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Information About the (Pure) Major and Minor

Students who enjoy mathematics are urged to consider majoring in it. Brandeis offers a wide variety of mathematics courses, and majors will have the benefits of small classes and attention from individual faculty members. To become a major a student should have completed the requirements under Part A (below) by the end of the sophomore year; these courses are prerequisites to the higher-level courses.

I. Requirements for the Undergraduate Major (consult the Bulletin for details before enrolling)

A. Either MATH 15a **or** 22a (Linear Algebra); Either MATH 20a **or** 22b (Multivariable Calculus).

B. MATH 23b (Introduction to Proofs) or exemption exam.

C. One of the following: MATH 35a, 110a or 115a (Analysis).

D. One of the following: MATH 28a, 28b or 100a (Algebra).

E. Four additional semester courses, either MATH courses numbered 27 or higher or cross-listed courses. A course used to satisfy the requirements for the major must receive a grade of C- or higher.

F. A degree with honors requires items A, B, C, and D above, plus six additional semester courses, either MATH courses numbered 27 or higher or cross-listed courses, passed with a grade of B or higher. At least four of the courses used to satisfy the major requirement must be honors courses. The honors courses are all MATH courses numbered 100 or higher.

II. Requirements for the Undergraduate Minor (consult the Bulletin for details before enrolling)

A. Either MATH 15a **or** 22a (Linear Algebra);
Either MATH 20a **or** 22b (Multivariable Calculus).

B. Three additional semester courses, either MATH courses numbered 27 or higher or cross-listed courses. Most MATH courses numbered 27 or higher require MATH 23b as a prerequisite.

III. Teacher Preparation Track (consult the Bulletin for details before enrolling)

Students who complete the Brandeis program for Massachusetts High School Teacher Licensure (see section on Education Program in this *Bulletin*) may earn a bachelor's degree in mathematics by satisfying major requirements A, B, C, and D above and the following:

- MATH 8a (Introduction to Probability and Statistics) or 36a (Probability).
- Two additional courses, either MATH courses numbered 27 or higher or cross-listed courses.
- A computer science course numbered 10 or higher.
- Completion of the High School Teacher Licensure Program.

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Information About the Applied Major and Minor

This new major focuses on applications of mathematics to physics, biology, chemistry, economics and social sciences, which have proved particularly fruitful, and have led to the development of new mathematical tools and methods. The Applied Mathematics major will introduce students to the essential tools used in such applications. It will prepare students for professional careers in public institutions, research centers or private companies using quantitative methods (such as modeling, data analysis or optimization) to understand and solve complex real-world problems.

I. Requirements for the Undergraduate Major (consult the Bulletin for details before enrolling)

A. Either MATH 15a **or** 22a (Linear Algebra); Either MATH 20a **or** 22b (Multivariable Calculus).

B. MATH 35a (Advanced Calculus and Fourier Analysis), MATH 36a (Probability), **and** MATH 36b (Mathematical Statistics)..

C. MATH 37a (Differential Equations), MATH 40a (Introduction to Applied Mathematics), **and** MATH 121a (Mathematics for Natural Sciences).

D. One course chosen from: MATH 122a (Scientific Computing), COSI 177a (Scientific Data Processing in Matlab) or COSI 178a (Computational Molecular Biology).

E. One course chosen from: MATH 123a (Principles of Mathematical Modeling and Applications to Biology) or NBIO 136b (Computational Neuroscience).

F. One of the following: MATH 39a (Intro to Combinatorics), MATH 115a (Complex Analysis), MATH 126a (Stochastic Processes and Models), BCHM 145a (Bayesian Inference), COSI 123a (Statistical Machine Learning), NPHY 115a (Dynamical Systems) or PHYS 110a (Mathematical Physics).

G. At least two courses must be taken from another department in the School of Science or Economics from the following list: BCHM 102a, BCHM 104a, COSI 130a, COSI 180a, ECON 181b, ECON 184b, PHYS 100a, PHYS 163b. The non-math classes used to satisfy the requirements A-E **may** double count towards this requirement.

Any course used to satisfy the requirements for the major must receive a grade of C- or higher.

II. Requirements for the Honors Degree

A. Satisfactory completion of all the items above, as well as:

- Passing all the courses used to satisfy the BS with a grade of B or higher.
- Completion and defense of a senior honors thesis. Students considering this option should enroll in MATH 99a and MATH 99b (Independent Research).

General Questions About Math Courses

Do I need to take a math class?

There is no university requirement that you take a math class, although Brandeis does require at least one semester of course work from the School of Science. However, many students choose to take a math course out of interest or need to take one to satisfy another department's requirements. Departments that require their majors to take a math class include Biology, Biochemistry, Chemistry, Physics, Economics, and Neuroscience. Details can be found on each department's web site.

What math class should I take?

It is essential that you enroll in a math class at the right level, so you should take one of the math department's placement exams. You can find the placement exams by going to http://www.brandeis.edu/registrar/newstudent/testing.html#mathtest. If you have any questions about the calculus placement exam, contact Professor Rebecca Torrey at rtorrey@brandeis.edu. If you have any questions about the MATH 22a placement exam, contact Professor Bong Lian at lian@brandeis.edu.

How do I switch from one section of a course to another?

If the section you want is open, you can simply switch sections using SAGE. If the section you want is closed, you can keep trying SAGE to see if a spot opens up. Students who check SAGE frequently usually get into one of their top choices. **You should attend a section from the first day of class even if you haven't yet been able to enroll in your first choice, since you will be responsible for all of the material covered in the course.**

Can I use AP or IB credit to place out of a math class?

Yes, but you should still take one of our placement exams (see above). Be sure to consult the registrar's information on AP, IB and other transfer credit at http://www.brandeis.edu/registrar/transfer/placement.html.
NOTE: Some departments that require a math course do not accept AP credit for their requirement. Always check individual department web sites for requirements.

I'm interested in a career in medicine or another health profession. What math course should I take?

The majority of medical schools have no math requirement, but some require one semester of calculus and a few (3 or 4) require two semesters. The safest choice is to take one semester of calculus and another semester of college mathematics. Statistics is often the best choice for the second course. There are a number of statistics courses available at Brandeis: MATH 8a, BIOL 51a, PSYC 51a, ECON 83a, MATH 36a. In general, it's fine to use AP credit for one of your math classes if you are premed.

Requirements for other health professions schools vary. For more information, see http://www.brandeis.edu/acserv/health/academics/prereqs.html. If you have more questions, contact Katie Stutz in the Office of Academic Services at stutz@brandeis.edu . You can also contact Professor Rebecca Torrey (rtorrey@brandeis.edu) in the math department.