

The **Mathematical Sciences Program** is designed to provide broad training in basic mathematics together with some specialization in an area of application of mathematics. Each student must select one of the eight Program Options as a special area. Because the program options have somewhat more specific requirements, careful planning and frequent consultation with your advisor are essential to ensure timely completion of the program. The concentration program must include at least nine courses: four basic courses (**II.**), three courses from one of the Program Options (**III.**), and two additional courses (**IV.**) as described below. At least two of the five (optional and additional) courses must be MATH courses.

I. Prerequisites (3 courses) {must be completed with C- or better}**

Instructions	Course(s)	Student Elections (enter your course selections here)
Select one of the following course pairs :	Math 215 & 217 Math 285 & 217 Math 205 & 217 Math 295 & 296	1. _____ 2. _____
EECS 183 or working knowledge of a high-level computer language (Fortran, C, or C++)	EECS 183 or working knowledge of a high-level computer language (Fortran, C, or C++) *Students are strongly encouraged to take EECS 280 and EECS 281 as well.	3. _____

II. Basic Courses (4 courses) {must be completed with C- or better}**

Instructions	Course(s)	Student Elections (enter your course selections here)
Select one of the following Differential Equations courses:	Math 316 Math 286	1. _____
Select one of the following Discrete Math/Modern Algebra courses:	Math 312 Math 465 Math 412 Math 493	2. _____
Select one of the following Analysis courses: (<i>Students in Mathematical Economics should choose Math 351 or 451 as their Analysis course.</i>)	Math 351 Math 354 Math 451 Math 450 Math 454	3. _____
Select one of the following Probability courses:	Math 425 Math 525	4. _____

** More advanced students, such as those who have completed Math 396, may substitute higher-level courses with the approval of a concentration advisor. All students are strongly encouraged to include in their program one of the more theoretical courses: Math 412, 451, 493, 494, or 525.

III. Program Options: Control Systems (3 courses)

A student in the **Mathematical Sciences Program** must choose one of the eight options and complete at least three courses listed under that option. This requirement is designed to provide focus and depth to the program and can only be waived by a departmental advisor in favor of a program that provides this depth in some equivalent way. An acceptable program must include some of the more difficult courses. Advice should be sought from a departmental advisor before selecting an option.

Mathematical modeling refers generally to the representation of real-world problems in mathematical terms. In some sense, this is necessary for any application of mathematics, but the term is used more often to refer to applications of mathematics to biological, mechanical, and human systems. Analysis of such systems involves complex mathematical descriptions and leads to large problems which can be solved only by use of a computer. Operations Research studies integrated systems, including health care, education, manufacturing processes, finance, and transportation. Because the emphasis is on the analysis and operation of systems, practitioners are also qualified to deal with managerial problems. Career opportunities are available in many parts of industry and government.

Instructions	Course(s)	Student Elections (enter your course selections here)
Select three of the following courses:	Math 420 - Adv Linear Algebra Math 433 - Intro to Diff Geom Math 462 - Math Models Math 463 - Math Modeling in Biology Math 561 - Linear Prog I I Math 562 - Cont. Optimization Math CHE 510 - Math Meths in Chem IOE 515 - Stochastic Processes IOE 543 - Scheduling IOE 610 - Linear Prog II IOE 611 - Nonlinear Prog IOE 612 - Network Flows IOE 614 - Integer Prog STATS 426 - Intro Theory Stats	1. _____ 2. _____ 3. _____

**** Most students should include Math 561 and Stats 426.**

IV. Advanced Courses (2 courses)

To complete the major program, each student should elect two additional advanced courses in mathematics or a related area. In all cases, **approval from a departmental advisor is required**. This is a very flexible requirement designed to accommodate special interests and may be satisfied by a broad range of courses in other departments (generally numbered 300 or above) or by mathematics courses numbered 400 or above.

Instructions	Course(s)	Student Elections (enter your course selections here)
Select two Advanced courses:	<i>Selected with approval from a mathematical sciences advisor</i>	1. _____ 2. _____

V. Requirements

At least two of the courses in III. and IV. must be MATH courses.

At least one must be a cognate course numbered 300 or above taught outside the department that emphasizes applying significant mathematical tools (at least at the level of Math 215) in another discipline.