Dietrich College Interdisciplinary Majors

When addressing complex issues, we often rely on approaches that take advantage of a variety of relevant disciplines. The college houses the special category of "interdepartmental majors" for programs where this interdisciplinary approach is most pronounced and in which the varied disciplinary perspectives are most fully integrated. These majors are presented here separately, rather than as departmentally-based options, to reflect and underscore their sponsorship by more than one academic department and the unique features that follow from this structure.

Interdepartmental majors are administered by the academic department of the major's faculty advisor.

The Major in Economics and Mathematical Sciences

Kathleen Conway, Academic Advisor
Location: Tepper Quad 2407
kconway@andrew.cmu.edu

The B.S. in Economics and Mathematical Sciences (http://coursescatalog.web.cmu.edu/schools-colleges/dietrichcollegeofhumanitiesandsocialsciences/undergraduateeconomicsprogram/#econmathtext) is a collaborative effort between the Department of Mathematical Sciences and the Undergraduate Economics Program. Combining advanced mathematics with advanced economic theory is the hallmark of this curriculum. The curriculum provides students with courses that complement and develop depth of understanding of economic theory, applied economics, and applied mathematics. This major offers an integrated curriculum, guiding students through a program of coursework that exploits and builds upon the synergies between mathematics and economics. This degree program equips students with the mathematical tools that are essential for success in Ph.D. programs in economics, mathematics, and key functional areas of business including finance, accounting, marketing, and information systems. Students pursuing this degree will be well prepared for the beginning of their research careers in academia, government, and industry. There are a limited number of student slots in this program; interested students may apply as early as their sophomore year.

The Major in Economics and Politics

Kathleen Conway, Senior Academic Advisor, Economics
Location: Tepper Quad 2407
kconway@andrew.cmu.edu

Emily Half, Deputy Director, Institute for Politics and Strategy Advising
Location: Baker Hall ASSA
ehalf@andrew.cmu.edu

Politics and economics are deeply interconnected. Political institutions and decision-making impact economic growth, income distribution, and many other aspects of economic life. Both fiscal and monetary policies affect the economy, but these policies are often employed with political considerations in mind and can influence political activity. Conversely, economic outcomes shape political preferences and policy choices. The overlap between these two disciplines is endless. For example, while the United Nations is often thought of in purely political terms, the Security Council can and does impose sanctions on countries-an example of an economic policy used for political change. And, not least important, there is broad recognition that commitments can facilitate compliance with a global initiative to combat climate change. However, not least important, there is broad recognition that the viability of the "Euro Zone" depends on whether the political-economic agreements necessary to mitigate institutional weaknesses are politically feasible or destined to failure.

Economics and Politics is available as both a primary and additional major.

The Major in Economics and Statistics

Samantha Nielsen, Statistics & Data Science Lead Academic Advisor
Kathleen Conway, Economics Senior Academic Advisor
Rebecca Nugent and Edward Kennedy, Faculty Advisors
Carol Goldberg, Executive Director, Undergraduate Economics Program

Statistics & Data Science Location: Baker Hall 132
statadvising@stat.cmu.edu

Economics Location: Tepper 2400
econprog@andrew.cmu.edu

The B.S. in Economics and Statistics is jointly advised by the Department of Statistics and Data Science and the Undergraduate Economics Program.

The Major in Economics and Statistics provides an interdisciplinary course of study aimed at students with a strong interest in the empirical analysis of economic data. With joint curriculum from the Department of Statistics and Data Science and the Undergraduate Economics Program, the major provides students with a solid foundation in the theories and methods of both fields. Students in this major are trained to advance the understanding of economic issues through the analysis, synthesis and reporting of data using the advanced empirical research methods of statistics and econometrics. Graduates are well positioned for admission to competitive graduate programs, including those in statistics, economics and management, as well as for employment in positions requiring strong analytic and conceptual skills-especially those in economics, finance, education, and public policy.

All economics courses counting towards an economics degree must be completed with a grade of "C" or higher.

The requirements for the B.S. in Economics and Statistics are the following:

I. Prerequisites 38-39 units

1. Mathematical Foundations 38-39 units

Calculus

21-120 Differential and Integral Calculus 10

and one of the following:

21-256 Multivariate Analysis 9

21-259 Calculus in Three Dimensions 9

Note: Passing the MSC 21-120 assessment test is an acceptable alternative to completing 21-120.

Note: Taking/having credit for both 21-111 and 21-112 is equivalent to 21-120. The Mathematical Foundations total is then 48-49 units. The Economics and Statistics major would then total 201-211 units.

Linear Algebra

One of the following three courses:

21-240 Matrix Algebra with Applications 10

21-241 Matrices and Linear Transformations 10

21-242 Matrix Theory 10

Note: 21-241 and 21-242 are intended only for students with a very strong mathematical background.
II. Foundations  18-36 units

2. Economics Foundations  18 units
73-102 Principles of Microeconomics  9
73-103 Principles of Macroeconomics  9

3. Statistical Foundations  9-18 units
Sequence 1 (For students beginning their freshman or sophomore year)

**All Special Topics are not offered every semester, and new Special Topics are regularly added. See section 5 for details.

Beginning*
Choose one of the following courses:

36-200 Reasoning with Data  9
36/70-207 Probability and Statistics for Business Applications  9
36-220 Engineering Statistics and Quality Control  9
36-247 Statistics for Lab Sciences  9

Note: Students who enter the program with 36-225 or 36-226 should discuss options with an advisor. Any 36-300 or 36-400 level course in Data Analysis that does not satisfy any other requirement for the Economics and Statistics Major may be counted as a Statistical Elective.

Intermediate*
Choose one of the following courses:

36-202 Methods for Statistics & Data Science **  9
36-208 Regression Analysis  9
36-290 Introduction to Statistical Research Methodology  9
36-309 Experimental Design for Behavioral & Social Sciences  9

* Or extra data analysis course in Statistics
** Must take prior to 36-401 Modern Regression.

Advanced
Choose two of the following courses:

36-303 Sampling, Survey and Society  9
36-311 Statistical Analysis of Networks  9
36-315 Statistical Graphics and Visualization  9
36-461 Special Topics: Statistical Methods in Epidemiology  9
36-462 Special Topics: Data Mining  9
36-463 Special Topics: Multilevel and Hierarchical Models  9
36-464 Special Topics: Applied Multivariate Methods  9
36-466 Special Topics: Statistical Methods in Finance  9
36-467 Special Topics: Data over Space & Time  9
36-468 Special Topics: Text Analysis  9
36-490 Undergraduate Research  9
36-497 Corporate Capstone Project  9

Sequence 2 (For students beginning later in their college career)

Advanced
Choose three of the following courses:

36-303 Sampling, Survey and Society  9
36-311 Statistical Analysis of Networks  9
36-315 Statistical Graphics and Visualization  9
36-461 Special Topics: Statistical Methods in Epidemiology  9
36-462 Special Topics: Data Mining  9
36-463 Special Topics: Multilevel and Hierarchical Models  9
36-464 Special Topics: Applied Multivariate Methods  9
36-466 Special Topics: Statistical Methods in Finance  9
36-467 Special Topics: Data over Space & Time  9
36-468 Special Topics: Text Analysis  9
36-490 Undergraduate Research  9
36-497 Corporate Capstone Project  9

III. Disciplinary Core  126 units

1. Economics Core  45 units
73-230 Intermediate Microeconomics  9
73-240 Intermediate Macroeconomics  9
73-270 Professional Communication for Economists  9
73-265 Economics and Data Science  9
73-274 Econometrics I  9
73-374 Econometrics II  9

2. Statistics Core  36 units
36-225 Introduction to Probability Theory *#  9
and one of the following two courses:
36-226 Introduction to Statistical Inference *  9
36-326 Mathematical Statistics (Honors) *  9

* In order meet the prerequisite requirements for the major, a grade of C or better is required in 36-225 (or equivalents), 36-226 or 36-326 and 36-401.
# It is possible to substitute 36-217, 36-218, or 36-225 for 36-225 36-225 36-225 in 36-225 36-225 36-225-36-225-36-225-36-225 is the standard introduction to probability, 36-217 is tailored for engineers and computer scientists, 36-218 is a more mathematically rigorous class for Computer Science students and more mathematically advanced Statistics students (Statistics students need advisor approval to enroll), and 36-401 36-217 36-217 36-401 is a rigorous Probability Theory course offered by the Department of Mathematics.

3. Computing  9 units
36-350 Statistical Computing *  9

* In rare circumstances, a higher level Statistical Computing course, approved by your Statistics advisor, may be used as a substitute.

4. Advanced Electives  36 units
Students must take two advanced Economics elective courses (numbered 73-300 through 73-495, excluding 73-374) and two (or three - depending on previous coursework; see Section 3) advanced Statistics elective courses (numbered 36-303, 36-311, 36-315, 36-46x, 36-490, or 36-497).

Students pursuing a degree in Economics and Statistics also have the option of earning a concentration area (https://www.cmu.edu/tepper/programs/undergraduate-economics/curriculum/concentrations/) by completing a set of interconnected electives. While a concentration area is not required for this degree, it is an additional option that allows students to explore a group of aligned topics and/or develop a specialized and advanced skill set appropriate for a desired career path. The electives required for this degree may count towards your concentration area. To fulfill a concentration, students must take four courses from the designated set of electives. Please make sure to consult an advisor when choosing these courses.

Total number of units for the major \[ \text{191-201 units} \]
Total number of units for the degree \[ \text{360 units} \]

Professional Development
Students are strongly encouraged to take advantage of professional development opportunities and/or coursework. One option is 73-210 Economics Colloquium I, a fall-only course that provides information about careers in Economics, job search strategies, and research opportunities. The Department of Statistics and Data Science also offers a series of workshops pertaining to resume preparation, graduate school applications, careers in the field, among other topics. Students should also take advantage of the Career and Professional Development Center.

Additional Major in Economics and Statistics
Students who elect Economics and Statistics as a second or third major must fulfill all Economics and Statistics degree requirements. Majors in many other programs would naturally complement an Economics and
Statistics Major, including Tepper’s undergraduate business program, Social and Decision Sciences, Policy and Management, and Psychology. With respect to double-counting courses, it is departmental policy that students must have at least six courses (three Economics and three Statistics) that do not count for their primary major. If students do not have at least six, they typically take additional advanced data analysis or economics electives, depending on where the double counting issue is.

Students are advised to begin planning their curriculum (with appropriate advisors) as soon as possible. This is particularly true if the other major has a complex set of requirements and prerequisites or when many of the other major’s requirements overlap with the requirements for a Major in Economics and Statistics.

Many departments require Statistics courses as part of their Major or Minor programs. Students seeking transfer credit for those requirements from sub-major courses (at Carnegie Mellon or elsewhere) should seek permission from their advisor in the department setting the requirement. The final authority in such decisions rests there. The Department of Statistics and Data Science does not provide approval or permission for substitution or waiver of another department’s requirements.

If a waiver or substitution is made in the home department, it is not automatically approved in the Department of Statistics and Data Science. In many of these cases, the student will need to take additional courses to satisfy the Economics and Statistics major requirements. Students should discuss this with a Statistics advisor when deciding whether to add an additional major in Economics and Statistics.

**Sample Program**

The following sample program illustrates one way to satisfy the requirements of the Economics and Statistics Major. Keep in mind that the program is flexible and can support other possible schedules (see footnotes below the schedule).

<table>
<thead>
<tr>
<th>Freshman</th>
<th>Sophomore</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td><strong>Spring</strong></td>
</tr>
<tr>
<td>21-110 Differential and Integral Calculus</td>
<td>36-200 Methods for Statistics &amp; Data Science</td>
</tr>
<tr>
<td>36-200 Reasoning with Data</td>
<td>21-256 Multivariate Analysis</td>
</tr>
<tr>
<td>73-102 Principles of Microeconomics</td>
<td>73-103 Principles of Macroeconomics</td>
</tr>
<tr>
<td>73-060 Economics: BaseCamp <em>not required</em></td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Junior</th>
<th>Senior</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td><strong>Spring</strong></td>
</tr>
<tr>
<td>36-350 Statistical Computing</td>
<td>36-402 Advanced Methods for Data Analysis</td>
</tr>
<tr>
<td>36-401 Modern Regression</td>
<td>73-270 Professional Communication for Economists</td>
</tr>
<tr>
<td>73-374 Econometrics II</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Fall</strong></th>
<th><strong>Spring</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>36-225 Introduction to Probability Theory</td>
<td>21-240 Matrix Algebra with Applications</td>
</tr>
<tr>
<td>73-230 Intermediate Microeconomics</td>
<td>36-226 Introduction to Statistical Inference</td>
</tr>
<tr>
<td>73-210 Economics Colloquium I <em>not required</em></td>
<td>73-240 Intermediate Macroeconomics</td>
</tr>
<tr>
<td>73-265 Economics and Data Science</td>
<td></td>
</tr>
<tr>
<td>73-274 Econometrics I</td>
<td></td>
</tr>
</tbody>
</table>

*In each semester, *-----* represents other courses (not related to the major) which are needed in order to complete the 360 units that the degree requires.

Prospective PhD students might add 21-127 fall of sophomore year, replace 21-240 with 21-241, add 21-260 in spring of junior year and 21-355 in fall of senior year.

**Additional Major in Environmental Policy**

Professor Abigail E. Owen, Faculty Advisor
aoewen@cmu.edu, Wean Hall 3709, 412-268-2953

Dr. Andrew Ramey, Academic Advisor
aramey@andrew.cmu.edu, Baker Hall 240, 412-268-7906

The additional major in Environmental Policy focuses on human-environment interactions from a multitude of disciplinary perspectives. The curriculum draws on the expertise of faculty across several Carnegie Mellon colleges in order to provide students with the interdisciplinary background and skills necessary to understand environmental problems and the means to mitigate them. It emphasizes three general areas: (1) natural science and technology; (2) social sciences; and (3) the humanities. The flexible curriculum features training in research methods; a set of core courses on fundamental environmental issues including energy, pollution, and biological diversity; and a project course experience geared toward policy formulation. The total units required are 121.

Note that some courses carry prerequisites and/or reserve seats for primary majors. Students interested in pursuing the additional major must meet beforehand with the Faculty Advisor and their home unit academic advisor in order to evaluate the feasibility of completing the additional major and to map out a course of study. Double counting follows guidelines set by the Dietrich College. Students are encouraged to be alert to new course offerings; every effort will be made to find equivalent courses that meet student interest when done in consultation with the Faculty Advisor.

**Prerequisites (55–57 units)**

Complete ALL of the following courses:

<table>
<thead>
<tr>
<th>Courses</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>21-111 Calculus I (or equivalent)</td>
<td>10</td>
</tr>
<tr>
<td>36-200 Reasoning with Data</td>
<td>9</td>
</tr>
<tr>
<td>Students entering CMU prior to 2018 may substitute 36-201 for 36-200.</td>
<td></td>
</tr>
<tr>
<td>36-202 Methods for Statistics &amp; Data Science</td>
<td>9</td>
</tr>
</tbody>
</table>

Complete THREE of the following courses:

<table>
<thead>
<tr>
<th>Courses</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>03-121 Modern Biology</td>
<td>9</td>
</tr>
<tr>
<td>03-124 Modern Biology Laboratory (03-121 is corequisite)</td>
<td>9</td>
</tr>
<tr>
<td>03-125 Evolution</td>
<td>9</td>
</tr>
<tr>
<td>03-128 Biology for Life Special Topics</td>
<td>9</td>
</tr>
<tr>
<td>09-103 Atoms, Molecules and Chemical Change</td>
<td>9</td>
</tr>
<tr>
<td>09-105 Introduction to Modern Chemistry I</td>
<td>10</td>
</tr>
<tr>
<td>09-106 Modern Chemistry II</td>
<td>10</td>
</tr>
<tr>
<td>09-225 Climate Change: Chemistry, Physics and Planetary Science</td>
<td>9</td>
</tr>
</tbody>
</table>

**Disciplinary Perspectives:** Complete TWO of the following courses (18 units)

<table>
<thead>
<tr>
<th>Courses</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>09-510 Chemistry and Sustainability</td>
<td>9</td>
</tr>
<tr>
<td>73-427 Sustainability, Energy, and Environmental Economics</td>
<td>9</td>
</tr>
<tr>
<td>76-319 Environmental Rhetoric</td>
<td>9</td>
</tr>
<tr>
<td>99-236 Introduction to Environmental Ideas</td>
<td>9</td>
</tr>
</tbody>
</table>

**Thematic Electives:** Complete TWO of the following courses (18 units)

<table>
<thead>
<tr>
<th>Courses</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-100 Exploring CEE: Infrastructure and Environment in a Changing World</td>
<td>12</td>
</tr>
<tr>
<td>19-101 Introduction to Engineering and Public Policy</td>
<td>12</td>
</tr>
<tr>
<td>19-424 Energy and the Environment</td>
<td>9</td>
</tr>
<tr>
<td>76-395 Science Writing</td>
<td>9</td>
</tr>
<tr>
<td>79-283 Hungry World: Food and Famine in Global Perspective</td>
<td>9</td>
</tr>
<tr>
<td>79-315 Thirsty Planet: The Politics of Water in Global Perspective</td>
<td>9</td>
</tr>
<tr>
<td>79-336 Oil &amp; Water: Middle East Perspectives</td>
<td>6</td>
</tr>
<tr>
<td>79-372/90-765 The Rise and Fall of Pittsburgh Steel</td>
<td>6</td>
</tr>
<tr>
<td>79-394 Exploring History through Geography</td>
<td>6</td>
</tr>
<tr>
<td>80-348 Health, Human Rights, and International Development</td>
<td>9</td>
</tr>
<tr>
<td>88-223 Decision Analysis</td>
<td>12</td>
</tr>
<tr>
<td>88-302 Behavioral Decision Making</td>
<td>9</td>
</tr>
<tr>
<td>90-765/79-372 Cities, Technology and the Environment</td>
<td>6</td>
</tr>
<tr>
<td>90-798 Systems Analysis: Environmental Policy</td>
<td>12</td>
</tr>
<tr>
<td>90-808 Energy Policy</td>
<td>6</td>
</tr>
</tbody>
</table>

College courses open only to seniors
Research and Analytical Methods: Complete TWO of the following courses (18 units)

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>79-200</td>
<td>Social and Political History, for which a student can double count any course for the major with another major or minor, with a grade, and a second major. All courses toward the major must be taken for a letter grade.</td>
</tr>
<tr>
<td>79-202</td>
<td>Non-U.S. History (9 units)</td>
</tr>
<tr>
<td>79-203</td>
<td>Social and Political Change in 20th Century and 21st Century</td>
</tr>
<tr>
<td>79-205</td>
<td>20th Century Europe</td>
</tr>
<tr>
<td>79-222</td>
<td>African History: Earliest Times to 1780</td>
</tr>
<tr>
<td>79-226</td>
<td>Modern Africa: The Slave Trade to the End of Apartheid</td>
</tr>
<tr>
<td>79-229</td>
<td>The Origins of the Palestinian-Israeli Conflict, 1880-1948</td>
</tr>
<tr>
<td>79-230</td>
<td>Arab-Israeli Conflict Since 1948</td>
</tr>
<tr>
<td>79-237</td>
<td>Comparative Slavery</td>
</tr>
<tr>
<td>79-251</td>
<td>The Last Emperors: Chinese History and Society, 1600-1900</td>
</tr>
<tr>
<td>79-262</td>
<td>Modern China: From the Birth of Mao ... to Now</td>
</tr>
<tr>
<td>79-264</td>
<td>Tibet and China: History and Propaganda</td>
</tr>
<tr>
<td>79-265</td>
<td>Russian History: Tsar, Power, and Rebellion</td>
</tr>
<tr>
<td>79-266</td>
<td>Russian History and Revolutionary Socialism</td>
</tr>
<tr>
<td>79-270</td>
<td>Religion and Politics in the Middle East</td>
</tr>
<tr>
<td>79-278</td>
<td>Politics and Social Change in 20th Century America</td>
</tr>
<tr>
<td>79-300</td>
<td>Women, Politics, and Protest</td>
</tr>
</tbody>
</table>

Non-U.S. History (9 units)

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>79-249</td>
<td>Politics and Social Change in 20th Century America</td>
</tr>
<tr>
<td>79-320</td>
<td>Women, Politics, and Protest</td>
</tr>
</tbody>
</table>

III. Philosophy Core

Choose one 9-unit course from the list below. No more than 9 units at the 100 level may be counted toward the Philosophy Core.

- 80-130 Introduction to Ethics
- 80-330 Ethical Theory
- 80-135 Introduction to Political Philosophy
- 80-335 Social and Political Philosophy
- 80-221 Philosophy of Social Science
- 80-321 Causation, Law, and Social Policy
- 80-324 Philosophy of Economics
- 80-136 Social Structure, Public Policy & Ethics
- 80-244 Environmental Ethics
- 80-245 Medical Ethics
- 80-249 AI, Society, and Humanity
- 80-336 Philosophy of Law
- 80-348 Health, Human Rights, and International Development
- 80-447 Global Justice

IV. Senior Capstone Project Course

Choose one 9-unit course from each category below.

Policy History (9 units)

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>79-300</td>
<td>History of American Public Policy</td>
</tr>
<tr>
<td>79-240</td>
<td>Development of American Culture</td>
</tr>
<tr>
<td>79-242</td>
<td>African American History: Reconstruction to the Present</td>
</tr>
<tr>
<td>79-244</td>
<td>Women in American History</td>
</tr>
<tr>
<td>79-245</td>
<td>Capitalism and Individualism in American Culture</td>
</tr>
</tbody>
</table>

U.S. History (9 units)

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>79-249</td>
<td>Politics and Social Change in 20th Century America</td>
</tr>
<tr>
<td>79-320</td>
<td>Women, Politics, and Protest</td>
</tr>
</tbody>
</table>

Political Philosophy (9 units)

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
</tr>
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<tbody>
<tr>
<td>79-249</td>
<td>Politics and Social Change in 20th Century America</td>
</tr>
<tr>
<td>79-320</td>
<td>Women, Politics, and Protest</td>
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</tbody>
</table>

Foundations of Social Science (9 units)

<table>
<thead>
<tr>
<th>Course Number</th>
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<tbody>
<tr>
<td>79-249</td>
<td>Politics and Social Change in 20th Century America</td>
</tr>
<tr>
<td>79-320</td>
<td>Women, Politics, and Protest</td>
</tr>
</tbody>
</table>

Applied Philosophy (9 units)

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>79-249</td>
<td>EHPP Project Course [cross-listed]</td>
</tr>
<tr>
<td>80-449</td>
<td>EHPP Project Course</td>
</tr>
</tbody>
</table>

The Ethics, History and Public Policy Project Course is required for the Ethics, History and Public Policy major and is taken in the fall semester of the senior year. In this capstone course, Ethics, History and Public Policy majors carry out a collaborative research project that examines a compelling current policy issue that can be illuminated with historical research and philosophical and policy analysis. The students develop an original research report based on both archival and contemporary policy analysis and they present their results to a client organization in the community.
V. Elective Courses 27 units
Choose any three courses (at least 27 units) from any category or categories shown below. Substitution of elective courses that cohere with a student's interest or concentration may be allowed after consultation with and approval from the Director.

Engineering and Public Policy (some courses have prerequisites; see EPP catalog listing)
19-424 Energy and the Environment 9

Business
70-311 Organizational Behavior 9
70-321 Negotiation and Conflict Resolution 9
70-332 Business, Society and Ethics 9
70-364 Business Law 9
70-365 International Trade and International Law 9
70-430 International Management 9

Economics (some courses have prerequisites; see Economics catalog listing)
73-352 Public Economics 9
73-359 Benefit-Cost Analysis 9
73-365 Firms, Market Structures, and Strategy 9
73-372 International Money and Finance 9
73-408 Law and Economics 9
73-476 American Economic History 9

English
76-492 Rhetoric of Public Policy 9

History
Courses from the EHPP History Core (above) may be taken as electives only if they are not being used to fulfill the core requirement. Double counting is not permitted.
79-206 Crime and Punishment in Early Modern Europe 9
79-228 The Civil Rights Movement and the World 9
79-233 The United States and the Middle East since 1945 9
79-234 Technology and Society 9
79-242 African American History: Reconstruction to the Present 9
79-247 African Americans, Imprisonment, and the Carceral State 9
79-267 The Soviet Union in World War II: Military, Political, and Social History 9
79-288 Bananas, Baseball, and Borders: Latin America and the United States 9
79-298 Guns in American History: Culture, Violence, and Politics 6
79-299 From Newton to the Nuclear Bomb: History of Science, 1750-1950 9
79-301 History of Surveillance: From the Plantation to Data Capitalism 6
79-302 Killer Robots: The Ethics, Law, and Politics of Lethal Autonomous Weapons Systems 6
79-303 Pittsburgh and the Transformation of Modern Urban America 6
79-305 Moneyball Nation: Data in American Life 9
79-310 U. S. Business History: 1870 to the Present 9
79-315 Thrity Planet: The Politics of Water in Global Perspective 9
79-320 Women, Politics, and Protest 9
79-322 Stalin and the Great Terror 9
79-325 U. S. Gay and Lesbian History 6
79-330 Medicine and Society 9
79-331 Body Politics: Women and Health in America 9
79-336 Oil & Water: Middle East Perspectives 6
79-338 History of Education in America 9
79-339 Juvenile Delinquency & Film: From Soul of Youth (1920) to West Side Story (1961) 6
79-340 Juvenile Delinquency & Film: From 'Boyz N the Hood' (1991) to 'The Wire' (2002-08) 6
79-342 Introduction to Science and Technology Studies 9
79-343 Education, Democracy, and Civil Rights 9
79-349 United States and the Holocaust 6
79-370 Disasters in American History (2): Epidemics & Fires 6
79-371 African American Urban History 9
79-381 Energy and Empire: How Fossil Fuels Changed the World 9
79-397 Environmental and Public Health Crises in the City 6

Philosophy
Courses from the EHPP Philosophy Core (above) may be taken as electives only if they are not being used to fulfill the core requirement. Double counting is not permitted.
80-256 Modern Moral Philosophy 9
80-305 Decision Theory 9
80-405 Game Theory 9

Institute for Politics and Strategy
84-310 International Political Economy 9
84-380 Grand Strategy in the United States 9
84-393 Legislative Decision Making: US Congress 6
84-402 Judicial Politics and Behavior 6

Social and Decision Sciences
88-223 Decision Analysis 12
88-281 Topics in Law: 1st Amendment 9
88-444 Public Policy and Regulation 9

VI. Bachelor of Science Option
Students may elect to earn a Bachelor of Science rather than a Bachelor of Arts degree by completing two courses from the list below, or by petitioning the Director of EHPP to accept equivalent courses as substitutions.
21-257 Models and Methods for Optimization 9
36-202 Methods for Statistics & Data Science or 36-208 Regression Analysis or 70-208 Regression Analysis 9
36-303 Sampling, Survey and Society 9
36-309 Experimental Design for Behavioral & Social Sciences 9
70-257 Optimization for Business 9
80-305 Decision Theory 9
80-405 Game Theory 9
84-265 Political Science Research Methods 9
88-251 Empirical Research Methods 9
88-221 Analytical Foundations of Public Policy 9
88-223 Decision Analysis 12
88-300 Programming and Data Analysis for Social Scientists 9

Additional Major
The B.A./B.S. in Ethics, History, and Public Policy may be scheduled as an additional major in consultation with the Director of Ethics, History, and Public Policy, Professor Alex John London, ajlondon@andrew.cmu.edu.

Ethics, History, and Public Policy Sample Curriculum

The above sample program is presented as a two-year (junior-senior year) plan for completing EHPP major requirements. Its purpose is to show that this program can be completed in as few as two years; not that it must be. Students may enter the EHPP major, and begin major course requirements, as early as the start of the sophomore year, or even in the first year. Students should consult their advisor when planning their program.
The Major in Information Systems

Randy S. Weinberg, Faculty Program Director
Location: Porter Hall 224C, rweinberg@cmu.edu
Carol Young, Program Advisor
Location: Porter Hall 222F, caroly@andrew.cmu.edu

Faculty: C.F. Larry Heimann, Jeria Quesenberry, Raja Sooriamrthi

Information Systems (IS) is a unique and innovative undergraduate interdisciplinary program, drawing on a wide range of exciting college and university strengths. IS is an internationally recognized undergraduate major for students who want to design and implement effective solutions to meet organizational and management needs for information and decision support. IS majors learn how elements of organizations, technology, economics, social aspects and human interaction work together to create effective computer-based information systems to affect real outcomes. Graduates of the Program are ideally situated to take a leading role in managing and shaping our information-based future.

For full program information, go to The Major in Information Systems (http://www.cmu.edu/dietrichcollegofhumanitiesandsocialsciences/informationsystems/).

The Major in Linguistics

Tom Werner, Director
Location: Baker Hall 155F
twerner@andrew.cmu.edu

www.cmu.edu/dietrich/linguistics (http://www.cmu.edu/dietrich/linguistics/)

Linguistics is the study of human language, and it encompasses a broad spectrum of research questions, approaches and methodologies. Some linguists are concerned with the cognitive aspects of language learning, production and comprehension; some are concerned with language as a social and cultural phenomenon; others engage in the analysis of linguistic form and meaning, some from a functional and others from a formal perspective. There are also computational approaches to linguistics with both applied and theoretical goals.

The major in Linguistics reflects the multidisciplinary character of the field and of the Linguistics faculty here at Carnegie Mellon, offering a program which provides students with the fundamental tools of linguistic analysis while maintaining a focus on the human context in which language is learned and used. The major is available as either a primary major or an additional major. It is an ideal choice for students with a general interest in their own or other languages, and combines well thematically with studies in any of the departments represented in the major.

Curriculum

The Linguistics primary major requires a total of 12 courses plus a senior thesis. The Linguistics additional major requires at total of 13 courses. This includes 2 semesters of language study for all majors. At least three courses (not including specific language courses) must be at the 300-level or higher. All courses counted towards the major must be taken for a letter grade and passed with a grade of ‘C’ or above. Students may double count any course for the major simultaneously with another major or minor.

Linguistics Core (36 units)

Complete the following requirements.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>80-180</td>
<td>Nature of Language</td>
<td>9</td>
</tr>
<tr>
<td>80-282</td>
<td>Phonetics and Phonology I</td>
<td>9</td>
</tr>
<tr>
<td>80-280</td>
<td>Linguistic Analysis</td>
<td>9</td>
</tr>
<tr>
<td>or 80-285</td>
<td>Natural Language Syntax</td>
<td>9</td>
</tr>
<tr>
<td>or 80-381</td>
<td>Meaning in Language</td>
<td>9</td>
</tr>
<tr>
<td>or 80-383</td>
<td>Language in Use</td>
<td>9</td>
</tr>
</tbody>
</table>

Extended Core (27 units)

Choose three courses (27 units) from Extended Core and/or additional courses from Linguistics Core.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>80-283</td>
<td>It Matters How You Say It</td>
<td>9</td>
</tr>
<tr>
<td>80-284</td>
<td>Invented Languages</td>
<td>9</td>
</tr>
<tr>
<td>80-286</td>
<td>Words and Word Formation: Introduction to Morphology</td>
<td>9</td>
</tr>
<tr>
<td>80-287</td>
<td>Language Variation and Change</td>
<td>9</td>
</tr>
<tr>
<td>80-288</td>
<td>Intonation: Transcription and Analysis</td>
<td>9</td>
</tr>
<tr>
<td>80-382</td>
<td>Phonetics and Phonology II</td>
<td>9</td>
</tr>
</tbody>
</table>

80-384 Linguistics of Turkic Languages 9
80-385 Linguistics of Germanic Languages 9
80-388 Linguistic Typology: Diversity and Universals 9

Electives

Primary majors choose three additional electives (27 or more units).

Additional majors choose four additional electives (36 or more units).

Primary majors see thesis requirement below.

These can be additional courses from the Core or Extended Core courses listed above, the electives list below, or any other course which is approved by the Director as a linguistics elective. Listed below are the additional electives taught on a regular basis. Additional appropriate courses are offered irregularly or on a one-off basis. The Director will provide students with a list of possible electives each semester, and will assist students in selecting electives which are consistent with their goals and interests.

Philosophy

80-380 Philosophy of Language 9
80-484 Language and Thought 9

English

76-318 Communicating in the Global Marketplace 9
76-325 Intertextuality 9
76-385 Introduction to Discourse Analysis 9
76-386 Language & Culture 9
76-389 Rhetorical Grammar 9

Modern Languages

82-283 Language Diversity & Cultural Identity 9
82-373 Structure of the Japanese Language 9
82-383 Second Language Acquisition: Theories and Research 9
82-585 Topics in Second Language Acquisition 9

Psychology

85-354 Infant Language Development 9
85-421 Language and Thought 9

Language Technologies Institute

11-411 Natural Language Processing 12
11-492 Speech Processing 12
11-661 Language and Statistics 12
11-722 Grammar Formalisms 12

Language and Thought

12-283 Linguistics of Germanic Languages 12
12-380 Linguistics of Turkic Languages 12
12-385 Linguistics of Germanic Languages 12
12-388 Linguistic Typology: Diversity and Universals 12
12-484 Language and Thought 9

Language Requirement

Students must successfully complete two semesters of consecutive language courses. (Note that students may not ‘test out’ of this requirement. However, language courses taken at other institutions or as part of a study abroad program will typically substitute for a semester of language study.)

Senior Thesis [primary majors only]

Primary majors must complete a senior thesis (a workload equivalent to a 12-unit course) during their senior year. Topics must be approved by an advisor, who will work with the student and guide the thesis project. Students are responsible for identifying their topic and securing their thesis advisor. Students should work with the director of the major to begin the process of identifying their thesis topic. Students must complete the senior year at the latest. Students will be required to submit a written proposal of their thesis project, signed by their thesis faculty advisor, before the end of the second week of classes in which the thesis is being completed.

Note

• All 11-xxx courses have significant Computer Science prerequisites. Interested students should check with the course instructor before registering.
The Major in Psychology and Biological Sciences

This unified major is intended to reflect the interdisciplinary nature of our current research in the fields of psychology and biology, as well as the national trend in some professions to seek individuals broadly trained in both the social and natural sciences. Students entering from the Dietrich College of Humanities and Social Sciences will earn a Bachelor of Science in Psychology and Biological Sciences. Students entering from the Mellon College of Sciences receive a Bachelor of Science in Biological Sciences and Psychology.

Pre-Major Requirements

The unified major specifies particular pre-major requirements in the areas of mathematical sciences and statistics, natural science, and computational reasoning. Particular courses are specified in these areas because they are prerequisites for courses required in the major and therefore they are the most efficient way to complete the general education requirements for either Dietrich College or SHS. All other general education categories can be filled in any way that satisfies the requirements of the student’s college or of the SHS program.

The major in Psychology and Biological Sciences is offered only as a B.S. degree. Full curriculum requirements can be viewed under the Department of Psychology (http://coursecatalog.web.cmu.edu/schools-colleges/dietrichcollegeofhumanitiesandsocialsciences/departmentofpsychology/#psybiotext) section of the Catalog.

Student-Defined Major Program

Joseph E. Devine, Director and Associate Dean for Undergraduate Studies
Location: Baker Hall 154F
jd0x@andrew.cmu.edu

For Dietrich College students whose educational goals cannot be as adequately served by the curricula of existing majors, the college offers the opportunity to self-define a major. The procedure for establishing such a major centers on a written proposal, submitted to the Dietrich College Dean's Office. This proposal consists of two parts:

Major Description and Rationale

A description of the components of the proposed program of study; a presentation of the objectives of the program of study, how it represents a coherent and (given available faculty, courses, and other resources) viable course of study, and the reason(s) why these objectives cannot be accomplished within one or more of the college's existing majors.

Curriculum

Presentation of a complete outline of all courses that will comprise the requirements for the major. These courses should be categorized in two ways: first, according to that component of the major program to which each belongs (e.g., mathematical prerequisites; research methods; theoretical perspectives; etc.); and second, a semester-by-semester outline that indicates when each course is to be taken (or, for any already taken, when taken and grade received). In addition to courses taken at Carnegie Mellon, the major's curriculum may include courses taken (or to be taken) at other schools, related projects or internships, or programs of study abroad. The minimum requirements for graduation is, as with all majors in the college, 360 units of credit and completion of the Dietrich College general education program.

Proposals and curricula are evaluated for clarity of focus, coherence and depth in related areas, and viability. Proposals should generally be developed no later than the sophomore year, and approved majors begin their program generally no later than the junior year.

The student-defined option is also possible to propose as an additional major or minor. These options extend to undergraduates from all Carnegie Mellon colleges.