AMS Core Options

Option A (15 credit hours)

- No change to current classes
- All students take Calc I, II, III.
- DiffEQ moves out of the core; instead, departments can choose from a list of 3 credit hour options.
- This is about as easy as it gets on our end.

Option B (12 credit hours)

- All AMS classes become 3 credit hours
    - Calc I (limits and derivatives)
    - Calc II (integrals and series)
    - Calc III (vectors, multivariable functions, and their derivatives)
- In addition to 9 hours of calculus, departments must require at least one of the following:
    - Vector Calc (double/triple integrals, cylindrical/spherical coordinates, vector fields, conservative vector fields, div/curl, line integrals, surface integrals, Greens/Stokes/Divergence theorems)
    - DiffEQ
    - Linear algebra
    - Intro to Stats
    - Scientific Computing
- This option gives departments flexibility. If they don't feel they need vector calculus, they skip it. If they do need it, they can get it at no credit hour cost beyond what is currently required.
- This option means AMS teaches fewer student credit hours (since some departments will opt for just 12 AMS hours instead of the current 15).
- Requires the removal of some topics from Calc II: trig substitution, the method of shells, infinite sequences, convergence tests for series (limit comparison test, ratio test, alternating series test, p-series test), and/or some of the power series material (keep Taylor series and Taylor polynomials). What is removed would need to be worked out with the campus.
- Creates issues in our synchronization with physics. Some things (in particular, integrals and vectors) would have to be worked out. It's not clear yet how large an obstacle this would be; other schools do not synchronize these topics to the same degree we currently do.
- Some departments will stay at 12 credit hours, but many will require more. All ABET departments need 30 hours total of math and basic science.

- Some departments (those that choose to require Vector Calc) will remain at 15 total hours (or more in some cases) but it will be spread over 5 classes instead of 4. Flowcharts would have to be adjusted (maybe significantly).

How would topics fall into the 3-hour versions of the courses? A 3-credit hour class meets 43 times on a MWF schedule. The days listed below include review days and exam days.

- Calc currently includes 47 days on limits and derivatives. This would need to be trimmed by 4 days, which is easily doable.
- Calc I currently includes 11 days on integrals, and Calc II currently includes 45 days on integrals and series. This would need to be trimmed by 13 days. This is a bigger change. We would trim
    - Some integration techniques (trig substitution)
    - Some applications of integration (method of shells)
    - Some of the series content (currently 23 days on series)
- Calc II currently includes 13 days on vectors, and Calc III includes 25 days on multivariable functions and derivatives. This fits with room to include extra applications (like gradient descent).
- Calc III currently includes 33 days on multiple integrals (14 days) and vector calculus (19 days). Some of this material should be revisited (general change of variables formula, for example). This leaves room for additional material (Fourier series? Complex numbers? Survey departments for topics?).

Transfer/AP:

Basically, our rules here stay the same. It's not a 1-1 correspondence of topics, but it's close, and students get a bit of review from us (i.e., a student with AB calc credit would start in our 2nd course and would get a bit of review on integrals before moving on to series.) This does have the transfer/AP advantage of removing the gap in vectors that current BC students have when entering our Calc III.

What is lost?

- All students lose a bit of what's currently in Calc II (trig sub, convergence tests)
- Those students who don't take Vector Calc lose multiple integrals, div, curl, line integrals, surface integrals, Greens/Stokes/Divergence theorems
- We lose some synchronization with the physics curriculum (the teaching of vectors in AMS before students see them in Physics). This lack of synchronization is common at most universities, and it seems to work fine.