

Grad-school track in pure mathematics

1. AUDIENCE

This *informal* track is for undergraduate students who are considering applying to PhD programs in pure mathematics. The recommendations below should also be useful to those considering a masters program in math, either at UVM or elsewhere; those considering the Accelerated Masters Program at UVM; those who plan to apply to PhD programs in closely related fields; or those who just love math and want to be ready for advanced courses as soon as possible.

Note:

1. All recommendations below apply to students in one of the categories above. Also note that these are only recommendations. To get your degree, you need only satisfy the relevant University requirements and the requirements of your program.
2. Please check with your math advisor before finalizing your schedule. Different students will have different needs.

2. ANALYSIS AND ALGEBRA

We highly recommend that students take *two* semesters of both algebra and analysis. Most graduate programs consider these four semesters of work as part of the minimum for what it means to be well prepared for a PhD program in mathematics.

- The algebra sequence consists of Math 251 and Math 252. Math 251 is offered every fall and alternate springs. Math 252 is offered every spring.
- The analysis sequence consists of Math 241 and 242. Math 241 is offered every fall and in the spring in alternation with Math 251. Math 242 is offered every spring.

If possible, we recommend that you *do not* leave both 241 and 251 until your Senior year. Most graduate courses in pure mathematics at UVM have either 241 or 251 as a prerequisite.

3. OTHER SUGGESTED COURSES

There are a number of non-required courses that are really useful to take. A few notable ones:

- Complex Analysis (currently Math 295; Fall).
- Topology (currently Math 295; Spring).
- Ordinary Differential Equations (Math 230; Fall and Spring).
- Graph Theory (Math 273; Fall).
- Number Theory (Math 255; alternate Spring).
- Cryptography (Math 259; alternate Spring).
- Basic Statistical Methods 1 (Stat 141; Fall and Spring).

Sufficiently prepared undergraduate are welcome in graduate courses. Offerings vary from year to year and we encourage you to talk directly with your advisor or instructor in an upper-level course to help choose the best options. Please note that for topics courses such as Math 351 and Math 373, the prerequisites can vary widely from offering to offering; don't assume you are — or are not — prepared without checking with the instructor.

4. UNDERGRADUATE RESEARCH

We highly recommend you participate in some form of undergraduate research, if at all possible. There are many advantages to participating in undergraduate research. Primarily, you will get a much richer appreciation for what mathematics is and what it means to discover new mathematics. But there are many possible secondary benefits as well such as getting to know a faculty member better.

If a professor agrees to work with you on a project, you can arrange to sign up for Math 293/294 for credit, just as you would with a traditional course.

Read [here](#) and [here](#) for more information on undergraduate research opportunities both at UVM and elsewhere.

5. SUGGESTED YEARLY PLAN

Below we list some suggested plans for students with different levels of preparation upon starting at UVM. While we list specific courses for concreteness, note that there is a wide variety of options for the non-required courses. You are strongly encouraged to explore options with your advisor, professors and fellow students.

If you begin your first year at UVM with Math 021, the following is a good option. Asterisks indicate courses specifically required for the BS in Mathematical Sciences, Majoring in Mathematics:

Year	Fall	Spring
First	021*, CS 021*	022*, 052*
Second	121*, 124*	173, STAT 141
Third	241*, 251*	242, 252
Fourth	273, 295, 293	255, 230, 294

If you have AP credit and start in Math 022, you might do something like the following:

Year	Fall	Spring
First	022*, CS 021*	121*, 052*
Second	173, 124*	241*, STAT 141
Third	251*, 273	242, 252
Fourth	273, 295, 351	255, 295, 331

If you have AP credit and start in Math 121, you might do something like the following:

Year	Fall	Spring
First	121*, 124*	052*, CS 021*
Second	251*, 260	252, 259
Third	241*, 351	242, 331
Fourth	230, 293, 333	373, 294, 335