

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 requirements for the Mathematical Biology option work a little differently from other Mathematical Sciences tracks, and the requirements below are organized to reflect these requirements.

I. Prerequisites** (3-7 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++) <i>*Students are encouraged to take EECS 280 and EECS 281 as well.</i>	3. _____
Required for the Mathematical Biology option:	Bio 171 & Bio 172 or 174; or Bio 192; or Bio 195	4. _____ 5. _____

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 286 Math 316	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:	Math 351 Math 451 Math 354 Math 454 Math 450	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, or 525.

III. and IV. Program Options and Related Courses (Mathematical Biology)

Ever since the advent of high-powered computing, it has become obvious that mathematics can contribute a great deal to biological and medical research. Indeed, in many cases mathematical approaches can answer questions that cannot be addressed by other means, and thus mathematics is often an indispensable tool for biological research. Typical areas of application include such diverse areas as the topology of DNA, genetic algorithms, cell physiology, cancer biology and control strategies, micro-circulation and blood flow, the study of infectious diseases such as AIDS, the biology of populations, neuroscience and the study of the brain, developmental biology and embryology, the study of hormone secretion and endocrine control, and bioinformatics. The Mathematical Biology option will thus be appropriate for any student with an interest in biology or medicine and a desire to apply the mathematics they learn to current and important biological problems.

An additional prerequisite to this major is completion of the Introductory Biology sequence (Bio 171 and 172). Students electing this option must complete Math 463 (Math Modeling in Biology), a second math course from the list below, and at least one advanced level (numbered over 300) in biological sciences. The options list below contains approved biological sciences courses, but other courses in Biology, Physiology, Microbiology/Immunology, Neuroscience, Bioinformatics, or Natural Resources and Environment can be accepted with approval of your mathematics advisor. Recommended cognate courses include STATS 426, STATS 510 and quantitative courses focused on biological processes such as BIOPHYS 370, BIOPHYS/PHYS/CHEM 417, EEB/CMPLXSYS 430 and EEB/MATH 466.

Instructions	Course(s)		Student Elections (enter your course selections here)
	All students selecting the Mathematical Biology option must complete Math 463.		1. _____
Select two of the following math courses:	Math 404 - Intermediate Diff Equations Math 452 – Intro Analys: Multi Math 454 - Bound Val. Prob for PDE Math 460 – Intro Stoch Proc Math 462 – Math Models Math 471 - Intro to Numerical Methods	Math 558 - Applied Nonlinear Dynamics Math 559 - Comp. & Math. Neuroscience Math 563 - Adv. Math Methods for Bio. Sci. Math 564 - Topics in Math Bio Math 568 - Math/Comp Neuro <i>Other courses may be used with approval of a Math advisor</i>	2. _____ 3. _____
Select one course in biological sciences	BIO 305 - Genetics CHEM 351 - Fund. Of Biochem BioChem 415 - Intro Biochem	MICROBIOL 301 - Intro to Microbiology <i>Other courses may be used with approval of a Math advisor</i>	4. _____
Select one additional advanced course	Approval from a Math advisor is required.		5. _____