### Standard Program for the A.B. degree (Advanced Economics track):

**Prerequisites:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 0100</td>
<td>Introductory Calculus, Part II</td>
</tr>
<tr>
<td>MATH 0520</td>
<td>Linear Algebra</td>
</tr>
</tbody>
</table>

**Applied Mathematics Requirements**

(a) 1

<table>
<thead>
<tr>
<th>Course</th>
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</tr>
</thead>
<tbody>
<tr>
<td>APMA 0350</td>
<td>Applied Ordinary Differential Equations</td>
</tr>
<tr>
<td>&amp; APMA 0360</td>
<td>Applied Partial Differential Equations</td>
</tr>
</tbody>
</table>

Select one of the following:

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>APMA 0160</td>
<td>Introduction to Scientific Computing (preferred)</td>
</tr>
<tr>
<td>CSCI 0040</td>
<td>Introduction to Scientific Computing and Problem Solving (preferred)</td>
</tr>
<tr>
<td>CSCI 0150</td>
<td>Introduction to Object-Oriented Programming and Computer Science</td>
</tr>
<tr>
<td>CSCI 0170</td>
<td>Computer Science: An Integrated Introduction</td>
</tr>
</tbody>
</table>

Select one of the following:

APMA 1200 Operations Research: Probabilistic Models

APMA 1210 Operations Research: Deterministic Models

APMA 1650 Statistical Inference I

or APMA 1655 Statistical Inference I

(b) 1

Select one of the following:

APMA 1200 Operations Research: Probabilistic Models

APMA 1210 Operations Research: Deterministic Models

APMA 1330 Methods of Applied Mathematics

APMA 1360 Applied Dynamical Systems

APMA 1660 Statistical Inference II

APMA 1690 Computational Probability and Statistics

APMA 1720 Monte Carlo Simulation with Applications to Finance

APMA 1740 Recent Applications of Probability and Statistics

MATH 1010 Analysis: Functions of One Variable

**Economics Requirements:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 1130</td>
<td>Intermediate Microeconomics (Mathematical)</td>
</tr>
<tr>
<td>ECON 1210</td>
<td>Intermediate Macroeconomics</td>
</tr>
<tr>
<td>ECON 1630</td>
<td>Mathematical Econometrics I</td>
</tr>
</tbody>
</table>

Two 1000-level courses from the “mathematical-economics” group: 4

**Standard program for the Sc.B. degree (Advanced Economics track):**

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<tr>
<td>ECON 1170</td>
<td>Welfare Economics and Social Choice Theory</td>
</tr>
<tr>
<td>ECON 1220</td>
<td>Monetary and Fiscal Policy</td>
</tr>
<tr>
<td>ECON 1225</td>
<td>Advanced Macroeconomics: Monetary, Fiscal, and Stabilization Policies</td>
</tr>
<tr>
<td>ECON 1460</td>
<td>Industrial Organization</td>
</tr>
<tr>
<td>ECON 1465</td>
<td>Market Design: Theory and Applications</td>
</tr>
<tr>
<td>ECON 1470</td>
<td>Bargaining Theory and Applications</td>
</tr>
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<td>ECON 1490</td>
<td>Designing Internet Marketplaces</td>
</tr>
<tr>
<td>ECON 1640</td>
<td>Econometrics II</td>
</tr>
<tr>
<td>ECON 1650</td>
<td>Financial Econometrics</td>
</tr>
<tr>
<td>ECON 1660</td>
<td>Big Data</td>
</tr>
<tr>
<td>ECON 1670</td>
<td>Advanced Topics in Econometrics</td>
</tr>
<tr>
<td>ECON 1740</td>
<td>Mathematical Finance</td>
</tr>
<tr>
<td>ECON 1750</td>
<td>Investments II</td>
</tr>
<tr>
<td>ECON 1759</td>
<td>Data, Statistics, Finance</td>
</tr>
<tr>
<td>ECON 1810</td>
<td>Economics and Psychology</td>
</tr>
<tr>
<td>ECON 1820</td>
<td>Theory of Behavioral Economics</td>
</tr>
<tr>
<td>ECON 1850</td>
<td>Theory of Economic Growth</td>
</tr>
<tr>
<td>ECON 1860</td>
<td>The Theory of General Equilibrium</td>
</tr>
<tr>
<td>ECON 1870</td>
<td>Game Theory and Applications to Economics</td>
</tr>
</tbody>
</table>

One 1000-level course from the “data methods” group: 4

ECON 1301 Economics of Education I

ECON 1305 Economics of Education: Research

ECON 1310 Labor Economics

ECON 1355 Environmental Issues in Development Economics

ECON 1360 Health Economics

ECON 1375 Inequality of Opportunity in the US

ECON 1400 The Economics of Mass Media

ECON 1410 Urban Economics

ECON 1480 Public Economics

ECON 1510 Economic Development

ECON 1520 The Economic Analysis of Institutions

ECON 1530 Health, Hunger and the Household in Developing Countries

ECON 1629 Applied Research Methods for Economists

ECON 1640 Econometrics II

ECON 1650 Financial Econometrics

ECON 1660 Big Data

ECON 1759 Data, Statistics, Finance

ECON 1765 Finance, Regulation, and the Economy: Research

One additional 1000-level economics course.

**Total Credits:** 13

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1 No course may be used to simultaneously satisfy (a) and (b).
2 APMA 0330 and APMA 0340 may be substituted with advisor approval. APMA 1910 cannot be used as an elective.
3 Or ECON 1110 with permission.
4 No course may be used to simultaneously satisfy the "mathematical economics" and the "data methods" requirements.
**Applied Mathematics Requirements**

(a)  
- APMA 0350: Applied Ordinary Differential Equations 2  
- APMA 0360: Applied Partial Differential Equations 1  

Select one of the following:  
- APMA 0160: Introduction to Scientific Computing 1  
- CSCI 0040: Introduction to Scientific Computing and Problem Solving (preferred)  
- CSCI 0150: Introduction to Object-Oriented Programming and Computer Science  
- CSCI 0170: Computer Science: An Integrated Introduction 1

(b)  
- APMA 1210: Operations Research: Deterministic Models  
- APMA 1650: Statistical Inference I  
- or APMA 1655: Statistical Inference I  
- APMA 1655: Statistical Inference I  

Select two of the following:  
- APMA 1210: Operations Research: Deterministic Models  
- APMA 1330: Methods of Applied Mathematics  
- APMA 1360: Applied Dynamical Systems  
- APMA 1660: Statistical Inference II  
- APMA 1690: Computational Probability and Statistics  
- APMA 1720: Monte Carlo Simulation with Applications to Finance  
- APMA 1740: Recent Applications of Probability and Statistics  
- MATH 1010: Analysis: Functions of One Variable  

**Economics Requirements:**

- ECON 1130: Intermediate Microeconomics 1  
- (Mathematical)  
- ECON 1210: Intermediate Macroeconomics 1  
- ECON 1630: Mathematical Econometrics I 1  

Three 1000-level courses from the “mathematical-economics” group: 3  

- ECON 1220: Monetary and Fiscal Policy  
- ECON 1225: Advanced Macroeconomics: Monetary, Fiscal, and Stabilization Policies  
- ECON 1460: Industrial Organization  
- ECON 1465: Market Design: Theory and Applications  
- ECON 1470: Bargaining Theory and Applications  
- ECON 1490: Designing Internet Marketplaces  
- ECON 1640: Econometrics II  
- ECON 1650: Financial Econometrics  
- ECON 1660: Big Data  
- ECON 1670: Advanced Topics in Econometrics  
- ECON 1740: Mathematical Finance  
- ECON 1750: Investments II  
- ECON 1759: Data, Statistics, Finance  
- ECON 1810: Economics and Psychology  
- ECON 1820: Theory of Behavioral Economics  
- ECON 1850: Theory of Economic Growth  

- ECON 1860: The Theory of General Equilibrium  
- ECON 1870: Game Theory and Applications to Economics  

One 1000-level course from the “data methods” group: 4 1  

- ECON 1301: Economics of Education I  
- ECON 1305: Economics of Education: Research  
- ECON 1310: Labor Economics  
- ECON 1355: Environmental Issues in Development Economics  
- ECON 1360: Health Economics  
- ECON 1375: Inequality of Opportunity in the US  
- ECON 1400: The Economics of Mass Media  
- ECON 1410: Urban Economics  
- ECON 1480: Public Economics  
- ECON 1510: Economic Development  
- ECON 1520: The Economic Analysis of Institutions  
- ECON 1530: Health, Hunger and the Household in Developing Countries  
- ECON 1629: Applied Research Methods for Economists  
- ECON 1640: Econometrics II  
- ECON 1650: Financial Econometrics  
- ECON 1660: Big Data  
- ECON 1759: Data, Statistics, Finance  
- ECON 1765: Finance, Regulation, and the Economy: Research  

Two additional 1000-level economics courses 2  

Total Credits 16  

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1 No course may be used to simultaneously satisfy (a) and (b).  
2 APMA 0330 and APMA 0340 may be substituted with advisor approval. APMA 1910 cannot be used as an elective.  
3 Or ECON 1110 with permission.  
4 No course may be used to simultaneously satisfy the “mathematical economics” and the “data methods” requirements.  
5 Note that Econ 1620, 1960, and 1970 (independent study) cannot be used for concentration credit. However, 1620 and 1960 can be used for university credit and up to two 1970s may be used for university credit.  

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**Standard program for the A.B. degree**  
(Mathematical Finance track):  

**Prerequisites:**  
- MATH 0100: Introductory Calculus, Part II  
- MATH 0520: Linear Algebra  

**Course Requirements: 13 Courses: 6 Applied Math and 7 Economics**  

**Applied Mathematics Requirements** (a)  


Select one of the following:  
- APMA 0360: Applied Partial Differential Equations I 1  
- APMA 0160: Introduction to Scientific Computing (preferred)  
- CSCI 0040: Introduction to Scientific Computing and Problem Solving (preferred)  
- CSCI 0150: Introduction to Object-Oriented Programming and Computer Science  
- CSCI 0170: Computer Science: An Integrated Introduction  

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2 Applied Mathematics-Economics
Select two 1000-level courses from the "financial economics" group:

- ECON 1630
- ECON 1660
- ECON 1650
- ECON 1640
- ECON 1629
- ECON 1520
- ECON 1410
- ECON 1400
- ECON 1375
- ECON 1360
- ECON 1355
- ECON 1310
- ECON 1305
- ECON 1301
- ECON 1220
- ECON 1110
- ECON 1020

Select one of the following:

- APMA 1650
- APMA 1200
- APMA 1180
- APMA 1170
- APMA 1150
- APMA 1140
- APMA 1130
- APMA 1120
- APMA 1110
- APMA 1100

Economics Requirements:

- ECON 1130 Intermediate Microeconomics (Mathematical) 1
- ECON 1210 Intermediate Macroeconomics 1
- ECON 1230 Mathematical Econometrics I 1

Select two 1000-level courses from the "financial economics" group: 2

- ECON 1630
- ECON 1660
- ECON 1650
- ECON 1640
- ECON 1629
- ECON 1520
- ECON 1410
- ECON 1400
- ECON 1375
- ECON 1360
- ECON 1355
- ECON 1310
- ECON 1305
- ECON 1301
- ECON 1220
- ECON 1110
- ECON 1020

Select one 1000-level course from the "data methods" group: 2

- APMA 1650
- APMA 1200
- APMA 1180
- APMA 1170
- APMA 1150
- APMA 1140
- APMA 1130
- APMA 1120
- APMA 1110
- APMA 1100

Standard program for the Sc.B. degree (Mathematical Finance track):

Prerequisites:

- MATH 0100 Introductory Calculus, Part II
- MATH 0520 Linear Algebra

Course Requirements: 16 courses: 7 Applied Math and 9 Economics

Applied Mathematics requirements:

(a)


Select one of the following:

- APMA 0160 Introduction to Scientific Computing (preferred)
- CSCI 0040 Introduction to Scientific Computing and Problem Solving (preferred)
- CSCI 0150 Introduction to Object-Oriented Programming and Computer Science
- CSCI 0170 Computer Science: An Integrated Introduction
- APMA 1200 Operations Research: Probabilistic Models 1
- APMA 1650 Statistical Inference I 1
Economics Requirements:

ECON 1130 Intermediate Microeconomics 1
ECON 1210 Intermediate Macroeconomics 1
ECON 1630 Mathematical Economics I 1

Select three 1000-level courses from the "financial economics" group: 3

ECON 1650 Financial Econometrics
ECON 1710 Investments I
ECON 1720 Corporate Finance
ECON 1730 Venture Capital, Private Equity, and Entrepreneurship
ECON 1740 Mathematical Finance
ECON 1750 Investments II
ECON 1759 Data, Statistics, Finance
ECON 1760 Financial Institutions
ECON 1765 Finance, Regulation, and the Economy: Research
ECON 1770 Fixed Income Securities
ECON 1780 Advanced Topics in Corporate Finance
ECON 1790 Corporate Governance and Management

Select two 1000-level courses from the "mathematical economics" group: 2

ECON 1110 Welfare Economics and Social Choice Theory
ECON 1220 Monetary and Fiscal Policy
ECON 1225 Advanced Macroeconomics: Monetary, Fiscal, and Stabilization Policies
ECON 1460 Industrial Organization
ECON 1465 Market Design: Theory and Applications
ECON 1470 Bargaining Theory and Applications
ECON 1490 Designing Internet Marketplaces
ECON 1640 Econometrics II
ECON 1650 Financial Econometrics
ECON 1660 Big Data
ECON 1670 Advanced Topics in Econometrics
ECON 1740 Mathematical Finance
ECON 1750 Investments II
ECON 1759 Data, Statistics, Finance
ECON 1810 Economics and Psychology
ECON 1820 Theory of Behavioral Economics
ECON 1850 Theory of Economic Growth
ECON 1860 The Theory of General Equilibrium

or APMA 1655 Statistical Inference I
APMA 1655 Statistical Inference I

(b) Select two of the following: 2

APMA 1180 Introduction to Numerical Solution of Differential Equations
APMA 1210 Operations Research: Deterministic Models
APMA 1330 Methods of Applied Mathematics
APMA 1360 Applied Dynamical Systems
APMA 1660 Statistical Inference II
APMA 1690 Computational Probability and Statistics
APMA 1720 Monte Carlo Simulation with Applications to Finance (preferred)
APMA 1740 Recent Applications of Probability and Statistics
MATH 1010 Analysis: Functions of One Variable

Honors and Capstone Requirement

Admission to candidacy for honors in the concentration is granted on the following basis: 3.7 GPA for Economics courses, and a 3.5 GPA overall.

To graduate with honors, a student must write an honors thesis in the senior year following the procedures specified by the concentration (see Economics Department website).

Professional Track

The requirements for the professional track include all those of the standard track, as well as the following:

Students must complete two two-to-four month full-time professional experiences, doing work that is related to their concentration programs. Such work is normally done within an industrial organization, but may also be at a university under the supervision of a faculty member.

On completion of each professional experience, the student must write and upload to ASK a reflective essay about the experience addressing the following prompts, to be approved by the student's concentration advisor:

- Which courses were put to use in your summer's work? Which topics, in particular, were important?
- In retrospect, which courses should you have taken before embarking on your summer experience? What are the topics from these courses that would have helped you over the summer if you had been more familiar with them?
- Are there topics you should have been familiar with in preparation for your summer experience, but are not taught at Brown? What are these topics?
- What did you learn from the experience that probably could not have been picked up from course work?
• Is the sort of work you did over the summer something you would like to continue doing once you graduate? Explain.
• Would you recommend your summer experience to other Brown students? Explain.
Font Notice

This document should contain certain fonts with restrictive licenses. For this draft, substitutions were made using less legally restrictive fonts. Specifically:

Helvetica was used instead of Arial.

The editor may contact Leepfrog for a draft with the correct fonts in place.