PROPOSAL FOR AN AREA OF EMPHASIS

Date: March 6, 2024

School/College: Franklin College of Arts and Sciences

Department/Division: Mathematics

Program (Major and Degree): Mathematics (B.S.)

Which campus(es) will offer this program? Athens

Proposed Effective Date: August 1, 2024

If major has more than one area of emphasis, submit all areas of emphasis under one major together. A course may appear in more than one area of emphasis, but each area of emphasis should have a distinct focus.

1. **Area of Emphasis Title:** Mathematics and Data Science

2. **Area of Emphasis Description:**
   Include prefixes, numbers, and titles of required courses, number of credit hours required; residency requirements (if any); and grade requirements (if any). Graduate Areas of Emphasis may refer to groups of courses if necessary.

   The area of emphasis combines core mathematics courses, mathematics courses related to data science, and courses from statistics and computing about data science practice.

   Apart from general education courses and the courses required for all math majors, (MATH 2260, 2270, 2700, 3200, 3100, and 3000/3300), the area of emphasis will require the following courses:

   STAT 2360 (Programming and Data Literacy Using R) (should count toward Area VI)
   STAT 4210 (Statistical Methods) or STAT 4110H (Honors Applied Statistics) (should count toward Area VI)
   MATH 4500/6500 (Numerical Analysis I)
   MATH 4600/6600 (Probability) or STAT 4510/6510 (Mathematical Statistics I)
   CSCI 3360 (Data Science I)
   STAT 4365/6365 (Modern Statistical Programming)
   STAT 4230/6230 (Applied Regression Analysis)
   Two of the following: MATH 4510/6510 (Numerical Analysis II), MATH 4740/6740 (Optimization and Data Analysis), MATH 4750/6750 (Matrix and Integral Transforms with Applications), MATH 4780/6780 (Mathematical Biology), MATH 4790/6790 (Mathematics of Option Pricing), MATH 4802/6802 (Industrial Mathematics)

3. **Major Requirements:**
   Attach a list of requirements for the major. For undergraduate programs, attach a copy of the

major requirements from the Bulletin. For graduate programs, provide a list of general requirements for the major.

Area VI
MATH 2260 or MATH 2310H or MATH 2410 or MATH 2410H
MATH 2270 or MATH 2500 (can be waived by MATH 3510 or MATH 3510H)
MATH 2700

Choose at least two courses from the following:*
PHYS 1211-1211L or PHYS 1251 or PHYS 1311-1311L
PHYS 1212-1212L or PHYS 1252 or PHYS 1312-1312L (or higher, except PHYS 1990)
CSCI 1301-1301L
CSCI 1302
CSCI 1360
CSCI 2670
CSCI 2720
STAT 4210
STAT 4520/6520 **[Note: we are separately proposing to replace this option by STAT 2360-2360L, which is a prerequisite for the courses STAT 4230 and STAT 4365 that will be required in the Data Science AoE.]**

If after completing the above requirements, the University requirement of 18 hours in Area VI is not satisfied, any other courses may be used to complete the 18 hours in Area VI.   The Mathematics Department suggests courses in a foreign language or courses listed above.

Note: Mathematics requires individual review of non-equivalent transfer courses before they can be used to satisfy Area VI and Major Requirements.

MAJOR REQUIREMENTS

A baccalaureate degree program must require at least 21 semester hours of upper division courses in the major field and at least 39 semester hours of upper division work overall.
Students in the Franklin College must earn a grade of "C" (2.0) or better in major required courses.

Required Courses (24-28 hours)

(A minimum grade of "C" (2.0) or better must be earned in any upper-division MATH course.)

Required (9-10 hours)
MATH 3000 or MATH 3300 or MATH 3510 or MATH 3510H
MATH 3100
MATH 3200 (can be waived for students who complete MATH 3510 or MATH 3510H)

Students may either select an Area of Emphasis and complete the requirements corresponding to that area, or else complete the General Mathematics requirements listed below. [This is new phrasing, replacing a confusing paragraph in the current Bulletin.]

General Mathematics (15 hours)
MATH 4000/6000

Choose one of the following:
MATH 4100/6100
MATH 4150/6150
MATH 4250/6250

Three additional three-hour MATH courses at the 3000-level or above, subject to the advisor's approval. STAT 4510/6510 may also satisfy this requirement, unless MATH 4600/6600 was taken. MATH 3220, MATH 4801, MATH 4950, MATH 4960R, MATH 4970R, MATH 4980R, MATH 4990R do not satisfy this requirement. No 5000-level MATH courses, except MATH 5200/7200 and MATH 5210/7210, satisfy this requirement.

Area of Emphasis in Applied Mathematics (15 hours)
MATH 4500/6500

Choose two of the following:
MATH 4600/6600 or STAT 4510/6510
MATH 4700/6700
MATH 4720/6720

Two additional three-hour MATH courses at the 3000-level or above, subject to the advisor's approval. STAT 4510/6510 may also satisfy this requirement, unless MATH 4600/6600 was taken. MATH 3220, MATH 4801, MATH 4950, MATH 4960R, MATH 4970R, MATH 4980R, MATH 4990R do not satisfy this requirement. No 5000-level MATH courses, except MATH 5200/7200 and MATH 5210/7210, satisfy this requirement.

Area of Emphasis in Financial Mathematics (18 hours)
FINA 3001
FINA 4310
MATH 4500/6500
MATH 4600/6600 or STAT 4510/6510
MATH 4790/6790

One additional three-hour MATH course at the 3000-level or above, subject to the advisor's approval. STAT 4510/6510 may also satisfy this requirement, unless MATH 4600/6600 was taken. MATH 3220, MATH 4801, MATH 4950, MATH 4960R, MATH 4970R, MATH 4980R, MATH 4990R do not satisfy this requirement. No 5000-level MATH courses, except MATH

5200/7200 and MATH 5210/7210, satisfy this requirement.

If this proposal is approved, we would add here:

Area of Emphasis in Data Science (21 hours)

CSCI 3360
MATH 4500/6500
MATH 4600/6600 or STAT 4510/6510
STAT 4230/6230
STAT 4365/6365
Choose at least two courses from the following:
MATH 4510/6510
MATH 4740/6740
MATH 4750/6750
MATH 4780/6780
MATH 4790/6790
MATH 4802/6802

4. Approvals:

_____   _____   _____
        Department Head   Dean of School/College   Dean of Graduate School