MATHEMATICS MAJOR, B.A.

Mathematics has always been a fundamental component of human thought and culture, and the growth of technology in recent times has further increased its importance.

Students majoring in mathematics may enter either the B.A. or the B.S. program. The B.A. program is more flexible than the B.S. program; it allows students to specialize in mathematics and at the same time either to follow a broad liberal arts program or to specialize in a second area (possibly even taking a second major). MATH 521 is a key class in the curriculum and MATH 381 is a key to prepare for it. Your degree plan should be built with these classes as the backbone, and they should be taken in the second and third year by most students. Please see the sample plan for additional information and suggestions.

Student Learning Outcomes

Upon completion of the mathematics program (B.A., B.S.), students should be able to:

• Demonstrate mastery of the core of mathematics recognized as essential by national professional mathematics organizations
• Demonstrate mathematical reasoning and problem-solving skills
• Demonstrate the ability to construct logical arguments and mathematical proofs
• Demonstrate the ability to apply mathematical knowledge and skills in context and interpret results

Requirements

In addition to the program requirements, students must:

• earn a minimum final cumulative GPA of 2.000
• complete a minimum of 45 academic credit hours earned from UNC-Chapel Hill courses
• take at least half of their major core requirements (courses and credit hours) at UNC-Chapel Hill
• earn a minimum cumulative GPA of 2.000 in the major core requirements. Some programs may require higher standards for major or specific courses.

For more information, please consult the degree requirements section of the catalog (https://catalog.unc.edu/undergraduate/degree-requirements/).

Course Suggestions for Pure Mathematics

These courses provide a solid theoretical understanding of central mathematics and excellent preparation for graduate study in mathematics or the mathematical sciences.

Course Suggestions for Mathematical Economics

Suitable for students planning to go on to graduate school in economics or a related area, or pursue a career in economics, business, or finance. Note: With three more ECON courses numbered above 400, the requirements for the B.A. in economics could also be satisfied.

Mathematics Major, B.A.
**Course Suggestions for Future High School Teachers**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>MATH 231</td>
<td>Calculus of Functions of One Variable  (H, F)</td>
<td>4</td>
</tr>
<tr>
<td>MATH 232</td>
<td>Calculus of Functions of One Variable II (H, F)</td>
<td>4</td>
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<tr>
<td>MATH 233</td>
<td>Calculus of Functions of Several Variables (H, F)</td>
<td>4</td>
</tr>
<tr>
<td>MATH 381</td>
<td>Discrete Mathematics (H)</td>
<td>3</td>
</tr>
<tr>
<td>MATH 383</td>
<td>First Course in Differential Equations (H)</td>
<td>3</td>
</tr>
<tr>
<td>At least one of:</td>
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<td></td>
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<tr>
<td>MATH 534</td>
<td>Elements of Modern Algebra</td>
<td></td>
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<tr>
<td>MATH 535</td>
<td>Introduction to Probability</td>
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<tr>
<td>MATH 548</td>
<td>Combinatorial Mathematics</td>
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<tr>
<td>MATH 550</td>
<td>Topology</td>
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<tr>
<td>MATH 347</td>
<td>Linear Algebra for Applications</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 577</td>
<td>Linear Algebra</td>
<td></td>
</tr>
<tr>
<td>MATH 521</td>
<td>Advanced Calculus I (H)</td>
<td>3</td>
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<tr>
<td>MATH 533</td>
<td>Elementary Theory of Numbers</td>
<td>3</td>
</tr>
<tr>
<td>MATH 551</td>
<td>Euclidean and Non-Euclidean Geometries</td>
<td>3</td>
</tr>
<tr>
<td>STOR 155</td>
<td>Introduction to Data Models and Inference (F)</td>
<td>3</td>
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<tr>
<td>The Supplemental General Education requirement</td>
<td>9</td>
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</tbody>
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**Sample Plan of Study**

Sample plans can be used as a guide to identify the courses required to complete the major and other requirements needed for degree completion within the expected eight semesters. The actual degree plan may differ depending on the course of study selected (second major, minor, etc.). Students should meet with their academic advisor to create a degree plan that is specific and unique to their interests. The sample plans represented in this catalog are intended for first-year students entering UNC–Chapel Hill in the fall term. Some courses may not be offered every term.

In the first two years, students are required to complete the standard calculus sequence as well as discrete mathematics, linear algebra, and first course in differential equations. At the beginning of their third year, students take advanced courses in mathematics. They have a great deal of flexibility in tailoring their program to meet their individual interests.

**First and Second Years**

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<td>Linear Algebra</td>
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**Third and Fourth Years**

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</thead>
<tbody>
<tr>
<td>MATH 521</td>
<td>Advanced Calculus I (H)</td>
<td>3</td>
</tr>
<tr>
<td>At least three more MATH courses numbered above 500. (2)</td>
<td>9</td>
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</tbody>
</table>

**Total Hours**  
33

Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.

FY-Launch class sections may be available. A FY-Launch section fulfills the same requirements as a standard section of that course, but also fulfills the FY-SEMINAR/FY-LAUNCH First-Year Foundations requirement. Students can search for FY-Launch sections in ConnectCarolina using the FY-LAUNCH attribute.

A current or former major in statistics and analytics may substitute STOR 215 ([https://catalog.unc.edu/search/?P=STOR %20215](https://catalog.unc.edu/search/?P=STOR%20215)) for MATH 381 ([https://catalog.unc.edu/search/?P=MATH %20381](https://catalog.unc.edu/search/?P=MATH%20381)).

For this requirement, taking the three lab courses MATH 383L + MATH 528L + MATH 529L counts as one 500-level course.

One of these courses could be moved to the third year with minimal consequence.
MATH 381 is a key course to prepare for MATH 521. Students with double majors should take MATH 381 over similar courses offered in other departments.

**Special Opportunities in Mathematics**

Special activities for qualified students include an undergraduate Mathematics Club, problem-solving seminars, the Putnam Mathematical Competition, and the Virginia Tech Mathematics Contest. Qualified students may pursue opportunities as undergraduate learning assistants or tutors in the Math Help Center. Students interested in these activities should consult the undergraduate student services manager for additional information.

Qualified students can conduct original research with the guidance of a faculty member, usually in conjunction with the preparation of an honors project. Study Abroad opportunities include semester or yearlong programs in a variety of countries. The Archibald Henderson Medal and the Alfred Brauer Prize recognize outstanding performance and promise in mathematics.

Undergraduate honors research projects as well as some internships or study abroad programs might qualify for research and discovery or experiential education credit in the General Education curriculum. MATH 296 satisfies this requirement.

**Honors in Mathematics**

Special honors (H) sections are given in some mathematics courses when student demand is sufficient (for example, MATH 62H, MATH 231H, MATH 232H, MATH 233H, MATH 381H, MATH 383H).

Promising students are encouraged to work toward a bachelor's degree with honors in mathematics. This program consists of nine or more courses approved by the departmental honors advisor and satisfactory completion of an honors project completed over the two semesters. The honors project is conducted in association with a departmental faculty member on a topic approved by the departmental honors advisor, and spans two semesters of independent research, during which time the honors candidate must be enrolled in MATH 691H and MATH 692H. The final report on the project includes both a written description and an oral presentation before a committee of three faculty (including the project advisor) approved by the departmental honors advisor. The committee will then report to the departmental honors advisor, who, in conjunction with a subcommittee of the undergraduate committee, will make the final recommendation on awarding a degree with honors or highest honors. The candidate must have a 3.5 grade point average in mathematics courses to begin an honors project and must maintain the 3.5 average through the completion of the senior year.

**UNC–BEST**

The UNC Baccalaureate Education in Science and Teaching (UNC–BEST) Program is a collaboration between the School of Education and the College of Arts and Sciences and is designed to allow undergraduate mathematics (and science) majors interested in teaching high school mathematics the opportunity to earn their degree and obtain licensure as a North Carolina high school mathematics teacher in four years. UNC–BEST students meet all the degree requirements for their mathematics major and complete a teaching methods class (MATH 410 or EDUC 760). Students also fulfill teaching licensure coursework requirements (see list below) as well as many General Education and elective requirements.

**Contact Information**

**Department of Mathematics**

Visit Program Website (http://www.math.unc.edu)  
Phillips Hall, CB# 3250  
(919) 962-1294

**Chair**  
Jason Metcalfe

**Director of Undergraduate Studies**  
Jeremy Marzuola  
marzuola@email.unc.edu

**Undergraduate Student Services Manager**  
Erin Willis  
ewillis3@email.unc.edu

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**Graduate Programs**

- M.A. in Mathematics (https://catalog.unc.edu/graduate/schools-departments/mathematics/)
- M.S. in Mathematics (https://catalog.unc.edu/graduate/schools-departments/mathematics/)
- Ph.D. in Mathematics (https://catalog.unc.edu/graduate/schools-departments/mathematics/)

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**Code** | **Title** | **Hours**  
--- | --- | ---  
MATH 410 | Teaching and Learning Mathematics | 3-4  
or EDUC 760 | Methods and Materials for Teaching Secondary/K-12 Subjects I |  

**Educational Foundations**

- EDUC 532 | Human Development and Learning | 3  
- EDUC 615 | Schools and Community Collaboration | 3  
- EDUC 689 | Foundations of Special Education | 3  

**Student Teaching**

- EDUC 593 | Internship/Student Teaching | 12  

**Seminar**

- EDUC 601 | Education Workshops | 1  
**Total Hours** | 25-26  

For more details on admission requirements and application processes, visit the School of Education website (https://ed.unc.edu/academics/programs/unc-baccalaureate-education-in-science-and-teaching/).