances to candidacy.

## Thesis option (6 units)

MATH 6972	Graduate Thesis I	2
MATH 6974	Graduate Thesis II	4
<b>Total Units</b>		<b>6</b>

If the student chooses to pursue a thesis to fulfill the above requirement for graduation, they must have a GPA in the program of 3.25 or higher, and then complete the thesis preparation courses Math 6972 and Math 6974. To enroll in Math 6972, the student must submit a short proposal with a faculty mentor (who agrees to be the chair of their thesis committee) to the MA Coordinator by the final week of classes in the

semester prior to enrolling in Math 6972. A detailed thesis proposal approved by two other faculty members who agree to be on the student's thesis committee is usually produced by the student during Math 6972. In any event, this proposal must be submitted to the MA Coordinator before the last week of classes of the semester prior to enrolling in Math 6974 so that it can be reviewed and approved by the MA Committee, at which time the student may enroll in Math 6974 and complete the writing and defense of their thesis.

### Comprehensive Exam option (6 units)

MATH 6900	Comprehensive Exam Preparation in Elective Topics	1
MATH 6916	Comprehensive Exam Preparation in Algebra	1
MATH 6918	Comprehensive Exam Preparation in Analysis	1
At least 3 additional units at the 5000 or 6000 level		3
MATH 6981	MA Comprehensive Examination	0
<b>Total Units</b>		<b>6</b>

If the student does not pursue a thesis, then they must pass three comprehensive exams and enroll in at least 3 additional math units at the 5000 or 6000 level (this course level requirement may be waived in certain circumstances). These exams are each taken any time during the expected final semester of the program, this schedule is developed by those faculty involved. Two of the exams cover standard material in MATH 6016 and MATH 6018. The third exam *must not be* predominantly written (for example, oral), and covers material from two elective courses (excluding Math 6178 and Math 6411); one of these selected courses must be at the 6000 level. The instructors of these two courses comprise two of the three members of the student's elective examination committee, while the third is chosen by the student. The chair of this committee is responsible for helping to arrange administrative aspects of the exam but also help to mentor the student as they prepare.

The instructors of the most recent MATH 6016 and MATH 6018 courses will write and evaluate the written Algebra and Analysis exams, and will be the instructors of MATH 6916 and MATH 6918, respectively. The chair of the student's elective examination will be the instructor for MATH 6900, and this committee will evaluate the student's performance in their elective comprehensive examination. To enroll in MATH 6900, the student must submit a proposal to the MA Coordinator for approval by the MA Committee before the final week of classes prior to the semester they will enroll in MATH 6900, MATH 6916, and MATH 6918.

This proposal must have the names and signatures of the student's elective examination committee and the instructors of MATH 6916 and MATH 6918. In addition, it must contain the dates, times, and locations of all three examinations. It must also list what two courses the elective examination covers, and a short summary of the material from those courses the student shall be responsible for, along with any other information relevant to the exam, for example, any special topics or responsibilities of the student. This proposal functions as a contract for how the exams will be administered. The student must also enroll in the 0 unit course MATH 6981, where a grade of "Credit" is given once the student successfully passes all three comprehensive exams.

If a student fails any of the exams, they may retake it only once. Only failed exams need to be retaken. If an exam is failed twice, the student may petition the department for subsequent attempts in exceptional circumstances. Approval of such petitions may be contingent upon completion of additional designated courses.