General Guidance for Prospective Mathematics Majors or Minors

A major or minor in Mathematics will give you the quantitative skills needed for careers in science, engineering, or data analysis, and also teaches the kind of abstract critical thinking needed in careers such as law, medicine, and business. As such, it is a sound foundation for many different career paths.

Placement for Incoming Students.
Please use the following rough guidelines to help determine which course to take first at SMU. If you are unsure, we *strongly advise* taking a placement test.

- If you had no pre-calculus (or struggled in it), take **1304**.
- If you aced pre-calculus but had no calculus, then take **1337**.
- If you did well in calculus but earned no college credit, take **1340**.
- If you received credit for 1337, don't re-take it – you should take **1338**.
- If you received credit for 1337 *and* 1338, awesome! Consider honors **3302 / 3304.**

Don't take time off.
Mathematics is a highly sequential subject, with each course building on the previous courses. If you take a year or a semester away from math, it is harder to recall the foundational material within your next course. Plus, the higher-level courses needed to complete the major have *many prerequisites*. You may end up having to take 3-4 of these difficult courses in your final year, which is a recipe for disaster.

Don't get behind!!!
Again, the highly sequential nature of mathematics courses means that if you struggle to pass a course early in the curriculum, you don't get to start fresh the following semester – instead, you have fallen ***permanently behind***! Every year we have seniors who earned Cs in the lower-level classes, and are now so far behind that they cannot pass their final courses.

Finish the minor *early!!!!!*.
The following combination of courses forms a "standard" math minor:

1. Calculus I/II (Math 1337,1338 OR Math 1340)
2. Calbulus III (Math 3302)
3. Linear Algebra (Math 3304)
4. Differential Equations (Math 3313)
5. Intro. Scientific Computing (Math 3315)

Take these courses early, and learn them well! These are the foundation courses for the rest of the major, and mastering them early on will give you the time and skills needed to conquer the harder courses (it also makes scheduling easier). Even if you decide not to continue toward a major, a math minor looks great on your transcript (employers know it is difficult), and will significantly help you with mathematical aspects of your other major(s). So give it a shot!

General Guide to Courses

Undergraduate Mathematics courses can be grouped usefully into four "tiers."

Tier 1: AP-level courses
Math 1337 – Calculus I
Math 1338 – Calculus II
Math 1340 – Consolidated Calculus

These courses are associated with the content of the high school AP Exam. See "General Guidance for Prospective Majors" for placement advice. It is important to note that 1340 covers **both** 1337 and 1338 in one semester, and is the ideal choice for students who took calculus in high school, but did not receive any test credit.

Tier 2: Foundation Courses
Math 3302 – Multivariable Calculus
Math 3304 – Intro to Linear Algebra

These courses form the standard second-year sequence for most students. All majors must take these courses, in general *before* taking any other courses, though in certain circumstances a Tier 3 course could be taken before these two are completed (For instance, EE students may take 3313 first to prepare for Circuits, and someone adding a math major late in their career may take 3311 or 3315 concurrently with these courses).

Tier 3: Gateway Courses

Math 3311 – Intro to Proof and Analysis	(Pure Mathematics)
Math 3313 – Ordinary Differential Equations	(Modeling/Analysis)
Math 3315 – Intro. to Scientific Computing	(Computational)

The next course you take begins to explore your primary interest / specialization, and will be required for most other courses in that track. For Pure Math, take 3311. For students with an interest in modeling and analysis, take 3313. And for students with an interest in computation, take 3315. **It is best to complete this by the end of your second year**.

Tier 4: Upper-Level Electives
By now you have chosen your specialization, so you have some flexibility, and your mathematics advisor should be available to help you make your final choices. Here we list only the "core" courses associated with each branch, that you should be sure to take.

Pure Mathematics:	MATH {**4338**, **4339**, **4355**, **4381**}
Modeling/Analysis:	MATH {**4325**, **4334**, **4335**, **4337**}
Computational:	MATH {**4315**, **4316**, **4317**, **4370**, **4377**}

Current Schedule of Course Offerings

Unfortunately, not every class is offered every semester. Fortunately, this doesn't really become an issue until you are regularly meeting with your advisor. Here is the current schedule.

Every Semester All Foundation courses (1337, 1338, 3302, 3304) All Gateway courses (3311, 3313, 3315) Certain Advanced Electives (4337, 4325, 4315)	
Every Fall Math 4338 (Real Analysis) Math 4334 (Mathematical Modelling) Math 4316 (Numerical Methods I)	**Every Spring** Math 4339 (Complex Analysis) Math 4335 (Mathematical Biology) Math 4317 (Numerical Methods II)
	Spring of Even years Math 4355 (Groups and Rings)
	Spring of Odd years Math 4381 (Topology)

Example 4-year Plan: B.S.

This plan assumes ***some*** calculus in High School (which means you start in MATH 1340), and is slightly front-loaded, aiming to leave you with just one Math course each semester of your senior year. That way, if something doesn't work as planned, you have time to recover.

Year 1: Fall Math 1340 – Consolidated Calculus CSE 1341 – Introduction to Programming	Year 1: Spring Math 3302 – Calculus III First semester of Science
Year 2: Fall Math 3304: Linear Algebra Second Semester of Science	Year 2: Spring Primary Gateway (3311, 3313, or 3315) Stat 4340
Year 3: Fall Advanced Elective Advanced Elective	Year 3: Spring Advanced Elective Advanced Elective
Year 4: Fall Advanced Elective Advanced Elective	Year 4: Spring Advanced Elective Advanced Elective

Up for a Challenge?

If you are interested in graduate school or just enjoy challenging yourself, and expect to maintain a 3.5 GPA or above, consider taking some graduate-level courses. To find them you must look in the **graduate catalog**. In addition, to maximize your scheduling options, plan to take your primary gateway course **at the end of your second year**.

If you are interested in Pure Mathematics, then following MATH 3311 (Intro to Proof), make sure and take MATH 4338 (Real Analysis – every Fall), as well as and maybe even MATH 6337 (Real and Functional Analysis). These courses are **also a good idea** if you are interested in graduate school in applied or computational mathematics.

If you are interested in Applied Mathematics, then following MATH 4337 (Advanced Mathematics for Scientists and Engineers), consider MATH 6332 (Partial Differential Equations). Equivalently, after MATH 4325 (undergraduate Dynamical Systems), consider 6324 (graduate Dynamical Systems). These will give you the foundation needed to express many phenomenon in the real world in terms of mathematical equations.

If you enjoy computational mathematics, aim to take Intro to Proofs (Math 3311) and Intro to Scientific Computing (3315/3316) as a sophomore or junior, followed by Advanced Scientific Computing (4315) and the graduate Numerical Methods sequence (6316/6317) during your senior year. These courses will give you a strong computational foundation.

Finally, if you really enjoy programming, and aspire to be able to write massively parallel computational tools, then take CSE 1342 (C++), followed by MATH 3316 (Intro to Parallel Scientific Computing), followed by MATH 4370 (Parallel Scientific Computing).

For Prospective Graduate Students

The SMU math degree is fairly unique among undergraduate degrees in the extent to which it focuses on applied and computational topics. Hence, it is a good stepping stone on the road toward graduate studies in Applied Math, Computational Math, Engineering, or Physics. However, SMU tends to require somewhat fewer courses than competing institutions. So, plan to take **more** courses than required by the major, including at least {3311, 4338, 4339, 4325, 4337, 4315} plus a few more that we can discuss.

Potential graduate students are expected to have nearly-perfect grades in their math courses, and strong letters of recommendation from teachers who have had a chance to recognize their talent and potential. Therefore it is strongly recommended that you take several classes at the graduate level. These difficult courses will distinguish you from the competition, and also allow you to get to know your professors in a smaller class setting.