

# How to minor or major in math at SJSU

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### 1 Lower-division classes

If you want to minor in math at SJSU, the first step is usually to take Math 30/30P, 31, and 32 (Calculus I–III).<sup>1</sup> If you want to major in math, you need to take those classes plus Math 42 (Discrete Math). While you’re doing that, here are some things to keep in mind.

**Spread out your required GE classes instead of taking them all early.** For some reason, many students are told to “get your GE classes out of the way as soon as possible.” This is, without question, absolutely the **worst possible advice** for future students in math or any other technical major. The reason is, if you take all of your GE’s first, then later on, either you will end up taking 4 or more “nerd” classes per semester, causing great damage to your GPA, your health, and your sanity, or you will end up needing extra time to finish. Save your GE’s for later in your career as “sanity maintenance” classes.

**Start taking non-calculus math classes as soon as possible.** For example, you could take 161A (Applied Statistics I) right after finishing Math 31 (Calculus II), or you could take Math 129A (Linear Algebra I) at the same time as Math 32 (Calculus III). You could even take Math 42 (Discrete Math) at the same time as Calculus II or Calculus I.

In many ways, non-calculus classes are a better indicator of what it is like to minor or major in math than calculus classes, so they’ll give you a better idea of what you like or don’t like about math. Also, if you end up majoring in math, it’s better to start your major classes earlier, as there is a chain of prerequisites required to complete the degree.

### 2 Classes for the minor/Transition classes

After finishing your lower-division math, to complete a math minor, you need to take three math classes numbered 100 or higher (excluding 100W, 101, 105, 106, 107A, 107B, and 110L). For many people, the best three classes are Math 129A (Linear Algebra I), Math 133A (Ordinary Differential Equations), and Math 161A (Applied Statistics I). They are all at roughly the same level of difficulty, and can be taken in any order. Those three classes are also an excellent introduction to the math major, so if you like them, you should definitely think about majoring in math!

If you do end up thinking seriously about majoring in math, one other class that you should take at this stage, if not earlier, is Math 108 (Introduction to Proof). This class provides a transition from the calculational emphasis in lower-division math classes to the greater conceptual (and yes, sometimes theoretical) emphasis in upper-division math classes. Math 108 is also a prerequisite for the proof-heavy classes (Math 128A, 129B, and 131A) required for most math majors, and in general, it’s good preparation for the different ways of thinking that you will find in higher-level math classes.

### 3 Some core classes of the major

If you’ve finished your minor/beginning major classes from the previous section, then you’re ready to tackle the core classes in the major. The key points are:

1. **Find a faculty advisor** to help you choose your schedule for the next few years, and talk with your advisor early and often! Don’t pick blindly from the catalog; a good advisor can tell you which classes are easier or harder, which classes you should take first, and so on.

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<sup>1</sup>To be precise, a math minor requires 18 units of math, including Math 30 or 30P, Math 31, and at least 9 upper-division units. Most math minors end up taking Math 32 as a third lower-division course, though 30P and 31 together total 9 units, leaving only the upper-division units.

2. **Plan everything out early.** As soon as you are interested in majoring in math, make an academic plan for each semester until your intended graduation date, planning out the math classes first. Note that if you're an applied math major, you have to take 4 classes in a math-related application topic (physics, bio, CS, etc.), so you should start taking those classes at least 2 years before graduation.
3. **Watch out for prerequisites.** A prerequisite map can be found online; go to the Math web page (<http://www.math.sjsu.edu>) and look under the *Courses & Instruction* link.
4. **DO NOT TAKE MORE THAN 3 MATH CLASSES IN ANY GIVEN SEMESTER.** Taking too many math classes at once is the most common reason for SJSU math students' academic careers to get derailed. Remember, if you take 4 classes, and fail one, that one failed class can cause you to waste literally *years* of time trying to make up for it.  
  
It's also a common SJSU practice to take lots of classes to "save money" by graduating faster. However, the brutal truth is that if you take lots of classes and get mediocre grades in them, no one (employers, grad schools, etc.) will care that you were taking infinitely many classes and working 40 hours per week; all that will happen is that they'll see your GPA and throw away your resumé. In the long run, it may earn you **hundreds of thousands of dollars** to take fewer classes and do better in them.
5. **Finish the writing requirement as soon as you can.** If English is not your native language, this can be a big pain. In any case, you should start as early as possible. (By the way, once you're passed the WST, Math 100W is a good way to fulfill the requirement; it also doubles as a good sanity maintenance class.)

Here are a few key classes to take after finishing Math 129A, 133A, and 161A, depending on what "flavor" of math major you choose to pursue.

**Applied math:** Classes that you should take to further your major in applied math include Math 133B (Partial Differential Equations), Math 143C (Numerical Analysis and Scientific Computing, "solving differential equations" version), and Math 143M (Numerical Analysis and Scientific Computing, linear algebra version). Note that because Math 132 (Advanced Calculus) is rarely offered, many applied math majors end up taking Math 131A (Introduction to Analysis I); see below for notes on that class.

**Statistics:** Classes that you should take to further your major in statistics include Math 161B (Applied Statistics II) and Math 163 (Probability Theory). Also, for the same reasons as applied math majors, see below for notes on Math 131A.

**Economics/Finance/Actuarial Science:** Classes that you should take to further your major include Math 161B (Applied Statistics II) and Math 163 (Probability Theory). There is also a heavy Economics/Business requirement, so you should start those classes early on.

**General math:** If you major in math without a particular emphasis like applied math or statistics, you have a lot of freedom in choosing which courses you want to take. The main issue then becomes our three main proof-intensive classes: Math 129B (Linear Algebra II, or linear algebra with proofs), Math 128A (Abstract Algebra I), and Math 131A (Introduction to Analysis I).<sup>2</sup> These are probably the three most difficult and time-consuming courses we teach in the SJSU undergraduate math program, with Math 129B being the most manageable of the three, and Math 131A being the toughest. It is therefore probably a good idea to take these three courses in three different semesters, as taking two of them at the same time is a gigantic burden. So start taking one at a time, starting with 129B, as soon as possible, while taking other classes, like Math 126 (Number Theory), Math 134 (Dynamical Systems), Math 138 (Complex Variables), Math 142 (Introduction to Combinatorics), or any of the other classes listed above, to make suitable progress towards finishing.

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<sup>2</sup>Math 128A and Math 131A are required for the general math major. Math 129B is not required, but many majors, including applied majors, end up taking it anyway, especially since Math 129B is a better first proof class to take.