Applied Mathematics-Economics

The Applied Mathematics-Economics concentration is designed to reflect the mathematical and statistical nature of modern economic theory and empirical research. This concentration has two tracks. The first is the advanced economics track, which is intended to prepare students for graduate study in economics. The second is the mathematical finance track, which is intended to prepare students for graduate study in finance, or for careers in finance or financial engineering. Both tracks have A.B. degree versions and Sc.B. degree versions, as well as a Professional track option. If you are interested in declaring a concentration in Applied Mathematics-Economics, please refer to this page for more information regarding the process.

Requirements for the Bachelor of Arts

Prerequisites:

MATH 0100	Single Variable Calculus, Part II
MATH 0520	Linear Algebra

Course Requirements:

Applied Mathematics Requirements - six courses	6
Economics Requirements: seven courses	7
See applicable track for specific requirements	
Total Credits	**13**

Honors

Applied Math-Economics concentrators who wish to pursue honors must find a primary faculty thesis advisor in either Economics or Applied Math. They will be held to the Honors requirements of their advisor's department. Joint concentrators in Applied Mathematics-Economics with an Economics thesis advisor should follow the requirements published here (https://economics.brown.edu/academics/undergraduate/honors-and-capstones/thesis/), while concentrators with an Applied Math thesis advisor should follow the requirements published here (https://www.brown.edu/academics/applied-mathematics/undergraduate-program/honors/).

Requirements for the Bachelor of Science

Prerequisites:

MATH 0100	Single Variable Calculus, Part II
MATH 0520	Linear Algebra

Course Requirements:

Applied Mathematics Requirements - seven courses	7
Economics Requirements: nine courses	9
See applicable track for specific requirements	
Total Credits	**16**

Honors

Applied Math-Economics concentrators who wish to pursue honors must find a primary faculty thesis advisor in either Economics or Applied Math. They will be held to the Honors requirements of their advisor's department. Joint concentrators in Applied Mathematics-Economics with an Economics thesis advisor should follow the requirements published here (https://economics.brown.edu/academics/undergraduate/honors-and-capstones/thesis/), while concentrators with an Applied Math thesis advisor should follow the requirements published here (https://www.brown.edu/academics/applied-mathematics/undergraduate-program/honors/).

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

Prerequisites:

MATH 0100	Single Variable Calculus, Part II
MATH 0520	Linear Algebra

Course Requirements:

Applied Mathematics Requirements		
(a) [1]		
APMA 0350 & APMA 0360	Applied Ordinary Differential Equations and Applied Partial Differential Equations I [2]	2
Select one of the following:		1
APMA 0160	Introduction to Scientific Computing (preferred)	
APMA 0200	Introduction to Modeling	
CSCI 0111	Computing Foundations: Data	
CSCI 0150	Introduction to Object-Oriented Programming and Computer Science	
CSCI 0170	Computer Science: An Integrated Introduction	
CSCI 0190	Accelerated Introduction to Computer Science	
Select one of the following:		1
APMA 1200	Operations Research: Probabilistic Models	
or APMA 1210	Operations Research: Deterministic Models	
Select one of the following:		1
APMA 1650	Introduction to Probability and Statistics with Calculus	
or APMA 1655	Introduction to Probability and Statistics with Theory	
(b) [1]		
Select one of the following:		1
APMA 1160	An Introduction to Numerical Optimization	
APMA 1180	Introduction to Numerical Solution of Differential Equations	
APMA 1200	Operations Research: Probabilistic Models	
APMA 1210	Operations Research: Deterministic Models	
APMA 1330	Applied Partial Differential Equations II	
APMA 1360	Applied Dynamical Systems	
APMA 1660	Statistical Inference II	
APMA 1690	Computational Probability and Statistics	
APMA 1670	Statistical Analysis of Time Series	
APMA 1680	Nonparametric Statistics	
APMA 1690	Computational Probability and Statistics	
APMA 1710	Information Theory	
APMA 1720	Monte Carlo Simulation with Applications to Finance	
APMA 1740	Recent Applications of Probability and Statistics	
APMA 1860	Graphs and Networks	
MATH 1010	Analysis: Functions of One Variable	
APMA 193X, 194X [6]	Senior Seminar series, depending on topic	

Economics Requirements:		3
ECON 1130	Intermediate Microeconomics (Mathematical) [3]	
ECON 1210	Intermediate Macroeconomics	
ECON 1630	Mathematical Econometrics I	
Two 1000-level courses from the "mathematical-economics" group: [4]		2
ECON 1170	Welfare Economics and Social Choice Theory	
ECON 1225	Advanced Macroeconomics: Monetary, Fiscal, and Stabilization Policies	
ECON 1255	Unemployment: Models and Policies	
ECON 1470	Bargaining Theory and Applications	

ECON 1490	Designing Internet Marketplaces	
ECON 1545	Topics in Macroeconomics, Development and International Economics	
ECON 1640	Mathematical Econometrics II	
ECON 1660	Big Data	
ECON 1670	Advanced Topics in Econometrics	
ECON 1680	Machine Learning, Text Analysis, and Economics	
ECON 1750	Investments II	
ECON 1770	Crisis Economics	
ECON 1805	Experimental and Behavioral Economics	
ECON 1820	Theory of Behavioral Economics	
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 1310	Labor Economics	
ECON 1315	Health, Education, and Social Policy	
ECON 1340	Economics of Global Warming	
ECON 1355	Environmental Issues in Development Economics	
ECON 1360	Health Economics	
ECON 1375	Inequality of Opportunity in the US	
ECON 1385	Intergenerational Poverty in America	
ECON 1400	The Economics of Mass Media	
ECON 1430	The Economics of Social Policy	
ECON 1510	Economic Development	
ECON 1520	Culture, History and Comparative Development	
ECON 1530	Health, Hunger and the Household in Developing Countries	
ECON 1629	Applied Research Methods for Economists	
ECON 1640	Mathematical Econometrics II	
ECON 1660	Big Data	
ECON 1670	Advanced Topics in Econometrics	
ECON 1680	Machine Learning, Text Analysis, and Economics	
ECON 1825	Behavioral Economics and Public Policy	
ECON 1830	Behavioral Finance	
One additional 1000-level economics course. [5]		1
Total Credits		**13**

[1] No course may be used to simultaneously satisfy (a) and (b).
[2] APMA 0330 and APMA 0340 may be substituted with advisor approval, but these are no longer being offered.
[3] Or ECON 1110 with permission. For students matriculating at Brown in Fall 2021 or later, note that if ECON 1110 is used, then one additional course from the mathematical-economics group will be required
[4] No course may be used to simultaneously satisfy the "mathematical economics," and "data methods" requirements.
[5] Note that ECON 1620, ECON 1960, and ECON 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.
[6] Requires written approval of the Director of Undergraduate Studies in Economics. APMA 1910 is not permitted.

Professional Track

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

Students must complete full-time professional experiences doing work that is related to their concentration programs, totaling 2-6 months, whereby each internship must be at least one month in duration in cases where students choose to do more than one internship experience. Such work is normally done at a company, but may also be at a university under the supervision of a faculty member. Internships that take place between the end of the fall and the start of the spring semesters cannot be used to fulfill this requirement.

On completion of each professional experience, the student must write and upload to ASK a reflective essay about the experience, 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.
-

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

Prerequisites:		
MATH 0100	Single Variable Calculus, Part II	
MATH 0520	Linear Algebra	
Course Requirements:		
Applied Mathematics Requirements		
(a) [1]		
APMA 0350 & APMA 0360	Applied Ordinary Differential Equations and Applied Partial Differential Equations I [2]	2
Select one of the following:		1
APMA 0160	Introduction to Scientific Computing (preferred)	
APMA 0200	Introduction to Modeling	
CSCI 0111	Computing Foundations: Data	
CSCI 0190	Accelerated Introduction to Computer Science	
CSCI 0150	Introduction to Object-Oriented Programming and Computer Science	
CSCI 0170	Computer Science: An Integrated Introduction	
Select one of the following:		1
APMA 1200	Operations Research: Probabilistic Models	
or APMA 1210	Operations Research: Deterministic Models	
APMA 1650	Introduction to Probability and Statistics with Calculus	1
or APMA 1655	Introduction to Probability and Statistics with Theory	
(b) [1]		
Select two of the following:		2
APMA 1160	An Introduction to Numerical Optimization	
APMA 1180	Introduction to Numerical Solution of Differential Equations	
APMA 1200	Operations Research: Probabilistic Models	

APMA 1210	Operations Research: Deterministic Models	
APMA 1330	Applied Partial Differential Equations II	
APMA 1360	Applied Dynamical Systems	
APMA 1660	Statistical Inference II	
APMA 1670	Statistical Analysis of Time Series	
APMA 1680	Nonparametric Statistics	
APMA 1690	Computational Probability and Statistics	
APMA 1710	Information Theory	
APMA 1720	Monte Carlo Simulation with Applications to Finance	
APMA 1740	Recent Applications of Probability and Statistics	
APMA 1860	Graphs and Networks	
MATH 1010	Analysis: Functions of One Variable	
APMA 193X, 194X	Senior Seminar series, depending on topic [6]	

Economics Requirements:

ECON 1130	Intermediate Microeconomics (Mathematical) [3]	1
ECON 1210	Intermediate Macroeconomics	1
ECON 1630	Mathematical Econometrics I	1
Three 1000-level courses from the "mathematical-economics" group: [4]		3
ECON 1170	Welfare Economics and Social Choice Theory	
ECON 1225	Advanced Macroeconomics: Monetary, Fiscal, and Stabilization Policies	
ECON 1255	Unemployment: Models and Policies	
ECON 1470	Bargaining Theory and Applications	
ECON 1490	Designing Internet Marketplaces	
ECON 1545	Topics in Macroeconomics, Development and International Economics	
ECON 1640	Mathematical Econometrics II	
ECON 1660	Big Data	
ECON 1670	Advanced Topics in Econometrics	
ECON 1680	Machine Learning, Text Analysis, and Economics	
ECON 1750	Investments II	
ECON 1770	Crisis Economics	
ECON 1805	Experimental and Behavioral Economics	
ECON 1820	Theory of Behavioral Economics	
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 1310	Labor Economics	
ECON 1315	Health, Education, and Social Policy	
ECON 1340	Economics of Global Warming	
ECON 1355	Environmental Issues in Development Economics	
ECON 1360	Health Economics	
ECON 1375	Inequality of Opportunity in the US	
ECON 1385	Intergenerational Poverty in America	
ECON 1400	The Economics of Mass Media	
ECON 1430	The Economics of Social Policy	
ECON 1510	Economic Development	
ECON 1520	Culture, History and Comparative Development	

ECON 1530	Health, Hunger and the Household in Developing Countries	
ECON 1629	Applied Research Methods for Economists	
ECON 1640	Mathematical Econometrics II	
ECON 1660	Big Data	
ECON 1670	Advanced Topics in Econometrics	
ECON 1680	Machine Learning, Text Analysis, and Economics	
ECON 1825	Behavioral Economics and Public Policy	
ECON 1830	Behavioral Finance	
Two additional 1000-level economics courses [5]		2
Total Credits		**16**

[1] No course may be used to simultaneously satisfy (a) and (b).
[2] APMA 0330 and APMA 0340 may be substituted with advisor approval, but these are no longer being offered.
[3] Or ECON 1110 with permission. For students matriculating at Brown in Fall 2021 or later, note that if ECON 1110 is used, then one additional course from the mathematical-economics group will be required
[4] No course may be used to simultaneously satisfy the "mathematical economics" and "data methods" requirements.
[5] Students may apply, at most, one Economics course whose number is in the range of 1000 to 1099 toward the concentration. Note that ECON 1620, ECON 1960, and ECON 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.
[6] Requires written approval of the Director of Undergraduate Studies in Economics. APMA 1910 is not permitted.

Professional Track

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

Students must complete full-time professional experiences doing work that is related to their concentration programs, totaling 2-6 months, whereby each internship must be at least one month in duration in cases where students choose to do more than one internship experience. Such work is normally done at a company, but may also be at a university under the supervision of a faculty member. Internships that take place between the end of the fall and the start of the spring semesters cannot be used to fulfill this requirement.

On completion of each professional experience, the student must write and upload to ASK a reflective essay about the experience, 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.
-

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

Prerequisites:

MATH 0100	Single Variable Calculus, Part II	
MATH 0520	Linear Algebra	
or APMA 0260	Linear Algebra and Multivariable Calculus for Applied Mathematicians	
APMA 0260	Linear Algebra and Multivariable Calculus for Applied Mathematicians	
or MATH 0180	Multivariable Calculus	
or MATH 0200	Multivariable Calculus (Physics/Engineering)	
or MATH 0350	Multivariable Calculus With Theory	

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

Applied Mathematics Requirements

(a)

APMA 0355	Applied Ordinary Differential Equations with Theory [1]	1

and

APMA 0365	Applied Partial Differential Equations I with Theory	1
Select one of the following:		1
APMA 0160	Introduction to Scientific Computing (preferred)	
APMA 0200	Introduction to Modeling	
CSCI 0111	Computing Foundations: Data	
CSCI 0150	Introduction to Object-Oriented Programming and Computer Science	
CSCI 0170	Computer Science: An Integrated Introduction	
CSCI 0190	Accelerated Introduction to Computer Science	
APMA 1200	Operations Research: Probabilistic Models	1
APMA 1655	Introduction to Probability and Statistics with Theory	1

(b) [1]

Select one of the following:		1
APMA 1160	An Introduction to Numerical Optimization	
APMA 1180	Introduction to Numerical Solution of Differential Equations	
APMA 1210	Operations Research: Deterministic Models	
APMA 1330	Applied Partial Differential Equations II	
APMA 1360	Applied Dynamical Systems	
APMA 1660	Statistical Inference II	
APMA 1670	Statistical Analysis of Time Series	
APMA 1680	Nonparametric Statistics	
APMA 1690	Computational Probability and Statistics	
APMA 1710	Information Theory	
APMA 1720	Monte Carlo Simulation with Applications to Finance (preferred)	
APMA 1740	Recent Applications of Probability and Statistics	
APMA 1860	Graphs and Networks	
MATH 1010	Analysis: Functions of One Variable	
APMA 193X, 194X	Senior Seminar series, depending on topic [5]	

Economics Requirements:

ECON 1130	Intermediate Microeconomics (Mathematical) [3]	1
ECON 1210	Intermediate Macroeconomics	1
ECON 1630	Mathematical Econometrics I	1
Select two 1000-level courses from the "financial economics" group: [2]		2
ECON 1710	Investments I	
ECON 1720	Corporate Finance	
ECON 1730	Venture Capital, Private Equity, and Entrepreneurship	
ECON 1750	Investments II	
ECON 1760	Financial Institutions	
ECON 1770	Crisis Economics	
ECON 1780	Advanced Topics in Corporate Finance	
ECON 1830	Behavioral Finance	
Select one 1000-level course from the "mathematical economics" group: [2]		1
ECON 1170	Welfare Economics and Social Choice Theory	
ECON 1225	Advanced Macroeconomics: Monetary, Fiscal, and Stabilization Policies	
ECON 1255	Unemployment: Models and Policies	
ECON 1470	Bargaining Theory and Applications	
ECON 1490	Designing Internet Marketplaces	
ECON 1545	Topics in Macroeconomics, Development and International Economics	
ECON 1560	Economic Growth	
ECON 1640	Mathematical Econometrics II	
ECON 1660	Big Data	
ECON 1670	Advanced Topics in Econometrics	
ECON 1680	Machine Learning, Text Analysis, and Economics	
ECON 1750	Investments II	
ECON 1770	Crisis Economics	
ECON 1805	Experimental and Behavioral Economics	
ECON 1820	Theory of Behavioral Economics	
ECON 1860	The Theory of General Equilibrium	
ECON 1870	Game Theory and Applications to Economics	
Select one 1000-level course from the "data methods" group: [2]		1
ECON 1301	Economics of Education I	
ECON 1310	Labor Economics	
ECON 1315	Health, Education, and Social Policy	
ECON 1330	Gender and Development	
ECON 1340	Economics of Global Warming	
ECON 1345	Climate Change and the Commons	
ECON 1355	Environmental Issues in Development Economics	
ECON 1360	Health Economics	
ECON 1375	Inequality of Opportunity in the US	
ECON 1385	Intergenerational Poverty in America	
ECON 1400	The Economics of Mass Media	
ECON 1410	Urban Economics	
ECON 1430	The Economics of Social Policy	
ECON 1510	Economic Development	
ECON 1520	Culture, History and Comparative Development	
ECON 1530	Health, Hunger and the Household in Developing Countries	
ECON 1629	Applied Research Methods for Economists	
ECON 1640	Mathematical Econometrics II	
ECON 1660	Big Data	
ECON 1670	Advanced Topics in Econometrics	

ECON 1680	Machine Learning, Text Analysis, and Economics	
ECON 1825	Behavioral Economics and Public Policy	
ECON 1830	Behavioral Finance	
Total Credits		**13**

[1] Students can also use APMA 1650 but must also complete the APMA 1655 online bridgework course, pass the in-person bridgework exam that is offered once per semester, and have taken multivariable calculus and linear algebra

[2] No course may be used to simultaneously satisfy any two or more of the "financial economics," "mathematical economics," and "data methods" requirements.

[3] Or ECON 1110 with permission. For students matriculating at Brown in Fall 2021 or later, note that if ECON 1110 is used, then one additional course from the mathematical-economics group will be required

[4] Note that ECON 1620, ECON 1960, and ECON 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.

[5] Requires written approval of the Director of Undergraduate Studies in Economics. APMA 1910 is not permitted.

Professional Track

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

Students must complete full-time professional experiences doing work that is related to their concentration programs, totaling 2-6 months, whereby each internship must be at least one month in duration in cases where students choose to do more than one internship experience. Such work is normally done at a company, but may also be at a university under the supervision of a faculty member. Internships that take place between the end of the fall and the start of the spring semesters cannot be used to fulfill this requirement.

On completion of each professional experience, the student must write and upload to ASK a reflective essay about the experience, 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.
-

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

Prerequisites:

MATH 0100	Single Variable Calculus, Part II	
MATH 0520	Linear Algebra	

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

Applied Mathematics requirements:

(a)

APMA 0350 & APMA 0360	Applied Ordinary Differential Equations and Applied Partial Differential Equations I [1]	2
Select one of the following:		1
APMA 0160	Introduction to Scientific Computing (preferred)	
APMA 0200	Introduction to Modeling	
CSCI 0111	Computing Foundations: Data	
CSCI 0150	Introduction to Object-Oriented Programming and Computer Science	
CSCI 0170	Computer Science: An Integrated Introduction	
CSCI 0190	Accelerated Introduction to Computer Science	
APMA 1200	Operations Research: Probabilistic Models	1
APMA 1650	Introduction to Probability and Statistics with Calculus	1
or APMA 1655	Introduction to Probability and Statistics with Theory	

(b)

Select two of the following:		2
APMA 1160	An Introduction to Numerical Optimization	
APMA 1180	Introduction to Numerical Solution of Differential Equations	
APMA 1210	Operations Research: Deterministic Models	
APMA 1330	Applied Partial Differential Equations II	
APMA 1360	Applied Dynamical Systems	
APMA 1660	Statistical Inference II	
APMA 1670	Statistical Analysis of Time Series	
APMA 1680	Nonparametric Statistics	
APMA 1690	Computational Probability and Statistics	
APMA 1710	Information Theory	
APMA 1720	Monte Carlo Simulation with Applications to Finance (preferred)	
APMA 1740	Recent Applications of Probability and Statistics	
APMA 1860	Graphs and Networks	
MATH 1010	Analysis: Functions of One Variable	
APMA 193X, 194X	Senior Seminar series, depending on topic [5]	

Economics Requirements:

ECON 1130	Intermediate Microeconomics (Mathematical) [3]	1
ECON 1210	Intermediate Macroeconomics	1
ECON 1630	Mathematical Econometrics I	1
Select three 1000-level courses from the "financial economics" group: [2]		3
ECON 1710	Investments I	
ECON 1720	Corporate Finance	
ECON 1730	Venture Capital, Private Equity, and Entrepreneurship	
ECON 1750	Investments II	
ECON 1760	Financial Institutions	
ECON 1770	Crisis Economics	
ECON 1780	Advanced Topics in Corporate Finance	
ECON 1830	Behavioral Finance	
Select two 1000-level courses from the "mathematical economics" group: [2]		2
ECON 1170	Welfare Economics and Social Choice Theory	

ECON 1225	Advanced Macroeconomics: Monetary, Fiscal, and Stabilization Policies	
ECON 1255	Unemployment: Models and Policies	
ECON 1470	Bargaining Theory and Applications	
ECON 1490	Designing Internet Marketplaces	
ECON 1545	Topics in Macroeconomics, Development and International Economics	
ECON 1640	Mathematical Econometrics II	
ECON 1660	Big Data	
ECON 1670	Advanced Topics in Econometrics	
ECON 1680	Machine Learning, Text Analysis, and Economics	
ECON 1750	Investments II	
ECON 1770	Crisis Economics	
ECON 1805	Experimental and Behavioral Economics	
ECON 1820	Theory of Behavioral Economics	
ECON 1860	The Theory of General Equilibrium	
ECON 1870	Game Theory and Applications to Economics	
Select one 1000-level course from the "data methods" group: [2]		1
ECON 1301	Economics of Education I	
ECON 1310	Labor Economics	
ECON 1315	Health, Education, and Social Policy	
ECON 1340	Economics of Global Warming	
ECON 1355	Environmental Issues in Development Economics	
ECON 1360	Health Economics	
ECON 1375	Inequality of Opportunity in the US	
ECON 1385	Intergenerational Poverty in America	
ECON 1400	The Economics of Mass Media	
ECON 1430	The Economics of Social Policy	
ECON 1510	Economic Development	
ECON 1520	Culture, History and Comparative Development	
ECON 1530	Health, Hunger and the Household in Developing Countries	
ECON 1629	Applied Research Methods for Economists	
ECON 1640	Mathematical Econometrics II	
ECON 1660	Big Data	
ECON 1670	Advanced Topics in Econometrics	
ECON 1680	Machine Learning, Text Analysis, and Economics	
ECON 1825	Behavioral Economics and Public Policy	
ECON 1830	Behavioral Finance	
Total Credits		**16**

[1] APMA 0330 and APMA 0340 may be substituted with advisor approval, but these are no longer being offered.

[2] No course may be used to simultaneously satisfy any two or more of the "financial economics," "mathematical economics," and "data methods" requirements.

[3] Or ECON 1110 with permission. For students matriculating at Brown in Fall 2021 or later, note that if ECON 1110 is used, then one additional course from the mathematical-economics group will be required

[4] Note that ECON 1620, ECON 1960, and ECON 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.

[5] Requires written approval of the Director of Undergraduate Studies in Economics. APMA 1910 is not permitted.

Professional Track

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

Students must complete full-time professional experiences doing work that is related to their concentration programs, totaling 2-6 months, whereby each internship must be at least one month in duration in cases where students choose to do more than one internship experience. Such work is normally done at a company, but may also be at a university under the supervision of a faculty member. Internships that take place between the end of the fall and the start of the spring semesters cannot be used to fulfill this requirement.

On completion of each professional experience, the student must write and upload to ASK a reflective essay about the experience, 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.
-