

APMA Calculus Options

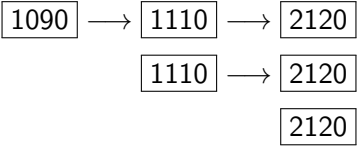
Which Course Should I Take?

School of Engineering & Applied Science
University of Virginia

July 3, 2018

APMA Calculus Sequences

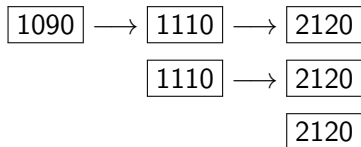
Traditional Calculus Sequence:



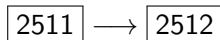
Originally, there was a single 3-semester sequence with 3 different starting points, depending on your previous math background.

APMA Calculus Sequences

Traditional Calculus Sequence:



Honors Engineering Math Sequence:



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 another option would be helpful: the Honors sequence was first offered 2016-17.

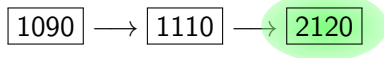
Now we'll try to guide you through the 4 potential starting points: 1090, 1110, 2120, or 2511.

APMA 2120 vs. APMA 2511

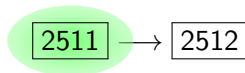
If you scored **5 on the BC exam** or received **Dual Enrollment Credit** for **Calculus II**, your choices are:

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

Traditional Calculus Sequence:



Honors Engineering Math Sequence:



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

APMA 2120 (Multi-variable Calculus) 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.

Important: if you choose the Honors sequence, **you don't lose your AP credit** because APMA 2511 is counted as an elective.

APMA 1110 (Calculus II)

Traditional sequence: 1090 → 1110 → 2120

- ▶ Probably best choice if you took **Calc II** *but*:
 - Did **not** score 5 on BC.
 - Do **not** have Dual Enrollment Credit for Calc II.
- ▶ Might be best option if your **Calc I** covered u -substitution.
Typically, IB Curriculum does **not** cover u -substitution.

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 (Calculus I)

Traditional sequence: 1090 \longrightarrow 1110 \longrightarrow 2120

- ▶ **Three** semesters:
1090 – 1110 – 2120.
- ▶ **No** prior calculus assumed.
- ▶ Pre-calculus review.
- ▶ Must count as free elective.

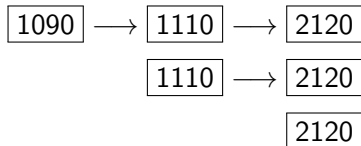
Beginning with 1090 means that you'll need to take 3 semesters of calculus at UVA (or take multi-variable calculus next summer).

1090 doesn't assume you've taken calculus in high school, and it begins with about 3 weeks of pre-calculus review.

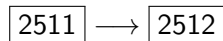
If you didn't cover u -substitution in calculus, or you haven't taken calculus yet, your best option is 1090 (Calculus I).

APMA Calculus: Summary of Options

Traditional Calculus Sequence:



Honors Engineering Math Sequence:



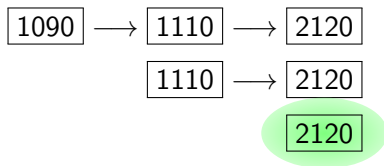
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We'll try to help you with any specific questions during your orientation breakout sessions.

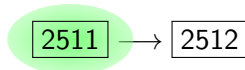
APMA Calculus: Summary of Options

5 on BC or Dual Enrollment Credit for Calculus II?

Traditional Calculus Sequence:



Honors Engineering Math Sequence:



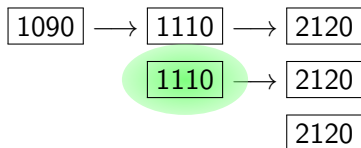
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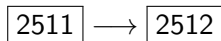
APMA Calculus: Summary of Options

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

Traditional Calculus Sequence:



Honors Engineering Math Sequence:



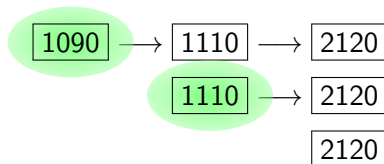
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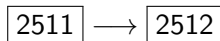
APMA Calculus: Summary of Options

Took Calculus I, but not Calculus II?

Traditional Calculus Sequence:



Honors Engineering Math Sequence:



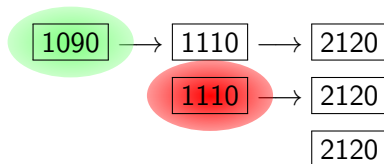
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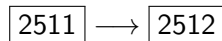
APMA Calculus: Summary of Options

Took Calculus I without u -substitution?

Traditional Calculus Sequence:



Honors Engineering Math Sequence:



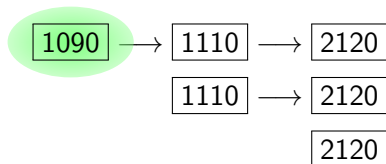
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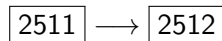
APMA Calculus: Summary of Options

No Calculus?

Traditional Calculus Sequence:



Honors Engineering Math Sequence:



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APMA Calculus Placement Test

During orientation, you'll receive an email asking you to fill out a brief survey. The goals of this survey are twofold:

- ▶ Collect information about your calculus experience.
- ▶ Schedule a time for you to take the APMA Calculus Placement Test.

The results of the Calculus Placement Test will help us create a personalized recommendation for your Fall calculus course.

You will be enrolling in your classes before taking the test, so please choose the APMA course that you believe is the best match and satisfies the necessary requirements.

Remember that we will be available during the breakout sessions to help you choose.

We will provide a recommended calculus placement based on the results of the placement test and your prior calculus experience. If you wish to change your enrollment upon receiving this recommendation, we will offer assistance.

If you're struggling to decide between 2120 & 2511, or between 1090 & 1110, your Placement Test results should be an important factor.

Placement Test Topics

The Placement Test will cover pre-calculus topics, including:

- ▶ simplifying expressions,
- ▶ solving equations and inequalities,
- ▶ trigonometry,
- ▶ exponential and logarithmic functions,
- ▶ graphing.

It will also cover calculus topics, including:

- ▶ differentiation,
- ▶ integration techniques (including approximate integration),
- ▶ applications of integration and differentiation,
- ▶ parametric equations,
- ▶ polar functions,
- ▶ series (including Taylor series and Taylor polynomials).

You should take the placement test without external assistance.

You may not use any resources other than paper and pen/pencil. Don't use textbooks, notes, calculators, or internet resources (such as WolframAlpha).

Seeking outside assistance will unfortunately defeat the purpose of this assessment by improperly gauging your foundational knowledge.