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

Academic Advisor: Kathleen Conway
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The B.S. in Economics and Mathematical Sciences (http://coursecatalog.web.cmu.edu/dietrichcollegeofhumanitiesandsocialsciences/undergraduateeconomicsprogram/#bsineconomicsandmathematicalsciencescurriculum) 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 Statistics

Academic Advisor: Samantha Nielsen
Faculty Advisors: Rebecca Nugent and Edward Kennedy
Executive Director, Undergraduate Economics Program: Carol Goldburg
Associate Director, Undergraduate Economics Program: Kathleen Conway
Office: Baker Hall 132
Email: statadvising@stat.cmu.edu

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 three:

21-122	Integration and Approximation	10
21-127	Concepts of Mathematics	10
21-257	Models and Methods for Optimization	9

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 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)

Beginning*

Choose *one* of the following courses

36-200	Reasoning with Data	9
36-201	Statistical Reasoning and Practice	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

*Or extra data analysis course in Statistics

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 and Data Science **	9
36-208	Regression Analysis	9
36-309	Experimental Design for Behavioral and Social Sciences	9

*Or extra data analysis course in Statistics

**Must take prior to 36-401

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

Advanced
Choose *one* of the following courses:

36-303	Sampling, Survey and Society	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
36-490	Undergraduate Research	9

**Special Topics rotate and new ones are regularly added.

III. Disciplinary Core 126 units

1. Economics Core 45 units

73-230	Intermediate Microeconomics	9
73-240	Intermediate Macroeconomics	9
73-270	Strategic Professional Communication for Economists	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

and *both* of the following two courses:

36-401	Modern Regression *	9
36-402	Advanced Methods for Data Analysis	9

*In order to be a major in good standing, a grade of C or better is required in 36-225 (or equivalents), 36-226 or 36-326 and 36-401. Otherwise you will not be allowed to continue in the major.

#It is possible to substitute 36-217 or 21-325 for 36-225. (36-225 is the standard introduction to probability, 36-217 is tailored for engineers and computer scientists, and 21-325 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 advanced Statistics elective courses (numbered 36-303, 36-315, or 36-410 through 36-495).

Students pursuing a degree in Economics and Statistics also have the option of earning a concentration area by completing a set of interconnected electives. While a concentration area is not required for this degree, this is an additional option that allows students to pursue courses that are aligned with a particular career path. The two electives that are already required for this degree could count towards your concentration area, please make sure to consult an advisor when choosing these courses.

Total number of units for the major	**191-201 units**
Total number of units for the degree	**360 units**

Professional Development

Students are strongly encouraged to take advantage of professional development opportunities and/or coursework. One option is 73-210 Economics Colloquim 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 electives.

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 substitute 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).

Freshman		**Sophomore**	
Fall	**Spring**	**Fall**	**Spring**
21-120 Differential and Integral Calculus	36-202 Methods for Statistics and Data Science	21-122 Integration and Approximation **	21-240 Matrix Algebra with Applications
36-200 Reasoning with Data	21-256 Multivariate Analysis	36-225 Introduction to Probability Theory	36-226 Introduction to Statistical Inference
73-102 Principles of Microeconomics	73-103 Principles of Macroeconomics	73-230 Intermediate Microeconomics	73-240 Intermediate Macroeconomics
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Junior		**Senior**	
Fall	**Spring**	**Fall**	**Spring**
36-350 Statistical Computing	36-402 Advanced Methods for Data Analysis	Statistics Elective	Economics Elective
36-401 Modern Regression	73-270 Strategic Professional Communication for Economists	Economics Elective	Statistics Elective
73-374 Econometrics II	-----	-----	-----
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*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.

** Students can also take 21-127 or 21-257. Students should consult with their advisor.

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

Faculty Advisor: Professor Abigail E. Owen; aeowen@cmu.edu, Wean Hall 3709 Academic Advisor: Dr. Andrew Ramey; aramey@andrew.cmu.edu, Baker Hall 240, 412/268-2880

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:

		Units
21-111	Differential Calculus-(or equivalent)	10
36-201	Statistical Reasoning and Practice	9
36-202	Methods for Statistics and Data Science	9

Complete THREE of the following courses:

03-121	Modern Biology	9
03-124	Modern Biology Laboratory-(03-121 is corequisite)	9
03-125	Evolution	9
09-103	Atoms, Molecules and Chemical Change	9
09-105	Introduction to Modern Chemistry I	10
09-106	Modern Chemistry II	10

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

09-510	Chemistry and Sustainability	9
73-148	Environmental Economics	9
76-319	Environmental Rhetoric	9
79-374	American Environmental History: Critical Issues	9

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

12-100	Introduction to Civil and Environmental Engineering	12
19-101	Introduction to Engineering and Public Policy	12
19-424	Energy and the Environment	9
60-203	Concept Studio: EcoArt	10
76-395	Science Writing	9
79-372	Cities, Technology, and the Environment 79-372/90-765	6
80-348	Health Development and Human Rights	9
88-223	Decision Analysis	9
88-302	Behavioral Decision Making	9
88-412	Energy, Climate Change, and Economic Growth in the 21st Century	9
90-765	Cities, Technology and the Environment 79-372/90-765	6
90-798	Environmental Policy & Planning	12
90-808	Energy Policy	6

(90-xxx Heinz College courses open only to seniors)

Research and Analytical Methods: Complete TWO of the following courses (18 units)

		Units
36-309	Experimental Design for Behavioral and Social Sciences	9
79-380	Ethnographic Methods	9
79-381	Energy and Empire: How Fossil Fuels Changed the World	9
88-220	Policy Analysis I	9
88-251	Empirical Research Methods	9
88-252	Causal Inference in the Field: Using Data to Study Crime, Love, Sports & More	9

Project Course: Complete ONE of the following courses (12 units)

19-451	EPP Projects (pre-approved topics)	12
19-452	EPP Projects (pre-approved topics)	12

The Major in Ethics, History, and Public Policy

Alex John London, Director
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http://www.cmu.edu/dietrich/ehpp/

The B.A./B.S. in Ethics, History, and Public Policy is an interdepartmental major offered jointly by the Departments of History and Philosophy. It prepares students for leadership positions by providing them with a rigorous, interdisciplinary humanistic and social-scientific education. It also serves as an excellent springboard for graduate study in a wide variety of disciplines such as law, public policy, ethics, and advocacy. The program focuses equally on the historical understanding of how modern-day problems have evolved, and the importance of developing clear criteria for ethical decision-making. The capstone project course provides students with the opportunity to engage with real-world public policy challenges using the methods, theories, and knowledge that they have gained through the major. Offered jointly by the departments of History and Philosophy, the B.A./B.S. in EHPP encourages specialization, internship experiences, and research in a wide range of policy areas.

Curriculum

Students graduating with a primary major in Ethics, History, and Public Policy may elect to receive either a Bachelor of Arts or a Bachelor of Science Degree (additional requirements apply; see below). Basic requirements include 120 units encompassing 9 units in Economics, 36 units in History, 36 units in Philosophy, 27 units of elective courses, and a 12-unit senior capstone course. This program may also be taken as an additional (e.g., second) major. All courses toward the major must be taken for a letter grade, and 79-200 and 79-300 must be passed with a grade of "C" or better. Students can double count any course for the major with another major or minor, with the exception of Social and Political History, for which a student can double count a maximum of two courses.

I. Economics Requirement 9 units

73-102	Principles of Microeconomics	9

II. History Core 36 units

Choose one 9-unit course from each category below:

Policy History (9 units)

79-300	History of American Public Policy	9

U.S. History (9 units)

79-240	Development of American Culture	9
79-249	20th/21st Century U.S. History	9

Non-U.S. History (9 units)

79-202	Flesh and Spirit: Early Modern Europe, 1400-1750	9
79-203	Social and Political Change in 20th Century Central and Eastern Europe	9
79-205	20th/21st Century Europe	9
79-207	Development of European Culture	9
79-222	Between Revolutions: The Development of Modern Latin America	9
79-223	Mexico: From the Aztec Empire to the Drug War	9
79-226	African History: Earliest Times to 1780	9
79-227	African History: Height of Trans-Atlantic Slave Trade to the End of Apartheid	9
79-229	Origins of the Arab-Israeli Conflict, 1880-1948	9
79-230	Arab-Israeli Conflict and Peace Process since 1948	9
79-237	Comparative Slavery	9

79-251	India/America: Democracy, Diversity, Development	9
79-261	The Last Emperors: Chinese History and Society, 1600-1900	9
79-262	Modern China: From the Birth of Mao ... to Now	9
79-264	Tibet and China: History and Propaganda	6
79-265	Russian History: From the First to the Last Tsar	9
79-266	Russian History: From Communism to Capitalism	9
79-307	Religion and Politics in the Middle East	9

Historical Methods and Approaches (9 units)

79-200	Introduction to Historical Research & Writing	9

III. Philosophy Core 36 units

Choose one 9-unit course from each category below. No more than 9 units at the 100 level may be counted toward this requirement.

Ethics (9 units)

80-130	Introduction to Ethics	9
80-230	Ethical Theory	9

Political Philosophy (9 units)

80-135	Introduction to Political Philosophy	9
80-334	Social and Political Philosophy	9

Foundations of Social Science (9 units)

80-221	Philosophy of Social Science	9
80-321	Causation, Law, and Social Policy	9
80-324	Philosophy of Economics	9
80-337	Philosophy, Politics & Economics	9

Applied Philosophy (9 units)

80-136	Social Structure, Public Policy & Ethics	9
80-244	Environmental Ethics	9
80-245	Medical Ethics	9
80-247	Ethics and Global Economics	9
80-335	Deliberative Democracy: Theory and Practice	9
80-348	Health Development and Human Rights	9
80-447	Global Justice	9

IV. Senior Capstone Project Course 12 units

79-449	EHPP Project Course [cross-listed]	12
80-449	EHPP Project Course	12

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 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 prerequisities; see Economics catalog listing)

73-148	Environmental Economics	9
73-352	Public Economics	9
73-358	Economics of the Environment and Natural Resources	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.

79-217	The War in Vietnam	6
79-221	Development and Democracy in Latin America	9
79-231	American Foreign Policy: 1945-Present	9
79-233	The United States and the Middle East since 1945	9
79-242	African American History: Reconstruction to the Present	9
79-250	Running for President: Campaigns & Elections in History of American Presidency	9
79-253	American Massacres in History and Memory	6
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	Mobile Phones & Social Media in Development & Human Rights: A Critical Appraisal	6
79-299	From Newton to the Nuclear Bomb: History of Science, 1750-1950	9
79-301	History of Surveillance: From the Plantation to Edward Snowden	6
79-302	Drone Warfare and Killer Robots: Ethics, Law, Politics, and Strategy	9
79-303	Pittsburgh and the Transformation of Modern Urban America	6
79-305	Moneyball Nation: Data in American Life	9
79-310	Modern U. S. Business History: 1870 to the Present	9
79-315	The Politics of Water: Global Controversies, Past and Present	9
79-320	Women, Politics, and Protest	9
79-325	U.S. Gay and Lesbian History	6
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 and Film (1920 to "The Wire")	9
79-340	Juvenile Delinquency and Juvenile Justice	9
79-342	Introduction to Science and Technology Studies	9
79-349	The Holocaust in Historical Perspective	9
79-370	Disasters in American History (2):Epidemics & Fires	6
79-371	African American Urban History	9
79-374	American Environmental History: Critical Issues	9
79-381	Energy and Empire: How Fossil Fuels Changed the World	9
79-389	Stalin and Stalinism	9

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	Choices, Decisions, and Games	9
80-405	Game Theory	9

Institute for Politics and Strategy

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

Social and Decision Sciences

88-223	Decision Analysis	9
88-281	Topics in Law: 1st Amendment	9
88-345	Perspectives on Industrial Research and Development	9
88-371	Entrepreneurship, Regulation and Technological Change	9
88-387	Social Norms and Economics	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 and Data Science	9
or 36-208	Regression Analysis	
or 70-208	Regression Analysis	
36-207	Probability and Statistics for Business Applications	9
36-303	Sampling, Survey and Society	9
36-309	Experimental Design for Behavioral and Social Sciences	9
80-305	Choices, Decisions, and Games	9
84-265	Political Science Research Methods	9
88-251	Empirical Research Methods	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

Junior Year		Senior Year	
Fall	**Spring**	**Fall**	**Spring**
Core requirement in Economics	Core requirement in History or Philosophy	Capstone Course	EHPP Elective Course
Core requirement in History or Philosophy	Core requirement in History or Philosophy	EHPP Elective Course	Second Course (open)
Core requirement in History or Philosophy	Core requirement in History or Philosophy	EHPP Elective Course	Third Course (open)
Core requirement in History or Philosophy	Core requirement in History or Philosophy	Fourth Course (open)	Fourth Course (open)
Core requirement in History or Philosophy	Fifth Course (open)	Fifth Course (open)	Fifth Course (open)

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

Faculty Program Director: Randy S. Weinberg
Office: Porter Hall 224C, rweinberg@cmu.edu
Program Advisor: Carol Young
Office: Porter Hall 222F, caroly@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://coursecatalog.web.cmu.edu/dietrichcollegeofhumanitiesandsocialsciences/informationsystems).

The Major in Linguistics

Tom Werner, Director
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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 major requires a total of 12 courses, which includes 2 semesters of language study. In addition, primary majors in Linguistics are required to write a Senior Thesis in their final year. 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.

Introductory course

80-180	Nature of Language	9

Fundamental Skills

Take **one** course from **each** of the following core subject areas:

Sounds

80-282	Phonetics and Phonology I	9

Structure

80-280	Linguistic Analysis	9
80-285	Natural Language Syntax	9

Meaning

80-381	Meaning in Language	9
80-383	Language in Use	9
76-385	Introduction to Discourse Analysis	9
or 76-484	Discourse Analysis	

Breadth

Take **one** course from **each** of the following breadth subject areas:

Area 1: Language Learning and Language Cognition

76-420	The Cognition of Reading and Writing: Introduction to a Social/Cognitive Process	9
80-281	Language and Thought	9
82-280	Learning About Language Learning	9
82-383	Second Language Acquisition: Theories and Research	9
82-388	Understanding Second Language Fluency	9

82-585	Topics in Second Language Acquisition	9
85-354	Infant Language Development	9
85-421	Language and Thought	9

Area 2: Discourse, Society and Culture

76-385	Introduction to Discourse Analysis	9
or 76-484	Discourse Analysis	
76-386	Language & Culture	9
80-283	Syntax and Discourse	9
82-273	Introduction to Japanese Language and Culture	9
82-283	Language Diversity & Cultural Identity	9
82-333	Introduction to Chinese Language and Culture	Var.
80-383	Language in Use	9
82-388	Understanding Second Language Fluency	9

Electives

Take **four** additional electives. These can be **additional courses from the Fundamental Skills courses or Breadth courses listed above**, 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.

76-378	Literacy: Educational Theory and Community Practice	9
76-451	Language and Globalization	9
80-284	Invented Languages	9
80-286	Words and Word Formation: Introduction to Morphology	9
80-287	Historical and Comparative Linguistics	9
80-380	Philosophy of Language	9
80-382	Phonetics and Phonology II	9
80-384	Linguistics of Turkic Languages	9
80-385	Linguistics of Germanic Languages	9
82-373	Structure of the Japanese Language	9
11-411	Natural Language Processing	12
11-492	Speech Processing	12
11-716	Graduate Seminar on Dialog Processing	6
11-721	Grammars and Lexicons	12
11-722	Grammar Formalisms	12
11-761	Language and Statistics	12
11-762	Language and Statistics II	12

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.

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. Students entering from the Science and Humanities Scholars (SHS) program can complete the SHS educational core and choose either departmental order for their diploma.

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/dietrichcollegeofhumanitiesandsocialsciences/departmentofpsychology/#psybiotext) section of the Catalog.

Student-Defined Major Program

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http://www.hss.cmu.edu/studentdefinedmajor.html

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.

The 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.