



What is the difference between the calculus sequences?

**** MAT133Y5** - This is a calculus and linear algebra course for students intending to pursue a Commerce or Management Program. We recommend that students in Commerce or Management who intend to also do an MCS program (for example a Mathematical Sciences Minor or Major, or a Computer Science Minor, etc.) take MAT135H5 + MAT136H5 instead of MAT133Y5. This is because *MAT133Y5 cannot be used as a prerequisite for any other 200+ level math course*. Nonetheless, if you change your mind and have a minimum grade of 65% in MAT133Y5, you can take the course MAT233H5 to fulfill MAT course prerequisites.

**** MAT132H5 + MAT134H5** - These two courses are designed for students in Life Sciences (for example, those aiming for a Biology program). MAT132H5 and MAT134H5 cover differential and integral calculus (respectively). They emphasize conceptual understanding, computations and reasoning, with little or no focus on proofs. MAT132H5 + MAT134H5 are directly substitutable for MAT135H5 + MAT136H5 as prerequisites for MAT courses at UTM, and can be used to complete MCS programs. However, MAT135H5 + MAT136H5 would give a stronger foundation for students who plan on taking many MCS courses.

- Students must complete MAT132H5 **before** taking MAT134H5 (they cannot be taken in the other order or simultaneously).

**** MAT135H5 + MAT136H5** - These are the calculus courses taken by the vast majority of first year UTM students taking calculus. MAT135H5 and MAT136H5 cover differential and integral calculus (respectively). They emphasize conceptual understanding, computations and reasoning, with little or no focus on proofs. The material covered is similar to MAT132H5 + MAT134H5, but is typically covered in a bit more depth or assessed a bit more intensely. The courses MAT135H5 + MAT136H5 together can be used to satisfy prerequisites for all 200+ level MCS courses and programs at UTM *except* the Mathematical Sciences Specialist program and the course MAT257Y5. (At U of T St. George, some other advanced or 200+ level mathematics courses will not accept MAT135H5 + MAT136H5 for prerequisites.)



- Students must complete MAT135H5 **before** taking MAT136H5 (they cannot be taken in the other order or simultaneously).

**** MAT137H5 + MAT139H5** - These courses are for students who intend to study Mathematical Sciences or any student with an interest in theoretical science. In particular, while Mathematical Sciences Major students can take either MAT132H5 + MAT134H5 or MAT135H5 + MAT136H5 to satisfy program requirements and 200+ level MAT course prerequisites, they will be better prepared for advanced MAT courses having taken MAT137H5 + 139H5 or MAT157H5 + 159H5. Furthermore, students in the Mathematical Sciences Specialist program are *required* to take either (MAT137H5 + 139H5) or (MAT157H5 + 159H5). Students in Computer Science, Applied Statistics, Physics or Economics who are mathematically inclined should consider these courses. Students who think they might pursue graduate studies in statistics should consider taking MAT137H5 + 139H5. MAT137H5 + 139H5 emphasize geometry and physical intuition but also give attention to the theoretical foundations of calculus and will develop your analytical thinking. While proofs will form a significant component of these courses, no previous experience with proofs is required. Students will be introduced to the language and techniques of proofs in the beginning of MAT137H5, with further development in MAT139H5.

**** MAT157H5 + MAT159H5** - These are the most advanced of the first-year mathematics courses offered. They give students the opportunity to experience the beauty of a theoretical approach to calculus with the mathematical rigour and depth that will prepare them for graduate studies in mathematics. Advanced conceptual thinking and proofs form the bulk of the courses. In that regard, MAT157H5 + 159H5 are similar to MAT137H5 + 139H5, but the depth of abstraction, complexity of proofs and expectations on students are higher in MAT157H5 + 159H5. Students in the Mathematical Sciences Specialist program are required to take either (MAT137H5 + 139H5) or (MAT157H5 + 159H5) and we recommend taking MAT157H5 + 159H5.

- Note that MAT102H5 (information can be found below) is a co-requisite for MAT157H5. This means that you must take MAT102H5 concurrently with MAT157H5 (preferably taking MAT102H5 in the Fall term of the academic session when you are enrolled in MAT157H5). That said, you *will not* be removed from MAT157H5 if you do not fulfill this requirement. So effectively, it is our *strong recommendation* that you take MAT102H5



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concurrently with MAT157H5. If you have taken MAT102H5 prior to taking MAT157H5, then that also fulfills the requirement.

You should think carefully about your intended combination of programs in order to pick the right calculus course(s). Note that if you change your mind, certain combinations of courses are allowed while others are not. For example, a student who completed MAT137H5 can then take MAT136H5. Check the prerequisites of each course carefully.

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