To: The Committee on Educational Programs
From: John Rafter, Director of Undergraduate Studies, Mathematics Department
Subject: A Change to the Undergraduate Mathematics Major
Date: October 1, 2014

All three tracks of the mathematics major require one of three calculus sequences. We propose to drop one of the options: 150a-150b-170-175. The change was approved unanimously (6-0) by the Mathematics Department’s Undergraduate Committee on March 11, 2014 and approved unanimously (23-0) at the September 30, 2014 Mathematics Department faculty meeting. There are three considerations that went into the decision.

1. Over the past several years, the Math Department has tried to simplify the advice given to incoming students when choosing what calculus course to enroll in. The current advice to students without pre-freshman mathematics credit is:

   a. If the student needs one semester of calculus, enroll in Math 140;
   b. if the student needs one year of calculus, enroll in Math 150a and continue with 150b;
   c. if the student needs a full calculus sequence or wants to take math courses beyond calculus, enroll in Math 155a and continue with 155b and 175.

An incoming student interested in majoring in math may currently look at the 150a-150b-170-175 option as an equally endorsed option, which it is not. We view the option as an exception that should only be used by students who originally plan to only take one year of calculus and change their minds. The rare student who goes from only wanting to take one year of math to wanting to major in math will be allowed to use the 150a-150b-170-175 sequence through the major variance mechanism.

2. Because of changes in prerequisites for chemistry courses and the introduction of a new physics sequence with reduced mathematics prerequisite recommendations, enrollment in Math 150a and Math 150b has dropped and as a result the availability of Math 170 has been reduced. For the past three years we have only offered Math 170 in the Fall semester. Here are the enrollments:

<table>
<thead>
<tr>
<th>Semester</th>
<th>Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 2012</td>
<td>12</td>
</tr>
<tr>
<td>Fall 2013</td>
<td>9</td>
</tr>
<tr>
<td>Fall 2014</td>
<td>11</td>
</tr>
</tbody>
</table>

Currently students who would like to take Math 170 in the Spring semester have the option of taking Math 155b, a four-hour course, for three hours of credit in place of Math 170 or waiting
an extra semester. In addition the low enrollments in Math 170 make it possible that there may be academic years when Math 170 is not offered. We do not want the perception that 150a-150b-170-175 is an endorsed option for the major when it is not readily available and its unavailability results in a loss of credit.

3. Our AP/IB/A-level credit policies avoid the 150a-150b-170-175 sequence, so with this change students with typical pre-freshman credit that want to major in math would be placed in one of the two calculus sequences that count toward the major.

**Catalog Edit**

Three tracks are available.

Program I (Standard Track) is intended for most mathematics majors in the College of Arts and Science, Blair School of Music, and Peabody College.

Program II (Applied Track) is intended for students in the School of Engineering who elect a second major in mathematics, but is also available for other students.

Program III (Honors Track) is intended for highly qualified students who either plan for graduate studies in mathematics or plan to graduate with departmental honors. Students who complete this program and, in addition, complete a senior thesis will graduate with departmental honors.

Requirements for the three tracks are summarized below.

**Program I (Standard Track).**

At least 32 credit hours in mathematics, as follows.

1. A calculus sequence: 150a–150b–170–175, or 155a–155b–175, or 155a–155b–205a–205b.
2. Linear algebra and differential equations: 204 or 205a–205b, and 208.
3. At least 15 additional hours from 200, 210, or above 210.
4. The remainder of the credit hours must be chosen from 200, 210, or above 210.

**Program II (Applied Track).**

At least 29 credit hours in mathematics and 6 credit hours outside the department, as follows.

1. A calculus sequence as in Program I.
2. Linear algebra and differential equations—one of the following:
   (a) one of 194, 204, or 205a–205b, and one of 198 or 208; or
   (b) 196 and either 204 or 205a–205b.
3. At least 12 additional credit hours from 200, 210, or above 210, excluding 252.
4. The remainder of the credit hours in mathematics must be chosen from 200, 210, or above 210.
5. At least 6 credit hours of advanced, mathematically based science or engineering courses approved by the director of undergraduate studies. This requirement is automatically fulfilled by students who complete a physics major or a major in the School of Engineering.

**Program III (Honors Track).**

At least 38 credit hours in mathematics, as follows.

1. A calculus sequence as in Program I.
2. Linear algebra and differential equations as in Program I.
3. At least 21 additional credit hours of advanced coursework,
   (a) including four courses taken from the following three categories, at least one from each category:
      1) Algebra: 223, 283a, 283b.
   (b) The remainder of the 21 credit hours must be chosen from 200, 210, or above 210, excluding 269.
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Students who complete Program III and, in addition, complete a senior thesis will graduate with departmental honors.
Students planning to teach in secondary school should contact the director of secondary education programs in the Department of Teaching and Learning at Peabody College for course recommendations.
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Dear Jonathan,

Attached you will find the applications for programmatic changes in the mathematic major approved by the Committee for Education Programs, on October, 2014. Also included is a clean catalog edit, which was omitted from the application (they only included the redline).

Best Regards,

Brian Bachmann

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