APMA Calculus Options

Which Course Should I Take?

School of Engineering & Applied Science
University of Virginia

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APMA Calculus Sequences

Traditional Calculus Sequence:

1090 → 1110 → 2120
1110 → 2120
2120

Originally, there was a single 3-semester sequence with 3 different starting points, depending on your previous math background.

A few years ago, we decided that a few more options would be helpful.
APMA Calculus Sequences

Traditional Calculus Sequence:

1090 → 1110 → 2120

Core Engineering Math Sequence:

2501 → 2502

Honors Engineering Math Sequence:

2511 → 2512

Originally, there was a single 3-semester sequence with 3 different starting points, depending on your previous math background. A few years ago, we decided that a few more options would be helpful. The Honors sequence was introduced last Fall, and the Core sequence will be offered for the first time this Fall. Now we’ll try to guide you through the 5 potential starting points.
APMA 2120 vs. APMA 2511

If you scored 5 on the BC exam or received Dual Enrollment Credit for Calculus II, your choices are:

- APMA 2120 (Multi-variable Calculus)
- APMA 2511 (Honors Engineering Math I)

Traditional Calculus Sequence:

1090 → 1110 → 2120

Honors Engineering Math Sequence:

2511 → 2512

If you took Calculus II and scored a 5 on the BC test or received Dual Enrollment credit, your options are:

- 2120 (Multi-variable Calculus) or 2511 (Honors Math I).

You’re probably wondering why you would take a 2-semester sequence instead of a one-semester course, so let’s compare them next.
APMA 2120 vs. APMA 2511 / Details

APMA 2120
Multi-variable Calculus

- **One** semester:
  multi-variable only.

- Assumes understanding of single-variable calculus.

APMA 2511
Honors Engineering Math I

- **Two** semester sequence:
  2511 – 2512.

- Covers some single-variable applications skipped in high school.

- Multi-variable topics covered in more depth than APMA 2120.

- MATLAB

2120 (Calculus III) only covers multi-variable topics.

The Honors sequence begins with single-variable topics usually not covered in high school. A few examples are:

- applications to engineering,
- numerical methods such as Newton’s method,
- integral approximation using Simpson’s Rule,
- approximation via Taylor series.

And multi-variable topics will be covered in more depth and detail than in APMA 2120.

You’ll also receive an introduction to MATLAB in the Honors Math sequence.
If you took Calculus II but did not score 5 on the BC test or receive Dual Enrollment credit, your best option is probably 1110 (Calculus II).

Or if you’ve taken Calculus I which covered $u$-substitution, 1110 is a good option.

If you took IB Calculus which typically does not cover $u$-substitution, you probably don’t want to begin with 1110.

Knowledge of $u$-substitution can be a good “mile marker” for your calculus experience. If you know it and love it, go with 1110. If you’re thinking, “what is $u$-substitution”, or “I think we covered that”, you’re probably not ready for 1110.
APMA 1090 vs. APMA 2501

If you begin with Calculus I, your choices are:

- APMA 1090 (Calculus I)
- APMA 2501 (Core Engineering Math I)

Traditional Calculus Sequence:

1090 → 1110 → 2120

Core Engineering Math Sequence:

2501 → 2502

If you didn’t cover u-substitution in calculus, or you haven’t taken calculus yet, your options are 1090 (Calculus I) or the new course 2501 (Core Engineering Math I).

Let’s compare the two to help you decide.
1090 (Calculus I) doesn’t assume you’ve taken calculus in high school, and it begins with about 3 weeks of pre-calculus review. And taking 1090 means that you’ll need to take 3 semesters of calculus at UVA (or take multi-variable calculus next summer).

The Core Math sequence covers essentially the same topics as the 3-semester sequence, but a previous calculus course is assumed, and there is no review of pre-calculus.

It’s important to note that enrollment in 2501 is currently restricted because you first have to pass the “Essential Math for Engineers” assessment, which will be given on the first day of class in August.

In the Core sequence, you’ll “hit the ground running”, so we want to make sure that you’re “up to speed” before you enroll.
APMA Calculus: Summary of Options

Traditional Calculus Sequence:

\[1090 \rightarrow 1110 \rightarrow 2120\]

Core Engineering Math Sequence:

\[2501 \rightarrow 2502\]

Honors Engineering Math Sequence:

\[2511 \rightarrow 2512\]

Please keep in mind that the recommendations we’ve provided in these slides are general guidelines, not strict rules, so “your mileage may vary”. We'll try to help you with any specific questions during your orientation’s breakout session.
5 on BC or Dual Enrollment Credit for Calculus II?

Traditional Calculus Sequence:

\[ 1090 \rightarrow 1110 \rightarrow 2120 \]

Core Engineering Math Sequence:

\[ 2501 \rightarrow 2502 \]

Honors Engineering Math Sequence:

\[ 2511 \rightarrow 2512 \]

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Took Calculus II but: < 5 on BC, not Dual Enrollment Credit?

Traditional Calculus Sequence:

\[ 1090 \rightarrow 1110 \rightarrow 2120 \]

Core Engineering Math Sequence:

\[ 2501 \rightarrow 2502 \]

Honors Engineering Math Sequence:

\[ 2511 \rightarrow 2512 \]

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Took Calculus I, but not Calculus II?

Traditional Calculus Sequence:

1090 → 1110 → 2120

Core Engineering Math Sequence:

2501 → 2502

Honors Engineering Math Sequence:

2511 → 2512

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Took Calculus I without \( u \)-substitution?

Traditional Calculus Sequence:

\[
1090 \rightarrow 1110 \rightarrow 2120
\]

Core Engineering Math Sequence:

\[
2501 \rightarrow 2502
\]

Honors Engineering Math Sequence:

\[
2511 \rightarrow 2512
\]

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No Calculus?

Traditional Calculus Sequence:

- 1090 → 1110 → 2120
- 1110 → 2120
- 2120

Core Engineering Math Sequence:

- 2501 → 2502

Honors Engineering Math Sequence:

- 2511 → 2512

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