Mission Statement

The BXA Intercollege Degree Programs are designed for students who want to turn talent and passion into viable professions for the future through a challenging academic regimen. BXA students pursue their goals with the help of multifaceted advising, innovative pedagogical strategies, and a focus on the impact arts have on technology and vice versa.

The goal of the Bachelor of Humanities and Arts (BHA), the Bachelor of Science and Arts (BSA), and the Bachelor of Computer Science and Arts (BCSA) BXA Intercollege Degree Programs is to allow a select group of students who demonstrate interest and accomplishment in the fine arts and the humanities, social sciences, natural sciences, computer science, and emerging media to explore beyond the traditional academic major, or integrate more than one field of study across disciplines. These programs foster the creativity of students who explore innovative approaches to the academic environments of two colleges. By merging the components in the arts and humanities, natural sciences, or computer science into an interdisciplinary/multidisciplinary study, a unique, complex product is born. BXA students produce new information, challenging questions, and innovative theory. BXA students are models of independence, motivation, and well-rounded scholarship as humanists, scientists, and artists at the same time.

In the context of the Carnegie Mellon University environment, the BXA Intercollege Degree Programs hold a special role. BXA provides access to four strong colleges that offer specialized training with expert faculty and researchers. The BXA Programs challenge students to utilize those resources as they explore and develop their own approach to interdisciplinary studies in the fine arts and the humanities and social sciences, the natural and mathematical sciences, or computer science. BXA students balance courses in their CFA concentration with courses in their academic concentration, as well as BXA-specific courses. These BXA-specific courses give students the opportunity to integrate their areas of concentration by focusing on interdisciplinary approaches and arts-based research techniques. The curricula in the concentration areas provide students with a solid disciplinary foundation upon which they can draw for interdisciplinary projects.

A BXA Intercollege degree prepares students for graduate study and careers in an enormous variety of fields, including traditional graduate training in the arts as well as academic areas, positions in arts and education nonprofits such as museums and foundations, and technical positions with media and technology companies.

Program Objectives

The skills developed by BXA students span the creative, the technical, the academic, and the practical. The objective of the BXA Intercollege Program is to prepare graduates for careers in which they will draw on their creative and academic skills to create, educate, communicate, and innovate across disciplines.

Students who complete the BXA curriculum will graduate with the following skills:

- Foundational knowledge and technical expertise in the CFA concentration area and the DC/MCS/SCS concentration area
- Ability to describe the connections between these concentrations and how the student integrates them
- Knowledge of how the concentration disciplines intersect with history, society, and culture from local and global perspectives
- Ability to use cognitive, behavioral, and ethical dimensions within the concentration disciplines to make decisions on individual and social levels
- Experience in engaging in art research to produce new knowledge both within the CFA concentration and the DC/MCS/SCS concentration
- Experience in designing, researching, and completing a large-scale, object-based project that integrates both areas of concentration

Bachelor of Humanities and Arts Degree Program

Carnegie Mellon University offers an intercollege degree that combines the strengths of the College of Fine Arts (CFA) and the College of Dietrich College of Humanities and Social Sciences (DC). The intercollege degree, called the Bachelor of Humanities and Arts (BHA), offers depth of study in both the fine arts and the humanities, social and behavioral sciences. The BHA Degree Program enables a student to receive broader exposure to the humanities and liberal arts than is generally possible through a Bachelor of Fine Arts degree in CFA, while obtaining deeper and more substantial training in the fine arts than is generally possible through a Bachelor of Arts or Bachelor of Science degree in DC. Students receive extensive training in one or more of the fine arts disciplines as well as related advanced training in areas such as writing, social sciences, behavioral sciences, or cultural studies. The program also provides enough flexibility to allow students to explore other areas of interest. The most important aspect of the BHA Program is for students to blend their interests, and to explore the connections between their chosen disciplines.

The BHA curriculum is divided into three parts: 1) BHA General Education coursework, 2) CFA concentration coursework, and 3) DC concentration coursework.

Students choose their fine arts concentration from among the five schools in CFA: Architecture, Art, Design, Drama, or Music. A student must meet the entry requirements for the particular CFA school of their choice. While in the BHA Program, a student may change their CFA concentration only if they pass all admission requirements for that particular school.

Students choose their humanities or social/behavioral sciences concentration from the list of majors and minors offered by DC.

The BHA Degree Program is governed by faculty and administrators from both colleges and led by the director of the BXA Intercollege Degree Programs. The director and associate director of the BXA Intercollege Degree Programs are the primary advisors and liaisons between CFA and DC. Students receive extensive advising support. Each student has two additional academic advisors: an advisor in the admitting school of CFA for their fine arts concentration, and an advisor in DC for their humanities/socail sciences concentration. This network of advisors guides each student through their curriculum.

Masters of Arts Management (MAM) Option

BHA students who have an interest in arts management and wish to go on for an advanced degree may select courses in their sophomore and junior years to prepare them for this area. A student in the junior year may apply to the Accelerated Master’s Program with the School of Public Policy & Management at Heinz College. In this program students take both graduate and undergraduate courses in the senior year, earn the BHA degree, and continue on for an additional year to complete the work for the Masters of Arts Management (MAM) degree.

BHA Curriculum

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I. BHA General Education

(14 courses, 111 units minimum)

- Communicating: Language and Interpretations (3 courses, 27 units minimum, 76-101 required, two approved modern language courses required)
- Reflecting: Societies and Cultures (1 course, 9 units, 79-104 required)
- Modeling: Mathematics and Experiments (1 course, 9 units minimum)
• Deciding: Social Sciences and Values (3 courses, 27 units minimum, 36-200 or 36-201 required)
• Computing @ Carnegie Mellon (1 course, 3 units, 99-101 or 99-102 required)
• BXA Required Courses (5 courses, 36 units minimum, 52-190 or 52-291, 52-391, 52-392, 52-401, 52-402)

Communicating: Language and Interpretations (3 courses, 27 units minimum)

Courses in this category give special attention to the study of language as interpretation, expression and argument within and across multiple discourses. Students examine language for its internal logics and structures.

76-101 Interpretation and Argument 9
(various topics by section) www.cmu.edu/hss/english/first_year/index.html
82-xxx Modern Languages 18

Complete two courses taught in a language offered by the Modern Language Department. A wide selection of courses are offered in Arabic, Chinese Studies, European Studies, French and Francophone Studies, German Studies, Hispanic Studies, Italian, Japanese Studies, Russian Studies, and Spanish. Students must complete two courses in the same language. Languages taught at other institutions are also acceptable (with advisor approval).

Reflecting: Societies and Cultures (1 course, 9 units)

This category emphasizes the study of history, society, and culture from local and global perspectives.

79-104 Global Histories 9
(various topics by section) http://www.history.cmu.edu/undergraduate/fall.html

Modeling: Mathematics and Experiments (1 course, 9 units minimum)

Courses in this category stress the interplay of mathematical (formal) theories and experimental work. Some courses investigate the internal structure of theories, whereas others use them as models for producing real-world knowledge. Such models may be drawn from a variety of disciplines including the natural sciences, but also, for example, psychology and computer science. The interactions between theorizing and experimenting (observing) can be understood within an intellectual framework that invites comparative assessment. Select one course from the following course options:

Mathematics
21-111 Differential Calculus 10
21-120 Differential and Integral Calculus 10
21-127 Concepts of Mathematics 10
21-241 Matrices and Linear Transformations 10
80-110 Nature of Mathematical Reasoning 9
80-210 Logic and Proofs 9
80-211 Logic and Mathematical Inquiry 9
80-212 Arguments and Logical Analysis 9

Natural Science
02-223 Personalized Medicine: Understanding Your Own Genome 9
02-261 Quantitative Cell and Molecular Biology Laboratory 9
03-121 Modern Biology 9
03-125 Evolution 9
03-132 Basic Science to Modern Medicine 9
03-161 Molecules to Mind 9
09-103 Atoms, Molecules and Chemical Change 9
09-105 Introduction to Modern Chemistry I 10
12-201 Geology 9
33-104 Experimental Physics 9
33-111 Physics for Science Students 12
33-114 Physics of Musical Sound 9
33-115 Physics for Future Presidents 9
33-124 Introduction to Astronomy 9

Other Courses
02-223 Personalized Medicine: Understanding Your Own Genome 9
05-413 Human Factors 9
15-104 Introduction to Computing for Creative Practice 10
15-110 Principles of Computing 10
15-112 Fundamentals of Programming and Computer Science 12
18-090 Twisted Signals: Multimedia Processing for the Arts 10
33-120 Science and Science Fiction 9
36-202 Methods for Statistics and Data Science 9
80-220 Philosophy of Science 9
80-222 Measurement and Methodology 9
80-223 Causality and Probability 9
80-226 Revolutions in Science 9
80-322 Philosophy of Physics 9
80-323 Philosophy of Biology 9
80-327 Philosophy of Neuroscience 9
85-370 Perception 9
99-238 Materials, Energy and Environment 9

Deciding: Social Sciences and Values (3 courses, 27 units minimum)

The theme of this category is the exploration of cognitive, behavioral and ethical dimensions of decision-making on both the individual and social level. Making decisions requires a broad understanding of human rationality and social interaction. Some courses examine the critical collection and analysis of data for achieving such an understanding, whereas others emphasize the historical development of policies and values, which form the matrix for decision-making.

36-200 Reasoning with Data -REQUIRED 9
or 36-201 Statistical Reasoning and Practice 9
73-102 Principles of Microeconomics 9
73-103 Principles of Macroeconomics 9
79-342 Introduction to Science and Technology Studies 9
80-130 Introduction to Ethics 9
80-136 Social Structure, Public Policy & Ethics 9
80-208 Critical Thinking 9
80-221 Philosophy of Social Science 9
80-230 Ethical Theory 9
80-242 Conflict and Dispute Resolution 9
80-244 Environmental Ethics 9
80-245 Medical Ethics 9
80-248 Engineering Ethics 9
80-270 Philosophy of Mind 9
80-271 Philosophy and Psychology 9
80-305 Choices, Decisions, and Games 9
80-324 Philosophy of Economics 9
80-335 Deliberative Democracy: Theory and Practice 9
80-336 Philosophy of Law 9
80-348 Health Development and Human Rights 9
80-405 Game Theory 9
80-430 Ethics and Medical Research 9
80-447 Global Justice 9
84-104 Decision Processes in American Political Institutions 9
84-309 Political Behavior 9
84-310 International Political Economy and Organizations 9
84-319 U.S. Foreign Policy and Interventions in World Affairs 9
84-320 Domestic Politics and International Affairs 9
84-321 Autocrats and Democrats 9
84-322 Nonviolent Conflict and Revolution 9
84-333 Power and Levers for Change in Washington, DC 12
84-336 Implementing Public Policy: From Good Idea To Reality 12
84-346 Legal Issues in Public Administration 6
84-348 Advocacy, Policy and Practice 6
84-362 Diplomacy and Statecraft 9
84-366 Presidential Politics: So, You Want to Be President of the United States 9
84-380 Grand Strategy in the United States 9
84-386 The Privatization of Force 9
84-388 Concepts of War and Cyber War 6
84-389 Terrorism and Insurgency 9
84-402 Judicial Politics and Behavior 9
84-414 International and Subnational Security 9
85-102 Introduction to Psychology 9
85-211 Cognitive Psychology 9
85-219 Biological Foundations of Behavior 9
85-221 Principles of Child Development 9
85-241 Social Psychology 9
85-251 Personality 9
85-261 Abnormal Psychology 9
85-395 Applications of Cognitive Science 9
88-120 Reason, Passion and Cognition 9

Computing @ Carnegie Mellon (1 course, 3 units)
This is a mini-course, pass/no pass, to be completed in the first semester.
99-101 Computing @ Carnegie Mellon 3
or 99-102 Computing @ Carnegie Mellon

BXA Required Courses (5 courses, 36 units minimum)
BXA-specific courses give students the opportunity to integrate their areas of concentration by focusing on interdisciplinary approaches and arts-based research techniques.
52-190 BXA Seminar I: Building the Wunderkammer 9
or 52-291 BXA Seminar II: Transferring Knowledge 0
52-391 BXA Junior Portfolio 0
52-392 BXA Seminar III: Deconstructing Disciplines 9
52-401 BXA Seminar IV: Capstone Fall 9
52-402 BXA Seminar V: Capstone Spring 9

II. Dietrich College of Humanities and Social Sciences Concentration
(9 courses, 81 units minimum)
Each student meets individually with a BHA DC Academic Advisor to design an 81 unit DC concentration based on existing DC majors/minors. Please refer to the DC section of this catalog to review the individual majors and minors offered. Curriculum for several BHA DC concentration options are outlined below and others will be made available in the BHA office throughout the academic year.
A completed DC Concentration Sheet must be approved by the concentration faculty advisor and submitted to the BHA office by the end of the student’s sophomore year.

Anthropology Concentration (81 units minimum)
The BHA concentration in Anthropology offers students training in ethnographic methods and in theoretical understandings of culture. Students examine the evolution, depth, and complexities of ethnography, and explore notions of “culture” in diverse settings, over time and across space. In today’s world, students are increasingly aware of the importance of developing a sophisticated approach to culture and its articulation with changes in the domains of the arts, technology, economics, and politics. The BHA concentration in Anthropology provides students with the tools to link artistic practices to various aspects of globalization. It is highly recommended that Anthropology students study abroad in some capacity. There are three required courses for the concentration: Introduction to Anthropology (79-201) and Advanced Seminar in Global Studies (79-400), and one Methods course which may be satisfied by rotating options each semester. Students also choose 6 regional/topical courses (51 units). Demonstrating intermediate to advanced level proficiency in a language other than English is also crucial component of the concentration in Anthropology; all students are required to take at least two upper level (intermediate or above) language courses to satisfy this language pre-
requisite requirement (which is in addition to required concentration courses).

Language Requirement
Every student is expected to take at least two upper level (intermediate or above) courses in a language other than English. These courses deepen the immersion in a culture or society that the Anthropology concentration provides a student, and when possible, should coordinate with the regional courses selected for the concentration.

Anthropology Required Introductory and Capstone Courses (2 courses, 21 units)
Students must earn a final grade of “C” or better for these courses to count toward the concentration.
79-201 Introduction to Anthropology 9
79-400 Global Studies Research Seminar 12

Required Anthropological Methods Course (1 course, 9 units minimum)
Students must take one course in ethnographic, archaeological, or other anthropological methods. Courses may also be taken as independent studies or from another university.
79-xxx See advisor for current course list 9

Anthropological Perspectives (6 courses, 51 units minimum)
Students gain knowledge of specialized theoretical and regional topics by choosing 51 units (typically six courses) selecting from the list below.
79-203 Social and Political Change in 20th Century Central and Eastern Europe 9
79-211 Introduction to Southeast Asia 9
79-221 Development and Democracy in Latin America 9
79-222 Between Revolutions: The Development of Modern Latin America 9
79-223 Mexico: From the Aztec Empire to the Drug War 9
79-224 Mayan America 9
79-235 Caribbean Cultures 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
79-275 Introduction to Global Studies 9
79-276 Beyond the Border 6
79-287 The Mummy's Curse: Uses and Abuses of Archaeology 6
79-295 Race Relations in the Atlantic World 9
79-311 PaleoKitchen: Food and Cooking in the Ancient World 6
79-314 The Politics and Culture of Memory 9
79-315 The Politics of Water: Global Controversies, Past and Present 9
79-317 Art, Anthropology, and Empire 9
79-332 Medical Anthropology 9
79-333 Sex, Gender & Anthropology 9
79-342 Introduction to Science and Technology Studies 9

Note: Courses that count toward this category may be taken at another university, and the units transferred to the BHA concentration under the guidance of the BHA Anthropology faculty advisor.

Behavioral Economics, Policy & Organizations Concentration (81 units minimum)
Students in BEPO—the first and only major of its kind—will be uniquely trained in the integration of Economics and Psychology and will have a solid grounding in quantitative methods. The core includes courses in economics, psychology, behavioral economics, and quantitative methods. SDS offers the largest selection of behavioral economics courses anywhere in the world. Applied projects in courses will teach students how to collect original data, design field and laboratory experiments, analyze data, and develop interventions to improve economic outcomes and decisions. Students will be well equipped to enter a wide range of professions and graduate degree programs.
Quantitative Methods (3 courses, 27 units)
- 36-202 Methods for Statistics and Data Science 9
- 88-251 Empirical Research Methods 9

Economics Courses (2 courses, 18 units)
- 73-102 Principles of Microeconomics 9
- 73-160 Foundations of Microeconomics: Applications and Theory 9

Psychology Courses (2 courses, 18 units)
- 88-120 Reason, Passion and Cognition 9
- 88-302 Behavioral Decision Making 9

Behavioral Economics Courses (2 courses, 18 units)
- 88-360 Behavioral Economics 9
- 88-367 Behavioral Economics in the Wild 9

Cognitive Neuroscience Concentration (81 units minimum)

Cognitive neuroscience is a science concerned with discovering biological bases of psychological functions. It addresses questions of how behavior is produced by neural circuits of the brain and also how those neural circuits are in turn influenced by behavioral experiences. Students in a concentration in Cognitive Neuroscience are expected to learn about existing findings within the field and also to become proficient in how to conduct and analyze scientific investigations directed toward understanding the biological basis of behavior. This includes observing behavior, formulating hypotheses, designing experiments to test these hypotheses, running experiments, performing statistical analyses, and writing reports.

Introductory and Survey Coursework (36 units)
- 03-121 Modern Biology 9
- 03-363 Systems Neuroscience 9
- 85-219 Biological Foundations of Behavior 9
- 85-211 Cognitive Psychology 9
  or 85-213 Human Information Processing and Artificial Intelligence 9

Research Methods Training (18 units)
- 36-309 Experimental Design for Behavioral and Social Sciences 9
- 85-314 Cognitive Neuroscience Research Methods * 9
  * 85-310 Research Methods in Cognitive Psychology may be substituted if necessary.

Distribution Requirements (27 units)
Complete three courses with at least one from each category below.

Approaches to Cognitive Neuroscience:
- 15-386 Neural Computation 9
- 15-883 Computational Models of Neural Systems 9
- 36-746 Statistical Methods for Neuroscience and Psychology 9
- 85-345 Meaning in Mind and Brain 9
- 85-412 Cognitive Modeling 9
- 85-414 Cognitive Neuropsychology 9
- 85-419 Introduction to Parallel Distributed Processing 9
- 85-429 Cognitive Brain Imaging 9

Cognitive Neuroscience Electives:
- 03-133 Neurobiology of Disease 9
- 03-362 Cellular Neuroscience 9
- 03-364 Developmental Neuroscience 9
- 85-370 Perception 9
- 85-385 Auditory Perception: Sense of Sound 9
- 85-390 Human Memory 9
- 85-406 Autism: Psychological and Neuroscience Perspectives 9
- 85-426 Learning in Humans and Machines 9
- 85-442 Health Psychology 9
- 85-501 Stress, Coping and Well-Being 9

Cognitive Science Concentration (81 units minimum)
The field of cognitive science has grown out of increasingly active interaction among psychology, linguistics, artificial intelligence, philosophy, and neuroscience. All of these fields share the goal of understanding intelligence. By combining these diverse perspectives, students of cognitive science are able to understand cognition at a deep level. Because this concentration is administered by the Psychology Department, it focuses on human cognition and the experimental study of the human mind as illuminated by the techniques of the above disciplines.

Pre-requisite Courses
- 15-112 Fundamentals of Programming and Computer Science 12
- 21-120 & 21-122 or 21-120 & 21-256 & 21-127 19-20
  - Differential and Integral Calculus: Integration and Approximation
  - Differential and Integral Calculus
  - Concepts of Mathematics

Statistics Course (9 units)
- 36-309 Experimental Design for Behavioral and Social Sciences 9

Computational/Cognitive Modeling Core (29 units minimum)
Complete two of the following courses:
- 15-122 Principles of Imperative Computation 10
- 15-150 Principles of Functional Programming 10
- 15-251 Great Ideas in Theoretical Computer Science 12

Plus one of the following courses:
- 85-412 Cognitive Modeling 9
- 85-419 Introduction to Parallel Distributed Processing 9
- 85-426 Learning in Humans and Machines 9

Cognitive Psychology Core (36 units)
- 85-211 Cognitive Psychology 9
  or 85-213 Human Information Processing and Artificial Intelligence 9
- 85-310 Research Methods in Cognitive Psychology 9

Plus two of the following (one of which must be 85-3xx or 85-4xx):
- 85-219 Biological Foundations of Behavior 9
- 85-370 Perception 9
- 85-390 Human Memory 9
- 85-395 Applications of Cognitive Science 9
- 85-408 Visual Cognition 9
- 85-414 Cognitive Neuropsychology 9
- 80-310 Formal Logic 9
- 80-314 Logic and Artificial Intelligence 9
- 80-315 Modal Logic 9
- 80-316 Causation Probability & AI 9
- 80-381 Meaning in Language 9
- 80-383 Language in Use 9

Cognitive Science Elective (9 units)
Choose one elective in consultation with your Cognitive Science Advisor.

Creative Writing Concentration (81 units minimum)
In the Creative Writing concentration, BHA students develop their talents in writing fiction, poetry, and other imaginative forms. While studying with faculty members who are practicing poets and prose writers, students read widely in literature, explore the resources of their imaginations, sharpen their critical and verbal skills, and develop a professional attitude toward their writing. The Creative Writing program is based on a conservatory...
model, made up of faculty and students who have an intense commitment to their work.

Students in the Creative Writing concentration are required to take two of the introductory Survey of Forms courses, ideally in their sophomore year. Choices include Poetry (76-265), Fiction (76-260), Screenwriting (76-269), and Nonfiction (76-261). In order to proceed into the upper level courses in the major (and in each of the genres), students must do well in these introductory courses (receive a grade of A or B). After completing the Survey of Forms courses, students take four workshops in fiction, poetry, screenwriting, or nonfiction. At least two of the workshops must be taken in a single genre. In the writing workshops, students develop their critical and verbal abilities through close writing and analysis of poems, stories, and other literary forms. Their work is critiqued and evaluated by peers and the faculty.

Survey of Forms Courses (2 courses, 18 units)

76-260 Survey of Forms: Fiction 9
76-261 Survey of Forms: Creative Nonfiction 9
76-265 Survey of Forms: Poetry 9
76-269 Survey of Forms: Screenwriting 9

Note: A student must receive a grade of A or B in the Survey of Forms class in a specific genre in order to be eligible to enroll in a workshop of that genre. A student who receives a grade of C in a Survey of Forms course may enroll in a related workshop only with the permission of the workshop professor. A student who receives a D or F in Survey of Forms may not take a workshop in that genre.

Creative Writing Workshops (4 courses, 36 units)

Complete four Creative Writing workshops, at least two in a single genre. Workshops in all genres may be taken more than once for credit.

76-365 Beginning Poetry Workshop 9
76-366 Essay Writing Workshop 9
76-460 Beginning Fiction Workshop 9
76-462 Advanced Fiction Workshop 9
76-464 Creative Nonfiction Workshop 9
76-465 Advanced Poetry Workshop 9
76-469 Screenwriting Workshop 9
76-4xx Elective Workshops (various forms) 9

English Electives (3 courses, 27 units)

Complete three courses from the English Department’s offerings. Reading in Forms classes are recommended, as is 76-306 Editing and Publishing. Please consult the list of courses published each semester by the Department for current offerings. Students should discuss curriculum choices with the Creative Writing advisor to determine the best electives for their focus in Creative Writing.

Decision Science Concentration (81 units minimum)

Decision Science is grounded in theories and methods drawn from psychology, economics, philosophy, statistics, and management science. Courses in the BHA concentration in Decision Science cover the three aspects of decision science: (a) normative analysis, creating formal models of rational choice; (b) descriptive research, studying how cognitive, emotional, social, and institutional factors affect judgment and choice; and (c) prescriptive interventions, seeking to improve judgment and decision making. In addition to gaining a broad education in the principles of judgment and decision making, students with a concentration in Decision Science gain broadly applicable skills in research design and analysis. They also have the chance to think about and discuss decision making in many different areas.

Disciplinary Perspectives (5 courses, 45 units)

73-102 Principles of Microeconomics 9
85-211 Cognitive Psychology 9
88-120 Reason, Passion and Cognition (freshman or sophomore year) 9
88-223 Decision Analysis 9
88-302 Behavioral Decision Making 9

Research Methods (2 courses, 18 units)

36-202 Methods for Statistics and Data Science 9
88-251 Empirical Research Methods 9

Electives (2 courses, 18 units)

Complete at least 18 units from the following categories of courses. The selected courses may be from one category or from any combination of categories. Note that not all elective courses are offered every year. At least one of these courses (9 units) must be a Department of Social and Decision Sciences course (88-xxx).

Biological and Behavioral Aspects of Decision Making:

85-352 Evolutionary Psychology 9
85-377 Attitudes and Persuasion 9
85-442 Health Psychology 9
88-230 Human Intelligence and Human Stupidity 9
88-342 The Neuroscience of Decision Making 9
88-360 Behavioral Economics 9
88-365 Behavioral Economics and Public Policy 9
88-380 Dynamic Decisions 9

Managerial and Organizational Aspects of Decision Making:

70-311 Organizational Behavior 9
70-381 Marketing I 9
70-460 Mathematical Models for Consulting 9
88-150 Managing Decisions 9
88-221 Analytical Foundations of Public Policy 9
88-406 Behavioral Economics in Organizations 9
88-418 Domestic Negotiation 9
88-419 International Negotiation 9
88-444 Public Policy and Regulation 9
88-451/452 Policy Analysis Senior Project 12

Philosophical and Ethical Perspectives on Decision Making:

80-208 Critical Thinking 9
80-221 Philosophy of Social Science 9
80-244 Environmental Ethics 9
80-245 Medical Ethics 9
80-305 Choices, Decisions, and Games 9
80-321 Causation, Law, and Social Policy 9
88-275 Bubbles: Big Data for Human Minds 9
88-409 Behavioral Economics Perspectives on Ethical Issues 9

Economic and Statistical Methods for Decision Science:

70-374 Data Mining & Business Analytics 9
70-455 Modern Data Management 9
70-460 Mathematical Models for Consulting 9
73-347 Game Theory for Economists 9
80-337 Philosophy, Politics & Economics 9
80-405 Game Theory 9
88-255 Behavioral and Applied Game Theory 9
88-360 Behavioral Economics 9
88-367 Behavioral Economics in the Wild 9

* 80-405 and 88-316 are different courses and are not cross-listed.

Decision Science and Public Policy:

84-393 Legislative Decision Making: US Congress 9
88-221 Analytical Foundations of Public Policy 9
88-365 Behavioral Economics and Public Policy 9
88-366 Behavioral Economics of Poverty and Development 9
88-405 Risk Perception and Communication 9
88-412 Energy, Climate Change, and Economic Growth in the 21st Century 9
88-444 Public Policy and Regulation 9
88-451/452 Policy Analysis Senior Project 12

Research Methods for Decision Science:

36-303 Sampling, Survey and Society 9
70-460 Mathematical Models for Consulting 9
The BHA concentration in Economics provides a solid understanding of economic theory and quantitative economic analysis. The introductory core disciplinary sequences in economic theory and quantitative analysis rely on a knowledge base of calculus and statistics. The advanced data analysis component pays additional attention to ordinal data and the study of surveys. Students also study political, historical, cultural, and social institutions within an economic context.

Economics Concentration (81 units minimum)

The BHA concentration in Economics provides a solid understanding of economic theory and quantitative economic analysis. The introductory core disciplinary sequences in economic theory and quantitative analysis rely on a knowledge base of calculus and statistics. The advanced data analysis component pays additional attention to ordinal data and the study of surveys. Students also study political, historical, cultural, and social institutions within an economic context.

Economics Theory Requirements (36 units)

- 73-102 Principles of Microeconomics
- 73-103 Principles of Macroeconomics
- 73-230 Intermediate Microeconomics
- 73-240 Intermediate Macroeconomics

Quantitative Analysis Requirements (18 units)

These courses require 36-201 Statistical Reasoning and Practice as a prerequisite; 36-201 fulfills a general education Decision requirement, as well.

- 36-202 Methods for Statistics and Data Science
- 73-265 Economics and Data Science

Advanced Economics Electives (27 units)

Students must take three advanced elective courses. Advanced elective courses are those numbered 73-300 through 73-495 (excluding 73-374 Econometrics II) as well as courses designated by the program offered by other departments/programs. Additionally, students may work with their economics advisor to structure alternative sets of courses to meet these requirements based on their particular interests, subject to course availability.

English Concentration (81 units minimum)

The BHA concentration in English is distinctive in drawing from the artistic and research strengths of the Department's faculty in Literary and Cultural Studies, Rhetoric, and Creative Writing. Literary and Cultural Studies focuses on the way texts are formally constructed and how they function in historical and contemporary contexts. Creative Writing helps students focus on language as a tool to explore and depict experience. Rhetoric focuses on the principles through which writers construct texts and audiences respond to them. Drawing from all of these perspectives, students with a Concentration in English learn the research skills and writing strategies to enable them to analyze the language and texts of other writers and to report their research in effective texts of their own. Such training can prepare students for graduate work in literature, cultural studies, or rhetoric, and also for careers in law, business, or government, which require similar skills in interpretation, research, and writing.

Introductory Courses (2 courses, 18 units)

The 200-level core courses are designed to introduce students to writing in a variety of genres, to a knowledge of literary and other media forms, and to a basic theoretical knowledge of how texts are produced and interpreted. In the Interpretive Practices course, students are introduced to basic concepts, methods, and practices of literary and rhetorical approaches to texts. In the Survey of Forms course, students learn how to use language to express experience through poetic and narrative forms.

- 76-26x Survey of Forms (Nonfiction, Fiction, Poetry, Screenwriting)
- 76-294 Interpretive Practices: Introduction to Critical Reading

Research Course (1 course, 9 units)

Research in English offers training in gathering information systematically and in building arguments based on that information. Students will hone their skills in reading texts, using critical commentary, assessing print and electronic materials, and conducting interviews and surveys. They will learn how to test their hypotheses against alternatives and present their research to audiences within the discipline of English. The historical or thematic content of this course will vary from one semester to another. While 76-394 is not a pre-requisite for 400-level courses, it is strongly recommended that students with a BHA concentration in English take this course in their junior year.

- 76-394 Research in English

Rhetoric Course (1 course, 9 units)

Complete one course from a set of varied offerings in Rhetoric as designated each term by the English Department. Rhetoric courses focus explicitly on language and discourse as objects of study and emphasize the relationships of language, text structure, and meaning within specific contexts.

- 76-4xx Any 400 level course with advisor approval

Period Course Requirement

The period course requirement is not a separate course requirement per se but one that needs to be met through the selection of the required 300- and 400-level courses. At least two of these four required courses must be "period" courses, that is, courses that focus on texts that are connected in time and place or through common social concerns. One of these two courses must focus on a historical period prior to 1900. Courses in this category will vary from year to year and be advertised on a semester-by-semester basis. Such courses may be at either the 300- or 400-level.

Elective Course (1 course, 9 units)

Complete one course from the English Department's offerings. This course may be at the 200-, 300-, or 400-level. Electives may include any courses offered by the English Department with the exception of courses designed for non-majors. Some semester offerings may include cross-listed courses from Modern Languages or History.

Environmental Studies Concentration (81 units minimum)

The concentration in Environmental Studies 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. It is recommended that students take 21-111 Differential Calculus and 36-202 Methods for Statistics and Data Science as prerequisites for higher-level coursework.

Note that some courses carry prerequisites and/or reserve seats for primary majors. Students interested in pursuing the concentration must meet beforehand with the faculty director and their BHA academic advisor in order to map out a course of study. 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 director.

Foundation of Environmental Sciences (18 units minimum)

Complete one required science course:

19-451 EPP Projects

Choose one of the following courses:

Choose one of the following courses:

Choose two of the following courses:

Disciplinary Perspectives (18 units)

Choose two of the following courses:

Thematic Electives (15 units minimum)

Choose two of the following courses:

Research and Analytical Methods (18 units)

Choose two of the following courses:

Project Course (12 units)

Complete one of the following courses:

Ethics, History, & Public Policy Concentration (81 units minimum)

The BHA concentration in Ethics, History, & Public Policy (EHPP) provides students with a rigorous, interdisciplinary humanistic and social-scientific education. The concentration in EHPP encourages the development of a broad technical skill set that will benefit students in whatever career they ultimately choose to pursue. Students with a concentration in EHPP learn how to analyze and construct arguments; to evaluate evidentiary statements; to persuade people to agree with their particular claims; to conduct research under time and resource constraints; and to craft policies that address real world problems in a way that is sensitive both to history and competing sets of values. Comprised of courses in the departments of History, Philosophy, Economics, and Decision Science, the BHA concentration in EHPP encourages specialization, internship experiences, and research in a wide range of policy areas.

Economics Requirement (1 course, 9 units)

History Core (3 courses, 27 units)

Required History Core Courses (Students must earn a final grade of “C” or better for these courses to count toward the concentration):

Choose one Survey Course:

US Survey

Non-US Survey

Choose one of the following courses:

Disciplinary Perspectives (18 units)

Choose two of the following courses:

Thematic Electives (15 units minimum)

Choose two of the following courses:

Research and Analytical Methods (18 units)

Choose two of the following courses:

Project Course (12 units)

Complete one of the following courses:

Ethics (9 units):

Political Philosophy (9 units):

Foundations of Social Science (9 units):

Philosophy Core (3 courses, 27 units)

Choose one course from three of the four categories below. No more than 18 units at the 100-level may be counted toward this requirement.

Ethics (9 units):

Political Philosophy (9 units):

Foundations of Social Science (9 units):

Philosophy of Social Science
Economics  

79-310 Modern U. S. Business History: 1870 to the Present  
79-312 Archaeology of Death  
79-315 The Politics of Water: Global Controversies, Past and Present  
79-320 Women, Politics, and Protest  
79-325 U.S. Gay and Lesbian History  
79-331 Body Politics: Women and Health in America  
79-336 Oil & Water: Middle East Perspectives  
79-338 History of Education in America  
79-339 Juvenile Delinquency and Film (1920 to “The Wire”)  
79-340 Juvenile Delinquency and Juvenile Justice  
79-342 Introduction to Science and Technology Studies  
79-349 The Holocaust in Historical Perspective  
79-370 Disasters in American History (2): Epidemics & Fires  
79-371 African American Urban History  
79-374 American Environmental History: Critical Issues  
79-381 Energy and Empire: How Fossil Fuels Changed the World  
79-389 Stalin and Stalinism  

Philosophy  

80-241 Ethical Judgments in Professional Life  
80-256 Modern Moral Philosophy  
80-305 Choices, Decisions, and Games  
80-341 Computers, Society and Ethics  
80-344 Management, Environment, and Ethics  
80-405 Game Theory  

Social and Decision Sciences  

88-223 Decision Analysis  
88-345 Perspectives on Industrial Research and Development  
88-371 Entrepreneurship, Regulation and Technological Change  
88-387 Social Norms and Economics  
88-444 Public Policy and Regulation  

Global Studies Concentration (81 units minimum)  

The BHA concentration in Global Studies is designed for students interested in humanistic approaches to understanding past and present processes of globalization. Participating faculty in the departments of History, Modern Languages, and English conduct research in Africa, Asia, Europe, Latin America, the Middle East, and the Pacific. The rigorous yet flexible Global Studies curriculum combines anthropology, history, literary and cultural studies, and advanced language training in order to help students make sense of complex interactions among global processes, regional and local cultures, and societal structures. BHA concentration students in Global Studies develop a broad understanding of their prospects and responsibilities as citizens of the world confronting challenging contemporary problems.  

There are two required courses for the concentration: Introduction to Global Studies (79-275) and Global Studies Research Seminar (79-400). Students also choose among several courses focused on theory, research methods, transnational histories, and regional/national histories and cultures.  

In addition to coursework at Carnegie Mellon, BHA students with a concentration in Global Studies are encouraged to incorporate a semester of study abroad into their course of study in order to immerse themselves in...
society different from their own with unfamiliar cultural practices, language, and history.

Students should consult frequently with the BHA advisor, the Global Studies academic program manager, and the faculty director who will help students to craft a coherent course of study on specific topics and/or regions that may lead to the capstone research project (79-400 Global Studies Research Seminar), the BXA capstone project (52-401 and 52-402) or a Dietrich College senior honors thesis (http://hss.cmu.edu/seniorhonorsprogram.html). The faculty director and the academic program manager will also work with students to connect their academic interests and their participation in student organizations and/or organizations based in Pittsburgh with transnational reach.

Global Studies Introductory and Capstone Courses (2 courses, 21 units)

Students must earn a final grade of “C” or better for these courses to count toward the concentration.

79-275 Introduction to Global Studies 9
79-400 Global Studies Research Seminar 12

Language Requirement

Demonstrating intermediate to advanced level proficiency in a language other than English is a crucial component of the concentration in Global Studies. Normally this requirement can be satisfied by successfully completing a course conducted in the second language at the 300-level or above for French, German, Italian, or Spanish, or the fourth semester (Intermediate II) level or above for Arabic, Chinese, Japanese, or Russian. Comparable proficiency for other languages can be considered. Additional advanced cultural, historical, and literary study in the second language is strongly recommended. Courses in a language other than English may also be counted as Global Studies transnational, global, regional courses or Global Studies electives as appropriate.

Theoretical and Topical Core Courses (2 courses, 18 units)

To gain a solid foundation in the theories, methods, and analytical topics underpinning the concentration in Global Studies, students select 18 units (typically two courses) from the core courses listed below. Students must earn a final grade of “C” or better in these courses to fulfill the theoretical and topical core course requirement.

76-453 Literature of Empire 9
76-497 Culture: Interdisciplinary Approaches 9
79-200 Introduction to Historical Research & Writing 9
79-297 Dilemmas and Controversies in Anthropology 9
79-314 The Politics and Culture of Memory 9
79-317 Art, Anthropology, and Empire 9
79-318 Sustainable Social Change: History and Practice 9
79-377 Food, Culture, and Power: A History of Eating 9
79-380 Ethnographic Methods 9
79-381 Energy and Empire: How Fossil Fuels Changed the World 9

Transnational, Global, and Regional Courses (3 courses, 27 units)

To gain insight into how complex transnational and global processes shape and are affected by local, national, and regional dynamics, students will select 27 units (typically three courses) from any subcategories below.

Transnational and Global Courses:

76-322 Global Masala: South Asians in the Diaspora 9
76-353 Transnational Feminisms: Fiction and Film 9
76-384 Race, Nation, and the Enemy 9
76-440 Postcolonial Theory: Diaspora and Transnationalism 9
76-448 The Global Renaissance 9
79-212 Nationalism, Diplomacy and the Origins of the First World War 6
79-224 Mayan America 9
79-233 The United States and the Middle East since 1945 9
79-237 Comparative Slavery 9
79-251 India/America: Democracy, Diversity, Development 9
79-273 Jews and Muslims in History: From the Time of Muhammad to the Present 9
79-276 Beyond the Border 6
79-295 Race Relations in the Atlantic World 9
79-282 Europe and the World since 1800 9
79-283 Hungry World: Food and Famine in Global Perspective 9
79-288 Bananas, Baseball, and Borders: Latin America and the United States 9
79-289 Animal Planet: An Environmental History of People and Animals 6
79-315 The Politics of Water: Global Controversies, Past and Present 9
79-333 Sex, Gender & Anthropology 9
79-385 The Making of the African Diaspora 9
80-348 Health Development and Human Rights 9
80-447 Global Justice 9
82-283 Language Diversity & Cultural Identity 9
82-304 The Francophone World 9
82-345 Introduction to Hispanic Literary and Cultural Studies 9
84-315 Contemporary Debates in Human Rights 9
84-319 U.S. Foreign Policy and Interventions in World Affairs 9
84-322 Nonviolent Conflict and Revolution 9
84-326 Theories of International Relations 9
84-389 Terrorism and Insurgency 9

Regional Courses:

Africa
79-225 West African History in Film 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
79-291 Globalization in East African History 6
79-386 Entrepreneurs in Africa, Past, Present and Future 9
84-312 Gender and Development in Sub-Saharan Africa 6

Eastern and Southern Asia and the Pacific
76-354 South Asian Literature 9
79-211 Introduction to Southeast Asia 9
79-264 Tibet and China: History and Propaganda 6
82-431 China and the West 9
88-411 Rise of the Asian Economies 9

Europe
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
79-268 World War I: The Twentieth Century’s First Catastrophe 9
79-270 Anti-Judaism and Antisemitism in Europe: From the Middle Ages to the Present 6
79-323 Family, Gender, and Sexuality in European History, 500-1890 9
79-353 Religious Identities and Religious Conflicts in 19th Century Europe 9
82-320 Contemporary Society in Germany, Austria and Switzerland 9
82-415 Topics in French and Francophone Studies 9
82-441 Studies in Peninsular Literature and Culture 9

The Middle East
79-229 Origins of the Arab-Israeli Conflict, 1880-1948 9
79-230 Arab-Israeli Conflict and Peace Process since 1948 9
79-307 Religion and Politics in the Middle East 9
79-336 Oil & Water: Middle East Perspectives 6
79-398 Documenting the 1967 Arab-Israeli War 9

The Americas
Nation-based Courses

79-222 Between Revolutions: The Development of Modern Latin America
79-223 Mexico: From the Aztec Empire to the Drug War
79-235 Caribbean Cultures
82-245 Bodies of Conflict: Gender, Violence, and Protest in Latin America
82-343 Latin America: Language and Culture
82-451 Studies in Latin American Literature and Culture
82-455 Topics in Hispanic Studies

Electives (2 courses, 15 units minimum)

Students are required to take an additional 15 units (typically two courses) of electives, selected from one or both of the subcategories below. “Theoretical and Topical Core Courses” and “Transnational, Global, and Regional Courses” listed above that are not used to fulfill those requirements may be counted as electives in addition to the courses listed below.

Global Studies offers students the opportunity to gain credit for a 9 unit elective while gaining first-hand experience interning with Pittsburgh-based organizations that work across borders. 79-506 Global Studies Internship is offered every semester and students should register for the course after consulting with the academic advisor and faculty director. The faculty director will assist students with matching their interests to local organizations and identifying an on-site supervisor available to collaborate in the ongoing and final evaluation of the student’s work.

Thematic Courses

57-306 World Music
70-365 International Trade and International Law
76-241 Introduction to Gender Studies
76-450 Language & Culture
76-450 Space and Mobilities Studies
79-201 Introduction to Anthropology
79-284 Introduction to Archaeological Methods: The Social Life of Things
79-330 Medicine and Society
79-349 The Holocaust in Historical Perspective
80-244 Environmental Ethics
80-247 Ethics and Global Economics
80-355 Deliberative Democracy: Theory and Practice
82-215 Arab Culture Through Film and Literature
82-311 Advanced Arabic I
82-541 Special Topics: Hispanic Studies
84-275 Comparative Politics
84-310 International Political Economy and Organizations
84-311 International Development: Theory and Praxis
84-362 Diplomacy and Statecraft
88-412 Energy, Climate Change, and Economic Growth in the 21st Century

International Relations and Politics Concentration (81 units minimum)

The International Relations and Politics (IRP) BHA concentration analyzes the role of politics at the national, regional, international, and transnational levels; examines political and institutional arrangements within and among these levels; and investigates the grand strategy of nation-states.

Statesmen, scholars, and policy makers often define grand strategy as the combination of diplomatic, economic, military, and political factors used by leaders to defend their respective nation-states. The IRP major investigates the way in which leaders and citizens construct grand strategy and national security policy more generally; the impact of domestic and international forces on states’ security and economic policies; and the significance of alliances, coalitions, and international institutions for world politics.

Although the study of grand strategy and political institutions is the flagship initiative of the concentration, students are also able to study the effects of culture, economics, and society on the international system through a rich set of elective courses.

Thinking systematically about international and domestic politics is the core objective of the IRP concentration. The concentration is rooted in the discipline of political science but also utilizes the interdisciplinary strengths of behavioral decision science, complex social systems, economics, and political history. Thus, students pursuing this concentration will use the analytic tools of game theory, economic and statistical analysis, qualitative analysis, rational choice theory, and theories of behavioral decision making as they study alliances, coalitions, institutions, and political strategy.

The name of the concentration signifies that those studying IRP learn about international relations and domestic politics from the standpoint of the discipline of political science. Thus, IRP preserves and expands CMU’s tradition in political science. At the same time, IRP taps into and contributes to CMU’s strengths in other social sciences that combine analytical and empirical methods. IRP has recently launched an innovative initiative to incorporate decision science in international relations. It will enable students to learn and apply the burgeoning science of judgment and decision making to understanding political actors’ strategies and foibles, the strengths and weaknesses of formal methods of policy analysis (e.g., cost, risk, benefit, analysis), and the factors shaping public responses to politics and policies.

Recognizing the influence of language and culture on politics, students are required to complete the intermediate (200) level, or its equivalent, in a modern language other than English. Advanced-level study is strongly encouraged.

Open to all Carnegie Mellon undergraduates, the Carnegie Mellon University Washington Semester Program (CMU/WSP) allows students to study public policy and international relations for one semester. Courses taken through CMU/WSP will count toward the elective sequence in public policy for the IRP concentration.
Students’ understanding of politics is further informed by courses and colloquia offered by CMU’s top-ranked departments, divisions, and schools in business, computer science, engineering, and the humanities.

IRP students interested in developing their research skills are encouraged to apply for a research position with the Center for International Relations and Politics. They are also encouraged to join student organizations focused on domestic or international politics. Becoming involved in the Institute for Politics and Strategy, as well as attending lectures and events sponsored by the Center for International Relations and Politics will provide additional opportunities for students.

The International Relations and Politics concentration is offered through the Institute for Politics and Strategy.

Pre-requisites

36-200  Reasoning with Data  9
or 36-201  Statistical Reasoning and Practice  9
73-102  Principles of Microeconomics  9

Core Courses (6 courses, 54 units)

84-104  Decision Processes in American Political Institutions  9
84-265  Political Science Research Methods  9
84-275  Comparative Politics  9
84-326  Theories of International Relations  9
84-369  Decision Science for International Relations  9
84-450  Policy Forum  6
36-202  Methods for Statistics and Data Science  9

Language Requirement

BHA IRP students are required to complete the intermediate (200) level or the equivalent in a modern language other than English. This Language Requirement may be satisfied by the BHA General Education Modern Languages requirement if the 200-level is reached. Advanced level study is strongly encouraged.

Electives (3 courses, 27 units minimum)

International Relations and Politics BHA students will either take the following:

Option 1

Take 27 units (three courses) from the elective lists below. At least two courses (18 units) must be from the Institute for Politics and Strategy (84-xxx).

Grand Strategy and Political Institutions

66-221  Topics of Law: Introduction to Intellectual Property Law  9
79-203  Social and Political Change in 20th Century Central and Eastern Europe  9
79-231  American Foreign Policy: 1945-Present  9
79-298  Mobile Phones & Social Media in Development & Human Rights: A Critical Appraisal  6
79-301  History of Surveillance: From the Plantation to Edward Snowden  6
79-389  Stalin and Stalinism  9
80-135  Introduction to Political Philosophy  9
80-321  Causation, Law, and Social Policy  9
80-335  Deliberative Democracy: Theory and Practice  9
84-309  Political Behavior  9
84-319  U.S. Foreign Policy and Interventions in World Affairs  9
84-320  Domestic Politics and International Affairs  9
84-321  Autocrats and Democrats  9
84-322  Nonviolent Conflict and Revolution  9
84-323  War and Peace  9
84-324  Democracies and War  9
84-362  Diplomacy and Statecraft  9
84-363  Comparative Legal Systems  9
84-366  Presidential Politics: So, You Want to Be President of the United States  9
84-380  Grand Strategy in the United States  9
84-386  The Privatization of Force  9
84-387  Technology and Policy of Cyber War  6
84-388  Concepts of War and Cyber War  6
84-389  Terrorism and Insurgency  9
84-393  Legislative Decision Making: US Congress  9
84-402  Judicial Politics and Behavior  9
84-405  Future of Warfare: Cyber, Violent Non-State Actors & Conflict in the Gray Zone  9
84-414  International and Subnational Security  9
88-281  Topics in Law: 1st Amendment  9
88-284  Topics of Law: The Bill of Rights  9

Economics and Society

19-452  EPP Projects  12
70-342  Managing Across Cultures  9
70-365  International Trade and International Law  9
70-430  International Management  9
73-103  Principles of Macroeconomics  9
73-148  Environmental Economics  9
73-328  Health Economics  12
73-331  Political Economy of Inequality and Redistribution  9
73-394  Development Economics  9
79-386  Entrepreneurs in Africa, Past, Present and Future  9
80-136  Social Structure, Public Policy & Ethics  9
80-244  Environmental Ethics  9
80-247  Ethics and Global Economics  9
80-348  Health Development and Human Rights  9
80-447  Global Justice  9
84-310  International Political Economy and Organizations  9
84-311  International Development: Theory and Praxis  6
84-312  Gender and Development in Sub-Saharan Africa  6
84-315  Contemporary Debates in Human Rights  9
88-411  Rise of the Asian Economies  9
86-412  Energy, Climate Change, and Economic Growth in the 21st Century  9
88-430  Methods of Policy Analysis  12

International Cultures

76-318  Communicating in the Global Marketplace  9
76-322  Global Masala: South Asians in the Diaspora  9
76-386  Language & Culture  9
79-205  20th/21st Century Europe  9
79-221  Development and Democracy in Latin America  9
79-222  Between Revolutions: The Development of Modern Latin America  9
79-223  Mexico: From the Aztec Empire to the Drug War  9
79-224  Mayan America  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
79-233  The United States and the Middle East since 1945  9
79-251  India/America: Democracy, Diversity, Development  9
79-256  20th Century Germany  9
79-257  Germany and the Second World War  9
79-259  France During World War II  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
79-267  The Soviet Union in World War II: Military, Political, and Social History  9
79-275  Introduction to Global Studies  9
79-288  Bananas, Baseball, and Borders: Latin America and the United States  9
79-291  Globalization in East African History  6
79-307  Religion and Politics in the Middle East  9
be chosen from the History department courses, or with permission of the advisor students can instead complete at least one Japanese history course at the University of Pittsburgh (e.g., Modern Japan, Popular Religion in a Changing Japan, and Modern East Asia), one in Japan when they study abroad, or in a summer program at any other university.

**Japanese Electives**

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>82-373 Structure of the Japanese Language</td>
<td>9</td>
</tr>
<tr>
<td>82-374 Technical Japanese</td>
<td>9</td>
</tr>
<tr>
<td>82-473/474 Topics in Japanese Studies</td>
<td>9</td>
</tr>
<tr>
<td>(Students may repeat with new topics.)</td>
<td></td>
</tr>
<tr>
<td>82-505 Undergraduate Internship</td>
<td>Var.</td>
</tr>
<tr>
<td>82-571/572 Special Topics: Japanese Studies</td>
<td>Var.</td>
</tr>
</tbody>
</table>

**Interdisciplinary Electives**

This list is compiled from possibilities such as but not limited to the following. Students should consult OLA and the advisor for the most up to date interdisciplinary electives appropriate for the Japanese Studies curriculum. Courses may be suggested to the advisor for approval as a substitute.

**English**

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>76-239 Introduction to Film Studies</td>
<td>9</td>
</tr>
<tr>
<td>76-386 Language &amp; Culture</td>
<td>9</td>
</tr>
<tr>
<td>76-387 Narrative &amp; Argument</td>
<td>9</td>
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</table>

**History**

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<thead>
<tr>
<th>Course</th>
<th>Units</th>
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<tbody>
<tr>
<td>79-261 The Last Emperors: Chinese History and Society, 1600-1900</td>
<td>9</td>
</tr>
<tr>
<td>79-262 Modern China: From the Birth of Mao ... to Now</td>
<td>9</td>
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<tr>
<td>79-275 Introduction to Global Studies</td>
<td>9</td>
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</tbody>
</table>

**Modern Languages**

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>82-278 Japanese Film and Literature: The Art of Storytelling</td>
<td>9</td>
</tr>
<tr>
<td>82-280 Learning About Language Learning</td>
<td>9</td>
</tr>
<tr>
<td>82-281 Tutoring for Community Outreach</td>
<td>Var.</td>
</tr>
<tr>
<td>82-282 Community Service Learning</td>
<td>Var.</td>
</tr>
<tr>
<td>82-373 Structure of the Japanese Language</td>
<td>9</td>
</tr>
<tr>
<td>82-374 Technical Japanese</td>
<td>9</td>
</tr>
<tr>
<td>82-383 Second Language Acquisition: Theories and Research</td>
<td>9</td>
</tr>
<tr>
<td>82-388 Understanding Second Language Fluency</td>
<td>9</td>
</tr>
<tr>
<td>82-480 Social and Cognitive Aspects of Bilingualism</td>
<td>9</td>
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**Music**

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<tr>
<th>Course</th>
<th>Units</th>
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<tbody>
<tr>
<td>57-306 World Music</td>
<td>9</td>
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</table>

**Philosophy**

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>80-180 Nature of Language</td>
<td>9</td>
</tr>
<tr>
<td>80-280 Linguistic Analysis</td>
<td>9</td>
</tr>
<tr>
<td>80-281 Language and Thought</td>
<td>9</td>
</tr>
<tr>
<td>80-380 Philosophy of Language</td>
<td>9</td>
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**Psychology**

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<tr>
<th>Course</th>
<th>Units</th>
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<tbody>
<tr>
<td>85-375 Crosscultural Psychology</td>
<td>9</td>
</tr>
<tr>
<td>85-421 Language and Thought</td>
<td>9</td>
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</table>

**Social and Decision Science**

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<tr>
<th>Course</th>
<th>Units</th>
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<tbody>
<tr>
<td>88-384 Conflict and Conflict Resolution in International Relations</td>
<td>9</td>
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</tbody>
</table>

**Linguistics Concentration (81 units minimum)**

The BHA concentration in Linguistics combines courses from the departments of English, Modern Languages, Philosophy and Psychology and the Language Technologies Institute. 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.

**Japanese Studies Concentration (81 units minimum)**

A BHA concentration in Japanese Studies promotes not just language proficiency but also an understanding of Japanese culture. Students who arrive at Carnegie Mellon with previous language study and/or who have high Advanced Placement, an International Baccalaureate, a Cambridge GCE Advanced level, or internal placement exam scores will be able to begin taking courses in the concentration earlier in their undergraduate program. In all cases, progress in the concentration will be accelerated by study abroad, which is recommended for all students.

**Prerequisites**

Low-intermediate level proficiency in Japanese. This is equivalent to the completion of three courses (two at the 100-level and one at the 200-level) or exemption based on internal placement test scores.

**Core Courses in Japanese (36-39 units)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>82-272 Intermediate Japanese II</td>
<td>9</td>
</tr>
<tr>
<td>82-273 Introduction to Japanese Language and Culture</td>
<td>9</td>
</tr>
<tr>
<td>82-371 Advanced Japanese I</td>
<td>9</td>
</tr>
<tr>
<td>82-372 Advanced Japanese II</td>
<td>9</td>
</tr>
</tbody>
</table>

* Placement out of 82-272 is possible. For students who place out of 82-272, a minimum of 9 additional units must be taken from the Japanese Electives of the “Japanese Studies and Interdisciplinary Electives” category below.

**Core Courses in Modern Languages (12 units)**

Complete one 9 unit course plus the Senior Seminar (3 units).

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>82-280 Learning About Language Learning</td>
<td>9</td>
</tr>
<tr>
<td>82-281 Tutoring for Community Outreach</td>
<td>Var.</td>
</tr>
<tr>
<td>82-282 Community Service Learning</td>
<td>Var.</td>
</tr>
<tr>
<td>82-383 Second Language Acquisition: Theories and Research</td>
<td>9</td>
</tr>
<tr>
<td>82-388 Understanding Second Language Fluency</td>
<td>9</td>
</tr>
<tr>
<td>82-480 Social and Cognitive Aspects of Bilingualism</td>
<td>9</td>
</tr>
<tr>
<td>82-580 Senior Seminar in Modern Languages</td>
<td>3</td>
</tr>
</tbody>
</table>

**Japanese Studies and Interdisciplinary Electives (33 units minimum)**

Complete three courses from Japanese Electives and one course from Interdisciplinary Electives, or a minimum of two courses from Japanese Electives and two courses from Interdisciplinary Electives in consultation with the Japanese advisor. One course from Interdisciplinary Electives must...
Introductory Course (1 course, 9 units)
80-180 Nature of Language 9

Fundamental Skills Courses (2 courses, 18 units)
Take one course each in two of the following three areas:

Sounds
80-282 Phonetics and Phonology I 9

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

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

Elective Courses (4 courses, 36 units)
Take four additional electives. These can be additional courses from the Fundamental Skills courses or Breadth courses listed above, or any other course which must be approved by the Director as a linguistics elective. Listed below are the additional electives taught on a regular basis.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>82-585</td>
<td>Topics in Second Language Acquisition</td>
</tr>
</tbody>
</table>

Language Requirement
Students must successfully complete two semesters of consecutive language courses. 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.

Philosophy Concentration (81 units minimum)
The BHA Concentration in in Philosophy provides students with a broad humanities education and sharpens their analytical skills. We encourage, but do not require, students to choose a thematic concentration through their electives. Sample curricula emphasizing Pre-Law, Metaphysics and Epistemology, Ethics and Social Philosophy, and Philosophy of Mind are suggested below. However, alternative emphases can be proposed and approved by the Director.

In any of the areas listed, substitutions of courses that cohere with a student’s interest may be allowed with approval from the Advisor.

Introduction to Philosophy (1 course, 9 units)
80-100 Introduction to Philosophy 9

Area 1: Values and Normative Theory (1 course, 9 units)
80-130 Introduction to Ethics 9
80-135 Introduction to Political Philosophy 9
80-136 Social Structure, Public Policy & Ethics 9
80-230 Ethical Theory 9
80-244 Environmental Ethics 9
80-245 Medical Ethics 9
80-247 Ethics and Global Economics 9
80-248 Engineering Ethics 9
80-334 Social and Political Philosophy 9
80-335 Deliberative Democracy: Theory and Practice 9
80-337 Philosophy, Politics & Economics 9
80-348 Health Development and Human Rights 9
80-430 Ethics and Medical Research 9
80-447 Global Justice 9

Area 2: Philosophy of Mind/Language/Metaphysics (1 course, 9 units)
80-180 Nature of Language 9
80-270 Philosophy of Mind 9
80-271 Philosophy and Psychology 9
80-276 Philosophy of Religion 9
80-280 Linguistic Analysis 9
80-281 Language and Thought 9
80-282 Phonetics and Phonology I 9
80-283 Syntax and Discourse 9
80-284 Invented Languages 9
80-327 Philosophy of Neuroscience 9
80-371 Philosophy of Perception 9
80-380 Philosophy of Language 9
80-381 Meaning in Language 9
80-382 Phonetics and Phonology II 9
80-383 Language in Use 9
80-384 Linguistics of Turkic Languages 9
80-580 Seminar on the Philosophy of Language 9

Area 3: Logic/Philosophy of Mathematics (1 course, 9 units)
80-110 Nature of Mathematical Reasoning 9
80-210 Logic and Proofs 9
80-211 Logic and Mathematical Inquiry 9
80-212 Arguments and Logical Analysis 9
80-310 Formal Logic 9
80-311 Undecidability and Incompleteness 9
80-312 Philosophy of Mathematics 9
80-315 Modal Logic 9
80-411 Proof Theory 9
80-413 Category Theory 9
80-513 Seminar on Philosophy of Mathematics 9
80-514 Categorical Logic 9

Area 4: Epistemology/Metaphysics (1 course, 9 units)
80-150 Nature of Reason 9
80-201 Epistemology 9
80-208 Critical Thinking 9
80-214 Computing, AI, and Philosophy 9
80-220 Philosophy of Science 9
80-221 Philosophy of Social Science 9
80-222 Measurement and Methodology 9
80-223 Causality and Probability 9
80-226 Revolutions in Science 9
80-305 Choices, Decisions, and Games 9
80-321 Causation, Law, and Social Policy 9
80-322 Philosophy of Physics 9
80-323 Philosophy of Biology 9
80-324 Philosophy of Economics 9
80-327 Philosophy of Neuroscience 9
80-405 Game Theory 9
80-515 Seminar on the Foundations of Statistics 9
80-516 Causality and Learning Var.
80-520 Seminar on Philosophy Science 9
80-521 Seminar on Formal Epistemology Var.

Area 5: History of Philosophy (1 course, 9 units)
80-150 Nature of Reason 9
80-226 Revolutions in Science 9
80-250 Ancient Philosophy 9
80-251 Modern Philosophy 9
80-252 Kant 9
80-253 Continental Philosophy 9
80-254 Analytic Philosophy 9
80-255 Pragmatism 9
80-256 Modern Moral Philosophy 9
80-257 Nietzsche 9
80-261 Empiricism and Rationalism 9
80-362 Russell 9
80-363 19th Century Foundations of Science 9

Area 6: Electives (3 courses, 27 units)
Three other philosophy courses, or appropriate courses from other departments, with the permission of the Director.

Professional Writing Concentration (81 units minimum)

Professional Writing combines liberal and professional education with a strong foundation in rhetorical studies. The concentration in Professional Writing has a strong career orientation and is specifically designed to prepare students for successful careers as writers and communications specialists in a range of fields: publishing, government, journalism, the non-profit sector, education, public and media relations, corporate communications, advocacy writing, and the arts. The concentration is designed to develop articulate and reflective communications professionals with both the skills needed to enter and negotiate current work contexts (including writing for the web and other digital media) and the analytic and problem-solving skills needed to understand and keep pace with cultural and technological change.

Foundation Courses (4 courses, 36 units)
76-26x Survey of Forms (Nonfiction, Fiction, Poetry, or Screenwriting) 9
76-271 Introduction to Professional and Technical Writing 9
76-373 Argument 9
76-390 Style 9

Rhetoric/Language Studies Course (1 course, 9 units)
Students with a concentration in Professional Writing complete one course from designated Rhetoric courses offered and advertised each semester by the English Department. Rhetoric courses focus on understanding the role of language and language practices in both personal and professional contexts. Courses emphasize the relationships between texts and their contexts and pay particular attention to textual features, meaning, processes of reading and writing, and the ways in which language practices vary over time and across situations and cultures. The courses also equip students with explicit techniques for analyzing, understanding, and exploring language practices. The Rhetoric/Language Studies courses may also be taken as part of the concentration requirements for three additional, Advanced Writing/Rhetoric courses and include but are not limited to the following list.
76-319 Environmental Rhetoric 9
76-351 Rhetorical Invention 9
76-355 Leadership, Dialogue, and Change 9
76-386 Language & Culture 9
76-396 Non-Profit Advocacy: Genres, Methods, and Issues 9
76-428 Visual Verbal Communication 9
76-476 Rhetoric of Science 9
76-484 Discourse Analysis 9
76-491 Rhetorical Analysis 9

Advanced Writing/Rhetoric Courses (3 courses, 27 units minimum)
Students with a concentration in Professional Writing complete three Advanced Writing/Rhetoric courses at the 300- or 400-level. Options for these courses include all of the Rhetoric/Language Studies courses listed above plus the writing-focused courses listed below. Additional courses that fulfill these requirements are advertised on a semester-by-semester basis. For help in choosing which of the possible options are most appropriate for various professional goals – journalism, writing for new media, editing and publishing, public relations/corporate communications, or science and technical writing – consult your English Department advisor and the “Selected Core Courses & Electives for PW Majors” advising sheet available through the English Department. All students with a concentration in PW, regardless of their career focus, are encouraged to take 76-391 Document & Information Design and 76-487 Web Design (in conjunction with the 3-unit 76-488 Web Design Lab) to extend their skills in writing for print to include information design for digital media. Both courses focus on the role of the writer in these specializations and provide lab instruction in the relevant software and related computer skills.
76-301 Internship Var.
76-302 Writing in the Disciplines 9
76-319 Environmental Rhetoric 9
76-351 Rhetorical Invention 9
76-355 Leadership, Dialogue, and Change 9
76-372 News Writing 9
76-375 Magazine Writing 9
76-386 Language & Culture 9
76-389 Rhetorical Grammar 9
76-391 Document & Information Design 12
76-396 Non-Profit Advocacy: Genres, Methods, and Issues 9
76-428 Visual Verbal Communication 9
76-476 Rhetoric of Science 9
76-481 Introduction to Multimedia Design 12
76-484 Discourse Analysis 9
76-487 Web Design 12
76-491 Rhetorical Analysis 9

Prerequisite English Elective
Students with a concentration in Professional Writing must complete one requisite course from the English Department’s offerings, which focuses on the relationships between texts and their cultural and historical contexts. The course must be at or above the 200 level. 76-270 Writing for the Professions, 76-272 Language in Design, and 76-271 Introduction to Professional and Technical Writing may not count as English electives. Appropriate courses are advertised every semester in the English department’s “What Counts for What” publication.

English Elective (1 course, 9 units)
Students with a concentration in Professional Writing complete one additional course from the English Department’s offerings. This course should be one that focuses on the relationships between texts and their cultural and historical contexts. Courses in literature, cultural studies, rhetoric, and media studies that meet this requirement are advertised on
more experience working with primary and secondary sources. The senior students majoring in History spend more time together in smaller classes and focus on particular themes, places, or eras. Upper-level courses aim to give students a sense of the sequence of courses, training in research methods, theoretical concepts, and professional training. The History concentration combines a structured sequence of courses, training in research methods, theoretical concepts, and analytical writing skills, plus a considerable array of electives.

Psychology Concentration (81 units minimum)

Psychology is a science that embraces both biological and social sciences. It is a science concerned with establishing principles and laws regarding the ways in which people think, feel, and behave through the scientific study of human behavior. Students with a concentration in Psychology are expected not only to learn about findings already established by psychologists, but also to become proficient in the investigation and analysis of behavior. This includes observing behavior, formulating hypotheses, designing experiments to test these hypotheses, running experiments, performing statistical analyses, and writing reports.

Breadth Courses (4 courses, 36 units)

To gain familiarity with the breadth of the field of Psychology, students take 85-102 Introduction to Psychology and three survey courses.

Required Intro Course

85-102 Introduction to Psychology 9

Survey Courses

85-211 Cognitive Psychology 9
or 85-213 Human Information Processing and Artificial Intelligence 9
85-219 Biological Foundations of Behavior 9
85-221 Principles of Child Development 9
85-241 Social Psychology 9
85-251 Personality 9

* A fourth survey course can be taken in place of Introduction to Psychology.

Research Methods and Statistics (2 courses, 18 units)

Students complete one course in Research Methods (9 units). The corresponding survey course is a prerequisite for this course.

85-310 Research Methods in Cognitive Psychology 9
85-314 Cognitive Neuroscience Research Methods 9
85-320 Research Methods in Developmental Psychology 9
85-330 Analytic Research Methods 9
85-340 Research Methods in Social Psychology 9

The following Statistics course is a prerequisite for all the Research Methods courses. This Statistics course counts toward the Psychology concentration.

36-309 Experimental Design for Behavioral and Social Sciences -Fall 9

Advanced Courses (3 courses, 27 units)


Social & Political History Concentration (81 units minimum)

The BHA concentration in Social & Political History focuses on new ways to understand the past and new ways to use what we know, as well as on connections between past and present and on how historical knowledge facilitates understanding of social, cultural, and policy change. The History concentration emphasizes empirical methods and conceptual analysis, as well as specific research skills relevant to many types of jobs and further professional training. The History concentration combines a structured sequence of courses, training in research methods, theoretical concepts, and analytical writing skills, plus a considerable array of electives.

The BHA concentration in Social & Political History emphasizes broad-based, cumulative knowledge and interpretive skills in the study of the past. Offerings at the 200- and 300-level are designed to allow maximum flexibility in meeting requirements and maximum choice in focusing on particular themes, places, or eras. Upper-level courses aim to give students majoring in History more time together in smaller classes and more experience working with primary and secondary sources. The senior capstone seminar, Advanced Studies in History, provides training and experience in conducting original research and in interpretive, analytical writing—skills that prepare graduates for professional careers as well as for graduate or law school.

Required History Courses (2 courses, 21 units)

Students must earn a final grade of “C” or better for these courses to count toward the concentration.

79-200 Introduction to Historical Research & Writing - Sophomore or Junior year 9
79-420 Historical Research Seminar -Fall, Senior year 12

Required Survey Courses (2 courses, 18 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
79-211 Introduction to Southeast Asia 9
79-221 Development and Democracy in Latin America 9
79-222 Between Revolutions: The Development of Modern Latin America 9
79-223 Mexico: From the Aztec Empire to the Drug War 9
79-225 West African History in Film 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
79-233 The United States and the Middle East since 1945 9
79-240 Development of American Culture 9
79-241 African American History: Africa to the Civil War 9
79-242 African American History: Reconstruction to the Present 9
79-245 Capitalism and Individualism in American Culture 9
79-249 20th/21st Century U.S. History 9
79-251 India/America: Democracy, Diversity, Development 9
79-252 Recent U.S. History: 1945-Present 9
79-256 20th Century Germany 9
79-258 French History: From the Revolution to De Gaulle 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
79-265 Russian History: From the First to the Last Tsar 9
79-266 Russian History: From Communism to Capitalism 9

Social & Political History Elective Courses (5 courses, 42 units minimum)

A minimum of 42 additional History units must be approved with the History advisor. Any History courses not fulfilling another major requirement may be chosen as an elective.

Statistics Concentration (81 UNITS MINIMUM)

In the BHA concentration in Statistics, students develop and master a wide array of skills in computing, mathematics, statistical theory, and the interpretation and display of complex data. In addition, students with a BHA concentration in Statistics gain experience in applying statistical tools to real problems in other fields and learn the nuances of interdisciplinary collaboration.

Mathematics Pre-requisites

These courses are not counted as part of your DC Concentration. They may be used to satisfy general education or free elective requirements.

21-120 Differential and Integral Calculus 10
21-256 Multivariate Analysis 9
or 21-259 Calculus in Three Dimensions 9
21-240 Matrix Algebra with Applications 10
or 21-241 Matrices and Linear Transformations
or 21-242 Matrix Theory

Note: 21-240, 21-241, 21-242 must be completed before taking 36-401
Modern Regression. 21-241 and 21-242 are intended only for students with a
very strong mathematical background.

Statistics Pre-requisite
This course is not counted as part of your DC Concentration. It fulfills the
BHA General Education Statistics Requirement.

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

Statistics Core (6 courses, 54 units)
36-202 Methods for Statistics and Data Science 9
36-225 Introduction to Probability Theory 9
36-226 Introduction to Statistical Inference 9
36-350 Statistical Computing 9
36-401 Modern Regression 9
36-402 Advanced Methods for Data Analysis 9

Special Topics and Electives (3 courses, 27 units)
Students must take a total of three courses from Special Topics (numbered
36-46x) and Statistics Electives. Students will consult with the Statistics
advisor to select the Special Topics and Electives courses that best fit for
their areas of interest.

Statistics & Machine Learning (81 UNITS MINIMUM)
In the BHA concentration in Statistics & Machine Learning, develop and
master a wide array of skills in computing, mathematics, statistical theory,
and the interpretation and display of complex data. In addition, students
with a BHA concentration in Statistics & Machine Learning gain experience
in applying statistical tools to real problems in other fields and learn the
nuances of interdisciplinary collaboration. This program is geared towards
students interested in statistical computation, data science, or “Big Data”
problems.

Mathematics Pre-requisites
These courses are not counted as part of your DC Concentration. They may
be used to satisfy general education or free elective requirements.
21-120 Differential and Integral Calculus 10
21-127 Concepts of Mathematics 10
21-256 Multivariate Analysis 9
or 21-259 Calculus in Three Dimensions 9
21-240 Matrix Algebra with Applications 10
or 21-241 Matrices and Linear Transformations 9
or 21-242 Matrix Theory 9

Note: 21-240, 21-241, 21-242 must be completed before taking 36-401
Modern Regression. 21-241 and 21-242 are intended only for students with a
very strong mathematical background.

Statistics Pre-requisite
This course is not counted as part of your DC Concentration. It fulfills the
BHA General Education Statistics Requirement.

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

Statistics Core (5 courses, 45 units)
36-225 Introduction to Probability Theory 9
36-226 Introduction to Statistical Inference 9
36-350 Statistical Computing 9
36-401 Modern Regression 9
36-402 Advanced Methods for Data Analysis 9

Machine Learning Core (3 courses, 34 units)
15-112 Fundamentals of Programming and Computer Science 9
15-122 Principles of Imperative Computation 10
10-601 Introduction to Machine Learning (Master’s) 12

Machine Learning Electives (1 courses, 9-12 units)
Students will consult with the Statistics & Machine Learning advisor to
choose an elective from Statistics, Data Analysis, Probability Theory, or
Computing. This course may have additional pre-requisites.

Technical Writing Concentration (81 units minimum)
The concentration in Technical Writing is specifically designed to prepare
students for successful careers involving scientific, technical, and computer-
related communication, including writing and designing for digital media.
Technical communicators develop and design web sites, explain science and
technology to the public, develop print and multimedia materials, design and
deliver corporate training, and develop support systems for consumer products ranging from software
for word processing or personal finances to complex data management
systems. The Technical Writing concentration includes with a common core
of foundation courses in print and on-line communication as well as a set of
prerequisites in math, statistics, and computer programming.

Students with a TW concentration take two Theory/Specialization courses
specific to either the Technical Communication or the Scientific and Medical
Communication track. In addition, students in the SMC track take two
courses in the natural sciences or engineering relevant to their areas of
interest, while TC students take two electives in management, technology,
and social issues.

Prerequisite Courses
21-111 Differential Calculus 10
or 21-112 Integral Calculus 10
or 21-120 Differential and Integral Calculus 10
or 21-127 Concepts of Mathematics 10
15-110 Principles of Computing
(recommended for SMC-track students) 10
or 15-112 Fundamentals of Programming and Computer Science
(recommended for TC-track students) 10

Technical Writing Core Courses (5 courses, 51 units)
76-26x Survey of Forms (Nonfiction, Fiction, Poetry, or Screenwriting) 9
76-271 Introduction to Professional and Technical Writing 9
76-390 Style 9
76-391 Document & Information Design 12
76-487 Web Design 12

Theory/Specialization Courses (2 courses, 18 units minimum)
Complete two courses to deepen your area of specialty in Technical
Communication (TC) or Scientific and Medical Communication (SMC). One
course must be chosen from among courses designated as Recommended
Options. Check with the English department each semester for additional
options.

Recommended Options
76-319 Environmental Rhetoric 9
76-361 Topics in Digital Humanities: Corpus Rhetorical Analysis 9
76-395 Science Writing 9
76-425 Science in the Public Sphere 9
76-428 Visual Verbal Communication 9
76-474 Software Documentation 9
76-476 Rhetoric of Science 9
76-481 Introduction to Multimedia Design 12
76-491 Rhetorical Analysis 9
76-494 Healthcare Communications 9

Additional Options
Include but are not limited to the following:
76-301 Internship 9
76-302 Writing in the Disciplines 9
76-318 Communicating in the Global Marketplace 9
76-319 Environmental Rhetoric 9
76-325 Intertextuality 9
76-340 American English 9
76-351 Rhetorical Invention 9
PORTFOLIO REVIEW REQUIRED FOR ADMISSION

Art Concentration (108 units minimum)

BHA students choose one of the following concentrations:

- Architecture (108 units)
- Art (108 units)
- Design (108 units)
- Drama (108 units)
- Music (108 units)

**Architecture Required Courses (52 units minimum)**

- 48-100 Architecture Design Studio: Foundation I -Fall, Freshman year 10-12
- or 48-095 Spatial Concepts for Non-Architects I 9
- 48-120 Digital Media I -Fall, Freshman year 6
- 48-121 Drawing I -Fall, Freshman year 6
- 48-125 Digital Media II -Spring, Freshman year 6
- 48-126 Drawing II -Spring, Freshman year 6
- 48-240 Historical Survey of World Architecture and Urbanism I -Spring, Freshman year 9
- 48-241 Modern Architecture -Fall, Sophomore year 9

Architecture Electives (56 units minimum)

A minimum of 56 additional Architecture units must be approved by the Architecture advisor. A list of these selected courses must be filed in the BXA office.

**Design Concentration (108 units minimum)**

**III. College of Fine Arts Concentration**

(number of courses vary, 108 units minimum)

BHA students choose one of the following concentrations:

- Architecture (108 units)
- Art (108 units)
- Design (108 units)
- Drama (108 units)
- Music (108 units)

**Art Concentration (108 units minimum)**

PORTFOLIO REVIEW REQUIRED FOR ADMISSION

- Leadership, Dialogue, and Change 9
- Literary Journalism Workshop 9
- Topics in Digital Humanities: Corpus Rhetorical Analysis 9
- News Writing 9
- Magazine Writing 9
- Literacy: Educational Theory and Community Practice 9
- Language & Culture 9
- Rhetorical Grammar 9
- Document & Information Design 12
- Science Writing 9
- Non-Profit Advocacy: Genres, Methods, and Issues 9
- The Cognition of Reading and Writing: Introduction to a Social/Cognitive Process 9
- Science in the Public Sphere 9
- Visual Verbal Communication 9
- Multimedia Storytelling in a Digital Age 9
- Software Documentation 9
- Law, Performance, and Identity 9
- Rhetoric of Science 9
- Introduction to Multimedia Design 12
- Discourse Analysis 9
- Web Design 12
- Rhetorical Analysis 9
- Engineering Design Projects 12
- Drama (108 units)
- Design (108 units)
- Art (108 units)
- Architecture (108 units)

**Electives (2 courses, 12 units minimum)**

Students with a TW concentration take two courses outside of English to deepen their area of specialty in their track. Typically, students in the SMC track select courses in the natural sciences, psychology, and social and decision sciences, or (for example) healthcare-related courses in the Heinz School. Students in the TC track typically select courses from engineering, design, HCI, computer science, math or statistics. Students should work with their faculty advisor to select courses that are meaningful for their track.

**Design Required Courses (96 units)**

- 51-101 Studio: Survey of Design -Fall, Freshman year 9
- 51-103 Design Workshop I -Fall, Freshman year 3
- 51-121 Visualizing -Fall, Freshman year 9
- 51-171 Placing -Fall, Freshman year 9
- 51-102 Design Lab -Spring, Freshman year 9
- 51-104 Design Workshop II -Spring, Freshman year 3
- 51-122 Collaborative Visualizing -Spring, Freshman year 9
- 51-172 Systems -Spring, Freshman year 9

Choose Two Studios:

- 51-225 Communications Studio I: Understanding Form & Context -Fall, Sophomore year 4.5
- or 51-245 Products Studio I: Understanding Form & Context 4.5
- or 51-265 Environments Studio I: Understanding Form & Context 4.5

Choose Two Corresponding Labs:
51-227 Prototyping Lab I: Communications -Fall, Sophomore year 4.5, 4.5
or 51-247 Prototyping Lab I: Products
or 51-267 Prototyping Lab I: Environments
51-271 How People Work -Fall, Sophomore year 9
51-371 Futures -Fall, Junior year or later 9

Design Electives (12 units minimum)
A minimum of 12 additional Design units must be approved by the Design advisor. A list of these selected courses must be filed in the BXA office.

Drama Concentration (108 units minimum)
A minimum of 35 additional Dramaturgy units must be approved by the Dramaturgy faculty option coordinator. A list of these selected courses must be filed in the BXA office.

Music Concentration (108 units minimum)
A minimum of 62 additional PTM units must be approved by the PTM faculty option coordinator. A list of these selected courses must be filed in the BXA office.

Music Concentration (108 units minimum)

<table>
<thead>
<tr>
<th>Required Courses for All Concentration Options (20 units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>54-175-54-176 Conservatory Hour-Conservatory Hour (1 unit each)</td>
</tr>
<tr>
<td>54-177 Foundations of Drama I</td>
</tr>
<tr>
<td>54-281 Foundations of Drama II (prerequisite: 54-177)</td>
</tr>
<tr>
<td>54-381 Special Topics in Drama: History, Literature and Criticism</td>
</tr>
</tbody>
</table>

Work with Drama Faculty Option Coordinator to Approve Concentration Option (88 units minimum):

<table>
<thead>
<tr>
<th>Design Required Courses (26 units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>54-151-54-152 Stagecraft-Stagecraft (13 units + 13 units)</td>
</tr>
</tbody>
</table>

A minimum of 62 additional Design units must be approved by the Design faculty option coordinator. A list of these selected courses must be filed in the BXA office.

<table>
<thead>
<tr>
<th>Directing Required Courses (52 units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>54-121-54-122 Directing I: Sources-Directing I: Sources</td>
</tr>
<tr>
<td>54-221-54-222 Directing II: Fundamentals-Directing II: Fundamentals</td>
</tr>
<tr>
<td>54-159-54-159 Production Practicum-Production Practicum (two times, 12 units total)</td>
</tr>
<tr>
<td>54-517 Director's Colloquium (four times, 4 units total)</td>
</tr>
</tbody>
</table>

A minimum of 36 additional Directing units must be approved by the Directing faculty option coordinator. A list of these selected courses must be filed in the BXA office.

<table>
<thead>
<tr>
<th>Dramaturgy Required Courses (53 units minimum)</th>
</tr>
</thead>
<tbody>
<tr>
<td>54-109 Dramaturgy 1: Approaches to Text</td>
</tr>
<tr>
<td>54-184 Dramaturgy 2: Introduction to Production</td>
</tr>
<tr>
<td>54-121 Directing I: Sources</td>
</tr>
<tr>
<td>54-159 Production Practicum</td>
</tr>
<tr>
<td>54-200-54-200 Dramaturgy Forum-Dramaturgy Forum -Fall (minimum of two; every semester it is offered while enrolled)</td>
</tr>
<tr>
<td>54-xxx Dramaturgy 3, 4, 5 or 6 (minimum of two; all four if enrolled as BXA for six semesters or more)</td>
</tr>
</tbody>
</table>

A minimum of 35 additional Dramaturgy units must be approved by the Dramaturgy faculty option coordinator. A list of these selected courses must be filed in the BXA office.

<table>
<thead>
<tr>
<th>Production Technology and Management Required Courses (26 units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>54-151-54-152 Stagecraft-Stagecraft (13 units + 13 units)</td>
</tr>
</tbody>
</table>

A minimum of 18 additional Music units must be approved by the Music advisor. A list of these selected courses must be filed in the BXA office.
Choose 59 units from:

- 57-153 Harmony II - Spring 9
- or 57-150 Basic Harmony II
- 57-182 Solfege II 3
- or 57-186 Advanced Solfege II
- 15-104 Introduction to Computing for Creative Practice 10
- 18-090 Twisted Signals: Multimedia Processing for the Arts 10
- 33-114 Physics of Musical Sound 9
- 54-166 Introduction to Sound Design for Theatre 6
- 54-275 History of Sound Design 3
- 54-666 Production Audio 6
- 57-344 Experimental Sound Synthesis 9
- 57-421 The Exploded Ensemble 6
- 57-425 Expanded Music Performance 9
- 57-427 Advanced Seminar in Film Musicology 9
- 57-478 Survey of Historical Recording 6
- 57-622 Independent Study in Sound Recording Production 3
- 60-131 3D Media Studio II 5
- 60-210 Electronic Media Studio: Introduction to Interactivity 10

Note: Students completing an IDeATe minor may double-count up to two of the IDeATe minor courses towards the Audio Recording & Production concentration.

Sound Theory & Practice Required Courses (47 units)

- 57-101 Introduction to Music Technology 6
- or 57-171 Introduction to Music Technology (self-paced)
- 57-181 Solfege I - Fall 3
- or 57-380 Basic Solfege I
- or 57-385 Advanced Solfege I
- 57-173 Survey of Western Music History - Fall (corequisite: 57-188) 9
- 57-188 Repertoire and Listening for Musicians 1
- 18-090 Twisted Signals: Multimedia Processing for the Arts 10
- 57-911 Music Since 1945 9
- 57-516 Independent Study in Sound Studies 9

Choose 52 units from:

- 57-153 Harmony II - Spring 9
- or 57-150 Basic Harmony II
- 57-182 Solfege II 3
- or 57-186 Advanced Solfege II
- 15-104 Introduction to Computing for Creative Practice 10
- 15-322 Introduction to Computer Music (pre-requisite: 15-112) 9
- 15-323 Computer Music Systems and Information Processing (pre-requisite: 15-122) 9
- 33-114 Physics of Musical Sound 9
- 57-337 Sound Recording 6
- 57-343 Interdisciplinary Studies in Listening, Culture, and Technology 9
- 57-344 Experimental Sound Synthesis 9
- 57-347 Electronic and Computer Music (pre-requisite: 57-101 or 57-171) 6
- 57-421 The Exploded Ensemble 6
- 57-425 Expanded Music Performance 9
- 57-438 Multitrack Recording 9
- 57-829 Contemporary Soundscapes 9
- 60-131 3D Media Studio II 5
- 60-210 Electronic Media Studio: Introduction to Interactivity 10

Note: Students completing an IDeATe minor may double-count up to two of the IDeATe minor courses towards the Sound Theory & Practice concentration.

IV. Free Electives

(approximately 9 courses, 78 units)

Take any Carnegie Mellon course. Many BHA students use their electives to broaden or deepen their concentrations. A maximum of 9 units of physical education and/or military science may be counted toward this requirement. Physical education and military science courses will not be calculated in a student’s QPA.

Bachelor of Science and Arts Degree Program

Carnegie Mellon University recognizes that there are students who are naturally gifted in both the fine arts and the natural sciences or mathematics. In order to accommodate students who want to pursue an education simultaneously in these areas, we offer a degree that combines the strengths of the College of Fine Arts (CFA) and the Mellon College of Science (MCS). The intercollege degree, called the Bachelor of Science and Arts (BSA), is a rigorous program that offers a unique group of qualified students the opportunity to develop their talents and interests in an area of the fine arts and an area of the natural sciences or mathematics.

The BSA curriculum is divided into three parts: 1) BSA General Education coursework, 2) CFA concentration coursework, and 3) MCS concentration coursework.

Students choose their fine arts concentration from among the five schools in CFA: Architecture, Art, Design, Drama or Music. A student must meet the entry requirements for the particular CFA school of their choice. While in the BSA Program, a student may change their CFA concentration only if they pass all admission requirements for that particular school.

Students choose their science concentration from among the four departments in MCS: Biological Sciences, Chemistry, Mathematical Sciences, Neurobiology, or Physics.

The BSA Degree Program is governed by faculty and administrators from both colleges and led by the director of the BXA Intercollege Degree Programs. The director and associate director of the BXA Intercollege Degree Programs are the primary advisors and liaisons between CFA and MCS. Students receive extensive advising support. Each student has two additional academic advisors: an advisor in the admitting school of CFA for their fine arts concentration, and an advisor in MCS for their natural sciences/mathematics concentration. This network of advisors guides each student through their curriculum.

BSA Curriculum

<table>
<thead>
<tr>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. BSA General Education</td>
</tr>
<tr>
<td>II. MCS Concentration</td>
</tr>
<tr>
<td>III. CFA Concentration</td>
</tr>
<tr>
<td>IV. Free Electives</td>
</tr>
<tr>
<td>Total BSA Degree Requirements</td>
</tr>
</tbody>
</table>

I. BSA General Education

(18 courses, 129 units minimum)

- Mathematics (2 courses, 20 units, 21-120 and 21-122 or 21-124 required)
- Science (3 courses, 31 units, 03-121, 09-105, and 33-111 or 33-151 required)
- First-year Courses (2 courses, 12 units, 76-101 and 99-101 or 99-102 required)
- ENGAGE (3 courses, 3 units)
- Cultural/Global Understanding (1 course, 9 units)
- Humanities and Social Sciences (2 courses, 18 units)
- BXA Required Courses (5 courses, 36 units minimum, 52-190 or 52-291, 52-391, 52-392, 52-401, 52-402)

Technical Breadth Requirements (5 courses, 51 units)

As a 21st Century practicing scientist or mathematician, our graduates will work with others from a variety of technical backgrounds. Therefore,
all of our students will be broadly trained within the technical fields of science and math. Students will fulfill this training by completing five (5) introductory technical courses in the Mellon College of Science at Carnegie Mellon University.

A student must take the five (5) courses listed below. AP/IB/Cambridge credit may be used to fulfill some of these requirements, but STEM electives must be taken at CMU or at another university for transfer credit to reach the total of five (5) Technical Breadth courses. A list of STEM electives can be found in the MCS general education requirements (http://coursecatalog.web.cmu.edu/melloncollegeofscience/#forstudentsenteringinfallof2015andbeyond).

Mathematics (2 courses, 20 units)
21-120 Differential and Integral Calculus 10
21-122 Integration and Approximation 10
or 21-124 Calculus II for Biologists and Chemists

Science (3 courses, 31 units)
03-121 Modern Biology 9
09-105 Introduction to Modern Chemistry I 10
33-121 Physics I for Science Students 12
or 33-151 Matter and Interactions I

Nontechenical Breadth Requirements (8 courses, 42 units)
MCS aspires for all of our undergraduates to leave our campus with a strong sense of personal integrity, social responsibility, ethics, working with diverse others, global engagement, and personal health and well-being. The following non-technical breadth requirements will require students to develop a personalized plan for their course selection and meta-curricular participation to maximize their CMU experience. Our graduates will be well trained to be life-long and life-wide learners that will lead the scientific community and the world at large.

All candidates for BSA degree must complete the following non-technical breadth requirements:

First-year Courses (2 courses, 12 units)
76-101 Interpretation and Argument 9
(various topics by section) www.cmu.edu/hss/english/first_year/index.html
99-101 Computing @ Carnegie Mellon 3
or 99-102 Computing @ Carnegie Mellon

ENGAGE (3 courses, 3 units)
The ENGAGE courses are self-directed learning opportunities (using the MyCORE online platform) designed to enhance students’ engagement with wellness and community service. Choose three courses from the list below:

38-110 ENGAGE in Service 1
38-230 ENGAGE in Wellness: Looking Inward 1
38-330 ENGAGE in Wellness: Looking Outward 1
38-430 ENGAGE in Wellness: Looking Forward 1

Cultural/Global Understanding (1 course, 9 units)
Cultural or global understanding course(s) may be taken at any time. Nine (9) or more units from the following group of courses will fulfill this requirement. Any student who finds an appropriate Carnegie Mellon course not on the list below that might fulfill this requirement should contact their academic advisor to review the course description to determine if it can be substituted. Cultural and global understanding courses that are taken while studying abroad can be used to fulfill this category. In addition, transfer courses will also be considered for this category.

57-173 Survey of Western Music History 9
57-209 The Beatles 9
57-306 World Music 9
70-342 Managing Across Cultures 9
73-331 Political Economy of Inequality and Redistribution 9
76-221 Books You Should Have Read By Now 9
76-227 Comedy 9
76-232 Introduction to African American Literature 9
76-239 Introduction to Film Studies 9
76-241 Introduction to Gender Studies 9
76-386 Language & Culture 9
79-104 Global Histories 9
79-201 Introduction to Anthropology 9
79-202 Flesh and Spirit: Early Modern Europe, 1400-1750 9
79-205 20th/21st Century Europe 9
79-207 Development of European Culture 9
79-221 Development and Democracy in Latin America 9
79-229 Origins of the Arab-Israeli Conflict, 1880-1948 9
79-230 Arab-Israeli Conflict and Peace Process since 1948 9
79-240 Development of American Culture 9
79-241 African American History: Africa to the Civil War 9
79-242 African American History: Reconstruction to the Present 9
79-255 Irish History 9
79-261 The Last Emperors: Chinese History and Society, 1600-1900 9
79-265 Russian History: From the First to the Last Tsar 9
79-266 Russian History: From Communism to Capitalism 9
79-275 Introduction to Global Studies: 9
79-297 Dilemmas and Controversies in Anthropology 9
79-307 Religion and Politics in the Middle East 9
79-345 Roots of Rock & Roll 9
79-349 The Holocaust in Historical Perspective 9
79-350 Early Christianity 9
79-357 History of Black American Music 6
79-377 Food, Culture, and Power: A History of Eating 9
80-100 Introduction to Philosophy 9
80-250 Ancient Philosophy 9
80-251 Modern Philosophy 9
80-253 Continental Philosophy 9
80-254 Analytic Philosophy 9
80-255 Pragmatism 9
80-276 Philosophy of Religion 9
82-xxx Any course from Modern Languages 9
99-241 Revolutions of Circularity 9
99-3xx Any of the Country Today courses 3

Humanities and Social Sciences (2 courses, 18 units)
To fulfill this requirement, students must complete a minimum of two (2) nontechnical courses totaling at least 18 units in the Tepper School of Business and/or the Dietrich College of Humanities and Social Sciences. Courses counted toward the Cultural/Global Understanding requirement, and 76-101, do not count toward this requirement.

Check our web site for courses from DC, CFA, and Tepper that may NOT be used (http://www.cmu.edu/mcs/undergrad/advising/hss-finearts/deletions.html) to satisfy this requirement because they are too technical in nature, plus a list of courses in other colleges (including SCS, CIT, Tepper, and Heinz College) that do satisfy (http://www.cmu.edu/mcs/undergrad/advising/hss-finearts/additions.html) this requirement.

BXA Required Courses (5 courses, 36 units minimum)
BXA-specific courses give students the opportunity to integrate their areas of concentration by focusing on interdisciplinary approaches and arts-based research techniques.

52-190 BXA Seminar I: Building the Wunderkammer 9
or 52-291 BXA Seminar II: Transferring Knowledge 9
52-391 BXA Junior Portfolio 0
52-392 BXA Seminar III: Deconstructing Disciplines 9
52-401 BXA Seminar IV: Capstone Fall 9
52-402 BXA Seminar V: Capstone Spring 9

II. Mellon College of Science Concentration
(number of courses vary, 114-134 units)
BSA students choose one of the following concentrations:
- Biological Sciences (114 units)
- Chemistry (121 units)
- Mathematical Sciences (123 units)
- Neurobiology (114 units)
- Physics (134 units)

**Biological Sciences Concentration (114 units minimum)**

Biological Sciences Required Courses (96 units minimum)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>03-201/202</td>
<td>Undergraduate Colloquium for Sophomores</td>
<td>2</td>
</tr>
<tr>
<td>03-220</td>
<td>Genetics (co-requisite: 03-343)</td>
<td>9</td>
</tr>
<tr>
<td>03-231</td>
<td>Biochemistry I</td>
<td>9</td>
</tr>
<tr>
<td>or 03-232</td>
<td>Biochemistry I</td>
<td>9</td>
</tr>
<tr>
<td>03-320</td>
<td>Cell Biology - Fall, Junior year</td>
<td>9</td>
</tr>
<tr>
<td>03-343</td>
<td>Experimental Techniques in Molecular Biology - Fall, Junior year</td>
<td>12</td>
</tr>
<tr>
<td>09-106</td>
<td>Modern Chemistry II</td>
<td>10</td>
</tr>
<tr>
<td>09-207</td>
<td>Techniques in Quantitative Analysis</td>
<td>9</td>
</tr>
<tr>
<td>or 09-208</td>
<td>Techniques for Organic Synthesis and Analysis</td>
<td>9</td>
</tr>
<tr>
<td>or 09-344</td>
<td>Experimental Biochemistry</td>
<td>9</td>
</tr>
<tr>
<td>or 09-345</td>
<td>Experimental Cell and Developmental Biology</td>
<td>9</td>
</tr>
<tr>
<td>or 09-346</td>
<td>Experimental Neuroscience</td>
<td>9</td>
</tr>
<tr>
<td>09-217</td>
<td>Organic Chemistry I</td>
<td>9</td>
</tr>
<tr>
<td>09-218</td>
<td>Organic Chemistry II</td>
<td>9</td>
</tr>
<tr>
<td>33-122</td>
<td>Physics II for Biological Sciences &amp; Chemistry Students</td>
<td>9</td>
</tr>
</tbody>
</table>

Biological Sciences Electives (2 courses, 18 units)

One course must be an advanced elective selected from 03-3xx or higher, excluding 03-445.

**Chemistry Concentration (121 units minimum)**

Chemistry Required Courses (103 units)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>09-106</td>
<td>Modern Chemistry II</td>
<td>10</td>
</tr>
<tr>
<td>09-219</td>
<td>Modern Organic Chemistry</td>
<td>10</td>
</tr>
<tr>
<td>09-220</td>
<td>Modern Organic Chemistry II</td>
<td>10</td>
</tr>
<tr>
<td>09-214</td>
<td>Physical Chemistry</td>
<td>9</td>
</tr>
<tr>
<td>or 09-344</td>
<td>Physical Chemistry (Quantum): Microscopic Principles of Physical Chemistry</td>
<td>9</td>
</tr>
<tr>
<td>or 09-345</td>
<td>Physical Chemistry (Thermo): Macroscopic Principles of Physical Chemistry</td>
<td>9</td>
</tr>
<tr>
<td>09-348</td>
<td>Inorganic Chemistry</td>
<td>10</td>
</tr>
<tr>
<td>09-221</td>
<td>Laboratory I: Introduction to Chemical Analysis</td>
<td>12</td>
</tr>
<tr>
<td>09-222</td>
<td>Laboratory II: Organic Synthesis and Analysis</td>
<td>12</td>
</tr>
<tr>
<td>09-321</td>
<td>Laboratory III: Molecular Design and Synthesis</td>
<td>12</td>
</tr>
<tr>
<td>or 09-323</td>
<td>Bioorganic Chemistry Laboratory</td>
<td>9</td>
</tr>
<tr>
<td>09-204</td>
<td>Professional Communication Skills in Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>09-201-09-202</td>
<td>Undergraduate Seminar I - Undergraduate Seminar II</td>
<td>3</td>
</tr>
<tr>
<td>09-402</td>
<td>Undergraduate Seminar VI</td>
<td>3</td>
</tr>
<tr>
<td>33-122</td>
<td>Physics II for Biological Sciences &amp; Chemistry Students</td>
<td>9</td>
</tr>
</tbody>
</table>

Note: Students who have a strong chemistry background, should enroll in 09-107 rather than 09-105. Students who complete 09-107 with an "A" grade will be exempted from the requirement to take 09-106 Modern Chemistry II.

Advanced Chemistry Electives (2 courses, 18 units)

May be any upper level chemistry course, 09-3xx or higher, or Biochemistry I, 03-231 or 03-232, with the exception of 09-435 Independent Study, which can be used only by permission of the Director of Undergraduate Studies.

**Mathematical Sciences Concentration (123 units minimum)**

Mathematical Sciences Required Courses (87 units minimum)

(Reasonable substitutions within the core program will be allowed.)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-110</td>
<td>Principles of Computing</td>
<td>10</td>
</tr>
<tr>
<td>21-127</td>
<td>Concepts of Mathematics</td>
<td>10</td>
</tr>
<tr>
<td>or 21-128</td>
<td>Mathematical Concepts and Proofs</td>
<td>9</td>
</tr>
<tr>
<td>21-228</td>
<td>Discrete Mathematics</td>
<td>9</td>
</tr>
<tr>
<td>21-241</td>
<td>Matrices and Linear Transformations</td>
<td>10</td>
</tr>
<tr>
<td>or 21-242</td>
<td>Matrix Theory</td>
<td>9</td>
</tr>
<tr>
<td>21-259</td>
<td>Calculus in Three Dimensions</td>
<td>9</td>
</tr>
<tr>
<td>or 21-268</td>
<td>Multidimensional Calculus</td>
<td>9</td>
</tr>
<tr>
<td>21-260</td>
<td>Differential Equations</td>
<td>9</td>
</tr>
<tr>
<td>or 21-261</td>
<td>Introduction to Ordinary Differential Equations</td>
<td>9</td>
</tr>
<tr>
<td>or 33-231</td>
<td>Physical Analysis</td>
<td>9</td>
</tr>
<tr>
<td>21-355</td>
<td>Principles of Real Analysis I</td>
<td>9</td>
</tr>
<tr>
<td>21-373</td>
<td>Algebraic Structures</td>
<td>9</td>
</tr>
<tr>
<td>33-142</td>
<td>Physics II for Engineering and Physics Students</td>
<td>12</td>
</tr>
<tr>
<td>or 33-152</td>
<td>Matter and Interactions II</td>
<td>9</td>
</tr>
</tbody>
</table>

Mathematical Sciences Electives (2 courses, 18 units)

Students with a Music concentration should take 21-272 Introduction to Partial Differential Equations.

Mathematical Sciences, Statistics, or Computer Science Electives (2 courses, 18 units)

May be computer science course above the 100-level, mathematical science courses beyond the calculus sequence, and statistics courses at the level of 36-225 or higher.

**Neurobiology Concentration (114 units minimum)**

Neurobiology Required Courses (12 courses, 96 units)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>03-161</td>
<td>Molecules to Mind</td>
<td>9</td>
</tr>
<tr>
<td>or 85-219</td>
<td>Biological Foundations of Behavior</td>
<td>9</td>
</tr>
<tr>
<td>03-201</td>
<td>Undergraduate Colloquium for Sophomores</td>
<td>2</td>
</tr>
<tr>
<td>03-220</td>
<td>Genetics - Fall, Sophomore year</td>
<td>9</td>
</tr>
<tr>
<td>03-231</td>
<td>Biochemistry I - Spring, Sophomore year</td>
<td>9</td>
</tr>
<tr>
<td>03-320</td>
<td>Cell Biology - Fall, Junior year</td>
<td>9</td>
</tr>
<tr>
<td>03-342</td>
<td>Introduction to Biological Laboratory Practices - Fall, Junior year</td>
<td>1</td>
</tr>
<tr>
<td>03-343</td>
<td>Experimental Techniques in Molecular Biology - Fall, Junior year</td>
<td>12</td>
</tr>
<tr>
<td>03-362</td>
<td>Cellular Neuroscience</td>
<td>9</td>
</tr>
<tr>
<td>03-363</td>
<td>Systems Neuroscience</td>
<td>9</td>
</tr>
<tr>
<td>09-217</td>
<td>Organic Chemistry I</td>
<td>9</td>
</tr>
<tr>
<td>33-122</td>
<td>Physics II for Biological Sciences &amp; Chemistry Students</td>
<td>9</td>
</tr>
<tr>
<td>85-211</td>
<td>Cognitive Psychology</td>
<td>9</td>
</tr>
</tbody>
</table>

Neurobiology Electives (2 courses, 18 units)

One course must be an advanced elective selected from 03-3xx or higher.

**Physics Concentration (134 units minimum)**

Physics Required Courses (116 units)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>21-259</td>
<td>Calculus in Three Dimensions</td>
<td>9</td>
</tr>
<tr>
<td>33-104</td>
<td>Experimental Physics</td>
<td>9</td>
</tr>
<tr>
<td>33-142</td>
<td>Physics II for Engineering and Physics Students</td>
<td>12</td>
</tr>
<tr>
<td>or 33-152</td>
<td>Matter and Interactions II</td>
<td>9</td>
</tr>
<tr>
<td>33-201</td>
<td>Physics Sophomore Colloquium I -Fall</td>
<td>2</td>
</tr>
<tr>
<td>33-202</td>
<td>Physics Sophomore Colloquium II -Spring</td>
<td>2</td>
</tr>
<tr>
<td>33-211</td>
<td>Physics III: Modern Essentials</td>
<td>10</td>
</tr>
<tr>
<td>33-228</td>
<td>Electronics I</td>
<td>10</td>
</tr>
<tr>
<td>33-231</td>
<td>Physical Analysis</td>
<td>10</td>
</tr>
<tr>
<td>33-232</td>
<td>Mathematical Methods of Physics</td>
<td>10</td>
</tr>
<tr>
<td>33-234</td>
<td>Quantum Physics</td>
<td>10</td>
</tr>
</tbody>
</table>
III. College of Fine Arts Concentration
(number of courses vary, 108 units minimum)
BSA students choose one of the following concentrations:

- Architecture (108 units)
- Art (108 units)
- Design (108 units)
- Drama (108 units)
- Music (108 units)

**Architecture Concentration (108 units minimum)**

**Architecture Required Courses (52 units minimum)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>48-100</td>
<td>Architecture Design Studio: Foundation I-Fall, Freshman year</td>
<td>10-12</td>
</tr>
<tr>
<td>48-095</td>
<td>Spatial Concepts for Non-Architects I</td>
<td>9</td>
</tr>
<tr>
<td>48-120</td>
<td>Digital Media I -Fall, Freshman year</td>
<td>6</td>
</tr>
<tr>
<td>48-121</td>
<td>Drawing I -Fall, Freshman year</td>
<td>6</td>
</tr>
<tr>
<td>48-125</td>
<td>Digital Media II -Spring, Freshman year</td>
<td>6</td>
</tr>
<tr>
<td>48-126</td>
<td>Drawing II -Spring, Freshman year</td>
<td>6</td>
</tr>
<tr>
<td>48-240</td>
<td>Historical Survey of World Architecture and Urbanism I -Spring, Freshman year</td>
<td>9</td>
</tr>
<tr>
<td>48-241</td>
<td>Modern Architecture -Fall, Sophomore year</td>
<td>9</td>
</tr>
</tbody>
</table>

**Architecture Electives (56 units minimum)**

A minimum of 56 additional Architecture units must be approved by the Architecture advisor. A list of these selected courses must be filed in the BXA office.

**Art Concentration (108 units minimum)**

**PORTFOLIO REVIEW REQUIRED FOR ADMISSION**

**Concept Studios (2 courses, 20 units)**
Complete two courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>60-101</td>
<td>Concept Studio: The Self and the Human Being</td>
<td>10</td>
</tr>
<tr>
<td>60-201</td>
<td>Concept Studio: Space and Time</td>
<td>10</td>
</tr>
<tr>
<td>60-202</td>
<td>Concept Studio: Systems and Processes</td>
<td>10</td>
</tr>
<tr>
<td>60-203</td>
<td>Concept Studio: EcoArt</td>
<td>10</td>
</tr>
<tr>
<td>60-204</td>
<td>Concept Studio: Networked Narrative</td>
<td>10</td>
</tr>
</tbody>
</table>

**Media Studios (3 courses, 30 units)**
Complete three courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>60-150</td>
<td>2D Media Studio: Drawing</td>
<td>10</td>
</tr>
<tr>
<td>60-160</td>
<td>2D Media Studio: Imaging</td>
<td>10</td>
</tr>
<tr>
<td>60-250</td>
<td>2D Media Studio: Painting</td>
<td>10</td>
</tr>
<tr>
<td>60-251</td>
<td>2D Media Studio: Print Media</td>
<td>10</td>
</tr>
<tr>
<td>60-130-60-130</td>
<td>3-D Media Studio I (complete two minis, 5 units each)</td>
<td>10</td>
</tr>
<tr>
<td>60-131-60-131</td>
<td>3D Media Studio II-II (complete two minis, 5 units each)</td>
<td>10</td>
</tr>
<tr>
<td>60-110</td>
<td>Electronic Media Studio: Introduction to the Moving Image</td>
<td>10</td>
</tr>
</tbody>
</table>

**Advanced Studios (4 courses, 40 units)**
Complete four courses. Courses may be offered in the fall and/or spring. Students may take courses in any media area (ETB, SIS, CP or DP3). They may take all courses in one media area if a focus is desired.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>60-401/402</td>
<td>Senior Studio</td>
<td>10</td>
</tr>
<tr>
<td>60-403</td>
<td>Extended Studio</td>
<td>10</td>
</tr>
<tr>
<td>60-410 - 60-429</td>
<td>Advanced Electronic and Time-Based Work (ETB)</td>
<td>10</td>
</tr>
<tr>
<td>60-430 - 60-447</td>
<td>Advanced Sculpture, Installation and Site-Work (SIS)</td>
<td>10</td>
</tr>
<tr>
<td>60-448 - 60-449</td>
<td>Advanced Contextual Practice (CP)</td>
<td>10</td>
</tr>
<tr>
<td>60-450 - 60-498</td>
<td>Advanced Drawing, Painting, Print Media and Photography (DP3)</td>
<td>10</td>
</tr>
<tr>
<td>60-499</td>
<td>Studio Independent Study (one only)</td>
<td>10</td>
</tr>
</tbody>
</table>

**Design Concentration (108 units minimum)**

**PORTFOLIO REVIEW REQUIRED FOR ADMISSION**

**Design Required Courses (96 units)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>51-101</td>
<td>Studio: Survey of Design -Fall, Freshman year</td>
<td>9</td>
</tr>
<tr>
<td>51-103</td>
<td>Design Workshop I -Fall, Freshman year</td>
<td>3</td>
</tr>
<tr>
<td>51-111</td>
<td>Visualizing -Fall, Freshman year</td>
<td>9</td>
</tr>
<tr>
<td>51-121</td>
<td>Placing -Fall, Freshman year</td>
<td>9</td>
</tr>
<tr>
<td>51-102</td>
<td>Design Lab -Spring, Freshman year</td>
<td>9</td>
</tr>
<tr>
<td>51-104</td>
<td>Design Workshop II -Spring, Freshman year</td>
<td>3</td>
</tr>
<tr>
<td>51-122</td>
<td>Collaborative Visualizing -Spring, Freshman year</td>
<td>9</td>
</tr>
<tr>
<td>51-172</td>
<td>Systems -Spring, Freshman year</td>
<td>9</td>
</tr>
</tbody>
</table>

Choose Two Studios:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>51-225</td>
<td>Communications Studio I: Understanding Form &amp; Context -Fall, Sophomore year</td>
<td>4.5, 4.5</td>
</tr>
<tr>
<td>51-245</td>
<td>Products Studio I: Understanding Form &amp; Context</td>
<td>4.5, 4.5</td>
</tr>
<tr>
<td>51-265</td>
<td>Environments Studio I: Understanding Form &amp; Context</td>
<td>4.5, 4.5</td>
</tr>
</tbody>
</table>

Choose Two Corresponding Labs:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>51-227</td>
<td>Prototyping Lab I: Communications -Fall, Sophomore year</td>
<td>4.5, 4.5</td>
</tr>
<tr>
<td>51-247</td>
<td>Prototyping Lab I: Products</td>
<td>4.5, 4.5</td>
</tr>
<tr>
<td>51-267</td>
<td>Prototyping Lab I: Environments</td>
<td>4.5, 4.5</td>
</tr>
</tbody>
</table>

**Design Electives (12 units minimum)**
A minimum of 12 additional Design units must be approved by the Design advisor. A list of these selected courses must be filed in the BXA office.

**Drama Concentration (108 units minimum)**

**AUDITION/INTERVIEW REQUIRED FOR DIRECTING OR DRAMATURGY CONCENTRATION OPTION. PORTFOLIO REVIEW/INTERVIEW REQUIRED FOR DESIGN OR PRODUCTION TECHNOLOGY AND MANAGEMENT CONCENTRATION OPTION.**
Options available in the following areas: 1) Design, 2) Directing, 3) Dramaturgy, 4) Production Technology and Management

Note: There is no BSA Acting or Musical Theatre option.
Required Courses for All Concentration Options (20 units)
54-175-54-176 Conservatory Hour-Conservatory Hour (1 unit each)  2
54-177 Foundations of Drama I  6
54-281 Foundations of Drama II (prerequisite: 54-177)  6
54-381 Special Topics in Drama: History, Literature and Criticism  6

Work with Music Advisor to Approve Concentration Option (99 units minimum):
Performance and Composition Required Courses (76 units)
57-161 Eurhythmics I -Fall (recommended co-requisite: 57-181)  3
57-181 Solfege I -Fall or 57-180 Basic Solfege I or 57-185 Advanced Solfege I  3
57-173 Survey of Western Music History -Fall (co-requisite: 57-188)  9
57-188 Repertoire and Listening for Musicians  1
57-69x BXA Studio (4 semesters)  36
57-xxx Major Ensemble (4 semesters)  24

A minimum of 23 additional Music units must be approved by the Music advisor. A list of these selected courses must be filed in the BXA office.

Musicology Required Courses (45 units)
57-283 Music History I (co-requisite: 57-190)  9
57-284 Music History II (co-requisite: 57-289)  9
57-285 Music History III (co-requisite: 57-290)  9
57-189 Introduction to Repertoire and Listening for Musicians  3
57-190 Repertoire and Listening for Musicians I  3
57-289 Repertoire and Listening for Musicians II  3
57-290 Repertoire and Listening for Musicians III  3
57-611 Independent Study in History  6

Choose 36 units from:
57-209 The Beatles  9
57-306 World Music  9
57-430 Music of Iran  9
57-477 Music of the Spirit  6
57-478 Survey of Historical Recording  6
57-480 History of Black American Music  6

A minimum of 18 additional Music units must be approved by the Music advisor. A list of these selected courses must be filed in the BXA office.

Audio Recording & Production Required Courses (40 units)
57-101 Introduction to Music Technology  6
or 57-171 Introduction to Music Technology (self-paced)  6
57-181 Solfege I -Fall or 57-180 Basic Solfege I or 57-185 Advanced Solfege I  9
57-173 Survey of Western Music History -Fall (co-requisite: 57-188)  9
57-188 Repertoire and Listening for Musicians  1
57-337 Sound Recording  6
57-338 Sound Editing and Mastering  6
57-438 Multitrack Recording  9

Choose 59 units from:
57-153 Harmony II -Spring  9
or 57-150 Basic Harmony II  9
57-182 Solfege II or 57-186 Advanced Solfege II  3
15-104 Introduction to Computing for Creative Practice  10
18-090 Twisted Signals: Multimedia Processing for the Arts  10
33-114 Physics of Musical Sound  9
54-166 Introduction to Sound Design for Theatre  6
54-275 History of Sound Design  3
54-666 Production Audio  6
57-344 Experimental Sound Synthesis  9
57-421 The Exploded Ensemble  6
57-425 Expanded Music Performance  9
57-427 Advanced Seminar in Film Musicology  9
57-478 Survey of Historical Recording  6

A minimum of 88 units must be approved by the Music advisor. A list of these selected courses must be filed in the BXA office.

Design Required Courses (26 units)
54-151-54-152 Stagecraft-Stagecraft (13 units + 13 units)  26

A minimum of 62 additional Design units must be approved by the Design faculty option coordinator. A list of these selected courses must be filed in the BXA office.

Directing Required Courses (52 units)
54-121-54-122 Directing I: Sources-Directing I: Sources  18
54-221-54-222 Directing II: Fundamentals-Directing II: Fundamentals  18
54-159-54-159 Production Practicum-Production Practicum (two times, 12 units total)  12
54-517 Director's Colloquium (four times, 4 units total)  1

A minimum of 36 additional Directing units must be approved by the Directing faculty option coordinator. A list of these selected courses must be filed in the BXA office.

Dramaturgy Required Courses (53 units minimum)
54-109 Dramaturgy 1: Approaches to Text  9
54-184 Dramaturgy 2: Introduction to Production Dramaturgy  9
54-121 Directing I: Sources  9
54-159 Production Practicum  6
54-200-54-200 Dramaturgy Forum-Dramaturgy Forum -Fall (minimum of two; every semester it is offered while enrolled)  2
54-xxx Dramaturgy 3, 4, 5 or 6 (minimum of two; all four if enrolled as BXA for six semesters or more)  18

A minimum of 35 additional Dramaturgy units must be approved by the Dramaturgy faculty option coordinator. A list of these selected courses must be filed in the BXA office.

Production and Technology and Management Required Courses (26 units)
54-151-54-152 Stagecraft-Stagecraft (13 units + 13 units)  26

A minimum of 62 additional PTM units must be approved by the PTM faculty option coordinator. A list of these selected courses must be filed in the BXA office.

Music Concentration (108 units minimum)
AUDITION REQUIRED FOR PERFORMANCE CONCENTRATION OPTION. PORTFOLIO REVIEW/INTERVIEW REQUIRED FOR COMPOSITION, MUSICOLOGY, AUDIO RECORDING & PRODUCTION, OR SOUND THEORY & PRACTICE CONCENTRATION OPTION.

Options available in the following areas: 1) Performance (instrumental, piano, organ, voice), 2) Composition 3) Musicology, 4) Audio Recording & Production, 5) Sound Theory & Practice

Required Course for All Concentration Options (9 units)
57-152 Harmony I-Fall  9
or 57-149 Basic Harmony I

Work with Music Advisor to Approve Concentration Option (99 units minimum):
Bachelor of Computer Science and Arts Degree Program

Carnegie Mellon University recognizes that there are students who are naturally gifted in both the fine arts and computer science. In order to accommodate students who want to pursue an education simultaneously in these areas, we offer a degree that combines the strengths of the College of Fine Arts (CFA) and the School of Computer Science (SCS). The intercollege degree, called the Bachelor of Computer Science and Arts (BCSA), is a rigorous program that offers a unique group of qualified students the opportunity to develop their talents and interests in an area of the fine arts and computer science.

The BCSA curriculum is divided into three parts: 1) BCSA General Education coursework, 2) CFA concentration coursework, and 3) SCS concentration coursework. Students choose their fine arts concentration from among the five schools in CFA: Architecture, Art, Design, Drama or Music. A student must meet the entry requirements for the particular CFA school of their choice. While in the BCSA Program, a student may change their CFA concentration only if they pass all admission requirements for that particular school. The BCSA Degree Program is governed by faculty and administrators from both colleges and led by the director of the BXA Intercollege Degree Programs. The director and associate director of the BXA Intercollege Degree Programs are the primary advisors and liaisons between CFA and SCS. Students receive extensive advising support. Each student has two additional academic advisors: an advisor in the admitting school of CFA for their fine arts concentration, and an advisor in SCS for their computer science concentration. This network of advisors guides each student through their curriculum.

BCSA Curriculum

I. BCSA General Education

(15 courses, 121 units minimum)
- Writing/Expression (1 course, 9 units, 76-101 required)
- Cultural Analysis (1 course, 9 units)
- Mathematics (2 courses, 20 units, 21-120 and either 21-122 or 21-241 required), Probability (1 course, 9 units minimum required)
- Science (2 courses, 18 units minimum)
- Engineering (In consultation with your academic advisor, an engineering course could substitute for one of the two Science requirements.)
- Economic, Political, & Social Institutions OR Cognition, Choice & Behavior (1 course, 9 units minimum)
- One additional course from one of the following departments: English, History, Modern Languages, Philosophy, or Psychology (1 course, 9 units minimum)
- Computing @ Carnegie Mellon (1 course, 3 units, 99-101 or 99-102 required)
- BXA Required Courses (5 courses, 36 units minimum, 52-190 or 52-291, 52-391, 52-392, 52-401, 52-402)

Writing (1 course, 9 units)

Broadly considered, language is a tool used to communicate, as well as a way to organize non-visual and non-mathematical thinking. This requirement focuses on the social nature of language and the ways in which writing constitutes thinking.

76-101 Interpretation and Argument 9
(various topics by section) www.cmu.edu/hss/english/first_year/index.html

Cultural Analysis (1 course, complete 9 units)

This requirement seeks to recognize cultures that have shaped and continue to shape the human experience; courses in this category are usually either broad in place, time, or cultural diversity.

76-101 Interpretation and Argument 9
(various topics by section) www.cmu.edu/hss/english/first_year/index.html

Bachelor of Computer Science and Arts Degree Program

Carnegie Mellon University recognizes that there are students who are naturally gifted in both the fine arts and computer science. In order to accommodate students who want to pursue an education simultaneously in these areas, we offer a degree that combines the strengths of the College of Fine Arts (CFA) and the School of Computer Science (SCS). The intercollege degree, called the Bachelor of Computer Science and Arts (BCSA), is a rigorous program that offers a unique group of qualified students the opportunity to develop their talents and interests in an area of the fine arts and computer science.

The BCSA curriculum is divided into three parts: 1) BCSA General Education coursework, 2) CFA concentration coursework, and 3) SCS concentration coursework. Students choose their fine arts concentration from among the five schools in CFA: Architecture, Art, Design, Drama or Music. A student must meet the entry requirements for the particular CFA school of their choice. While in the BCSA Program, a student may change their CFA concentration only if they pass all admission requirements for that particular school. The BCSA Degree Program is governed by faculty and administrators from both colleges and led by the director of the BXA Intercollege Degree Programs. The director and associate director of the BXA Intercollege Degree Programs are the primary advisors and liaisons between CFA and SCS. Students receive extensive advising support. Each student has two additional academic advisors: an advisor in the admitting school of CFA for their fine arts concentration, and an advisor in SCS for their computer science concentration. This network of advisors guides each student through their curriculum.

BCSA Curriculum

I. BCSA General Education

(15 courses, 121 units minimum)
- Writing/Expression (1 course, 9 units, 76-101 required)
- Cultural Analysis (1 course, 9 units)
- Mathematics (2 courses, 20 units, 21-120 and either 21-122 or 21-241 required), Probability (1 course, 9 units minimum required)
- Science (2 courses, 18 units minimum)
- Engineering (In consultation with your academic advisor, an engineering course could substitute for one of the two Science requirements.)
- Economic, Political, & Social Institutions OR Cognition, Choice & Behavior (1 course, 9 units minimum)
- One additional course from one of the following departments: English, History, Modern Languages, Philosophy, or Psychology (1 course, 9 units minimum)
- Computing @ Carnegie Mellon (1 course, 3 units, 99-101 or 99-102 required)
- BXA Required Courses (5 courses, 36 units minimum, 52-190 or 52-291, 52-391, 52-392, 52-401, 52-402)

Writing (1 course, 9 units)

Broadly considered, language is a tool used to communicate, as well as a way to organize non-visual and non-mathematical thinking. This requirement focuses on the social nature of language and the ways in which writing constitutes thinking.

76-101 Interpretation and Argument 9
(various topics by section) www.cmu.edu/hss/english/first_year/index.html

Cultural Analysis (1 course, complete 9 units)

This requirement seeks to recognize cultures that have shaped and continue to shape the human experience; courses in this category are usually either broad in place, time, or cultural diversity.

76-101 Interpretation and Argument 9
(various topics by section) www.cmu.edu/hss/english/first_year/index.html
Science & Engineering (2 courses, 18 units minimum)

Choose two science courses from different departments or one science and one engineering course from the following list:

- 02-223 Personalized Medicine: Understanding Your Own Genome
- 02-250 Introduction to Computational Biology
- 02-261 Quantitative Cell and Molecular Biology Laboratory

Mathematics & Probability (3 courses, 29 units minimum)

Choose two mathematics courses (20 units):

- 21-210 Differential and Integral Calculus
- 21-212 Integration and Approximation
- 21-241 Matrices and Linear Transformations

Choose one probability course (9 units minimum):

- 15-359 Probability and Computing
- 21-325 Probability
- 36-225 Introduction to Probability Theory

Economic, Political & Social Institutions OR Cognition, Choice & Behavior (1 course from either category, complete 9 units minimum)

Economic, Political & Social Institutions

This requirement explores the processes by which institutions organize individual preferences and actions into collective outcomes.

- 19-101 Introduction to Engineering and Public Policy
- 36-303 Sampling, Survey and Society
- 70-332 Business, Society and Ethics
- 73-102 Principles of Microeconomics
- 73-103 Principles of Macroeconomics
- 78-299 From Newton to the Nuclear Bomb: History of Science, 1750-1950
- 79-300 History of American Public Policy
- 79-320 Women, Politics, and Protest
- 79-331 Body Politics: Women and Health in America
- 80-135 Introduction to Political Philosophy
- 80-136 Social Structure, Public Policy & Ethics
- 80-243 Ethics of Leadership
- 80-244 Environmental Ethics
- 80-245 Medical Ethics
- 80-324 Philosophy of Economics
- 80-334 Social and Political Philosophy
- 80-341 Computers, Society and Ethics
- 84-104 Decision Processes in American Political Institutions
- 84-275 Comparative Politics
- 84-310 International Political Economy and Organizations
- 84-320 Domestic Politics and International Affairs
- 84-322 Nonviolent Conflict and Revolution
- 84-324 Democracies and War
- 84-362 Diplomacy and Statecraft
- 84-380 Grand Strategy in the United States
- 84-386 The Privatization of Force
- 84-389 Terrorism and Insurgency
- 84-393 Legislative Decision Making: US Congress
Complete ONE additional course from one of the following departments (1 course, complete 9 units minimum)

- English
- History
- Modern Languages
- Philosophy
- Psychology

Computing @ Carnegie Mellon (1 course, 3 units)

This is a mini-course, pass/no pass, to be completed in the first semester.

99-101 Computing @ Carnegie Mellon -REQUIRED

or 99-102 Computing @ Carnegie Mellon

BXA Required Courses (5 courses, 36 units minimum)

BXA-specific courses give students the opportunity to integrate their areas of concentration by focusing on interdisciplinary approaches and arts-based research techniques.

52-190 BXA Seminar I: Building the Wunderkammer 9
52-291 BXA Seminar II: Transferring Knowledge 9
52-391 BXA Junior Portfolio 0
52-392 BXA Seminar III: Deconstructing Disciplines 9
52-401 BXA Seminar IV: Capstone Fall 9
52-402 BXA Seminar V: Capstone Spring 9

II. School of Computer Science Concentration

Computer Science Concentration (111 units minimum)

Prerequisite

15-112 Fundamentals of Programming and Computer Science 12

Computer Science Core Requirements (56 units)

15-122 Principles of Imperative Computation 10
15-150 Principles of Functional Programming 10
15-210 Parallel and Sequential Data Structures and Algorithms 12
15-213 Introduction to Computer Systems 12
15-251 Great Ideas in Theoretical Computer Science 12

Concepts of Mathematics (10 units)

21-127 Concepts of Mathematics 10
(co-requisite for 15-122; prerequisite for 15-150)

Applications Courses or CS Electives (5 courses, 45 units minimum)

Choose a minimum of five courses from SCS beyond the core requirements, 200-level or higher, not including 02-201, 02-223, 02-250, 02-261, 08-200, 08-352, 15-351, 16-223. Listed below are suggested choices for these electives. Consult with the CS advisor if interested in courses not listed.

05-391 Designing Human Centered Software 12
05-418 Design Educational Games 12
08-540 Green Computing 9
11-291 Applied Computational Intelligence Lab 9
11-341 Machine Learning in Practice 12
11-412 Natural Language Processing 12
15-322 Introduction to Computer Music 9
15-323 Computer Music Systems and Information Processing 9
15-365 Experimental Animation 12
15-381 Artificial Intelligence: Representation and Problem Solving 9
15-388 Practical Data Science 9
15-415 Database Applications 12
15-437 Web Application Development 12
15-451 Algorithm Design and Analysis 12
15-458 Discrete Differential Geometry 12
15-462 Computer Graphics 12
15-463 Computational Photography 12
15-464 Technical Animation 12
15-465 Animation Art and Technology 12
15-466 Computer Game Programming 12
15-494 Cognitive Robotics: The Future of Robot Toys 12
16-264 Humansoids 12
16-362 Mobile Robot Programming Laboratory 12
16-374 IDeAte: Art of Robotic Special Effects 12
16-384 Robot Kinematics and Dynamics 12
16-385 Computer Vision 9
16-423 Designing Computer Vision Apps 12
16-455 Human-Machine Virtuosity 12
16-465 Game Engine Programming 10
16-467 Human Robot Interaction 12

III. College of Fine Arts Concentration

(number of courses vary, 108 units minimum)

BCSA students choose one of the following concentrations:

- Architecture (108 units)
- Art (108 units)
- Design (108 units)
- Drama (108 units)
- Music (108 units)
### Architecture Concentration (108 units minimum)

**Architecture Required Courses** (52 units minimum)
- 48-100 Architecture Design Studio: Foundation I - Fall, Freshman year 10-12
  - or 48-095 Spatial Concepts for Non-Architects I
- 48-120 Digital Media I - Fall, Freshman year 6
- 48-121 Drawing I - Fall, Freshman year 6
- 48-125 Digital Media II - Spring, Freshman year 6
- 48-126 Drawing II - Spring, Freshman year 6
- 48-240 Historical Survey of World Architecture and Urbanism I - Spring, Freshman year 9
- 48-241 Modern Architecture - Fall, Sophomore year 9

**Architecture Electives** (56 units minimum)

A minimum of 56 additional Architecture units must be approved by the Architecture advisor. A list of these selected courses must be filed in the BXA office.

### Art Concentration (108 units minimum)

**PORTFOLIO REVIEW REQUIRED FOR ADMISSION**

**Concept Studios** (2 courses, 20 units)
- Complete two courses:
  - 60-101 Concept Studio: The Self and the Human Being 10
  - 60-201 Concept Studio: Space and Time 10
  - 60-202 Concept Studio: Systems and Processes 10
  - 60-203 Concept Studio: EcoArt 10
  - 60-204 Concept Studio: Networked Narrative 10

**Media Studios** (3 courses, 30 units)
- Complete three courses:
  - 60-150 2D Media Studio: Drawing 10
  - 60-160 2D Media Studio: Imaging 10
  - 60-250 2D Media Studio: Painting 10
  - 60-251 2D Media Studio: Print Media 10
  - 60-130-60-130 3-D Media Studio I (complete two minis, 5 units each) 10
  - 60-131-60-131 3D Media Studio II (complete two minis, 5 units each) 10
  - 60-110 Electronic Media Studio: Introduction to the Moving Image 10
  - 60-210 Electronic Media Studio: Introduction to Interactivity 10

**Advanced Studios** (4 courses, 40 units)
- Complete four courses. Courses may be offered in the fall and/or spring. Students may take courses in any media area (ETB, SIS, CP or DP3). They may take all courses in one media area if a focus is desired.
  - 60-401/402 Senior Studio 10
  - 60-403 Extended Studio 10
  - 60-410 - 60-429 Advanced Electronic and Time-Based Work (ETB) 10
  - 60-430 - 60-447 Advanced Sculpture, Installation and Site-Work (SIS) 10
  - 60-448 - 60-449 Advanced Contextual Practice (CP) 10
  - 60-450 - 60-498 Advanced Drawing, Painting, Print Media and Photography (DP3) 10
  - 60-499 Studio Independent Study (one only) 10

**Art History/Theory** (2 courses, 18 units)
- 60-205 Critical Theory in Art III - Fall 9
- 60-206 Critical Theory in Art IV - Spring 9

**Review Requirement** (complete 2 required reviews, 0 units)

A review is required at the end of the sophomore and senior years. Pass/no pass only.

### Design Concentration (108 units minimum)

**PORTFOLIO REVIEW REQUIRED FOR ADMISSION**

**Design Required Courses** (96 units)
- 51-101 Studio: Survey of Design - Fall, Freshman year 9
- 51-103 Design Workshop I - Fall, Freshman year 3
- 51-121 Visualizing - Fall, Freshman year 9
- 51-171 Placing - Fall, Freshman year 9
- 51-102 Design Lab - Spring, Freshman year 9
- 51-104 Design Workshop II - Spring, Freshman year 3
- 51-122 Collaborative Visualizing - Spring, Freshman year 9
- 51-172 Systems - Spring, Freshman year 9

**Choose Two Corresponding Labs:**
- 51-225 Communications Lab I: Understanding Form & Context - Fall, Sophomore year 4.5, 4.5
- 51-245 Products Lab I: Understanding Form & Context 4.5, 4.5
- 51-265 Environments Lab I: Understanding Form & Context 4.5, 4.5

**Choose Two Corresponding Labs:**
- 51-227 Prototyping Lab I: Communications - Fall, Sophomore year 9
- 51-247 Prototyping Lab I: Products 9
- 51-267 Prototyping Lab I: Environments 9
- 51-271 How People Work - Fall, Sophomore year 9
- 51-371 Futures - Fall, Junior year or later 9

**Required Courses for All Concentration Options** (20 units)
- 54-175-54-176 Conservatory Hour-Conservatory Hour (1 unit each) 2
- 54-177 Foundations of Drama I 6
- 54-281 Foundations of Drama II (prerequisite: 54-177) 6
- 54-381 Special Topics in Drama: History, Literature and Criticism 6

**Work with Drama Faculty Option Coordinator to Approve Concentration Option (88 units minimum):**

**Design Required Courses** (26 units)
- 54-151-54-152 Stagecraft-Stagecraft (13 units + 13 units) 26

A minimum of 62 additional Design units must be approved by the Design faculty option coordinator. A list of these selected courses must be filed in the BXA office.

**Directing Required Courses** (52 units)
- 54-121-54-122 Directing I: Sources-Directing I: Sources 18
- 54-221-54-222 Directing II: Fundamentals-Directing II: Fundamentals 18
- 54-159-54-159 Production Practicum-Production Practicum (two times, 12 units total) 12
- 54-517 Director's Colloquium (four times, 4 units total) 1
A minimum of 36 additional Directing units must be approved by the Directing faculty option coordinator. A list of these selected courses must be filed in the BXA office.

Dramaturgy Required Courses (53 units minimum)

54-109  Dramaturgy 1: Approaches to Text  9
54-184  Dramaturgy 2: Introduction to Production  9
54-121  Directing I: Sources  9
54-159  Production Practicum  6
54-200-54-200  Dramaturgy Forum-Dramaturgy Forum -Fall (minimum of two; every semester it is offered while enrolled)  2
54-xxx  Dramaturgy 3, 4, 5 or 6 (minimum of two; all four if enrolled as BXA for six semesters or more)  18

A minimum of 35 additional Dramaturgy units must be approved by the Dramaturgy faculty option coordinator. A list of these selected courses must be filed in the BXA office.

Production Technology and Management Required Courses (26 units)

54-151-54-152  Stagecraft-Stagecraft (13 units + 13 units)  26

A minimum of 62 additional PTM units must be approved by the PTM faculty option coordinator. A list of these selected courses must be filed in the PTM office.

Music Concentration (108 units minimum)

AUDITION REQUIRED FOR PERFORMANCE CONCENTRATION OPTION. PORTFOLIO REVIEW/INTERVIEW REQUIRED FOR COMPOSITION, MUSICOLOGY, AUDIO RECORDING & PRODUCTION, OR SOUND THEORY & PRACTICE CONCENTRATION OPTION.

Options available in the following areas: 1) Performance (instrumental, piano, organ, voice), 2) Composition 3) Musicology, 4) Audio Recording & Production 5) Sound Theory & Practice

Required Course for All Concentration Options (9 units)

57-152  Harmony I -Fall  9
57-149  Basic Harmony I

Work with Music Advisor to Approve Concentration Option (99 units minimum):

Performance and Composition Required Courses (76 units)

57-161  Eurhythmics I -Fall (recommended co-requisite: 57-181)  3
57-181  Solfege I -Fall  3
57-180  Basic Solfege I
57-185  Advanced Solfege I
57-173  Survey of Western Music History -Fall (co-requisite: 57-188)  9
57-188  Repertoire and Listening for Musicians  1
57-69x  BXA Studio (4 semesters)  36
57-xxx  Major Ensemble (4 semesters)  24

A minimum of 23 additional Music units must be approved by the Music advisor. A list of these selected courses must be filed in the BXA office.

Musicology Required Courses (45 units)

57-283  Music History I (co-requisite: 57-190)  9
57-284  Music History II (co-requisite: 57-289)  9
57-285  Music History III (co-requisite: 57-290)  9
57-189  Introduction to Repertoire and Listening for Musicians  3
57-190  Repertoire and Listening for Musicians I  3
57-289  Repertoire and Listening for Musicians II  3
57-290  Repertoire and Listening for Musicians III  3
57-611  Independent Study in History  6

Choose 36 units from:

57-209  The Beatles  9
57-308  World Music  9
57-430  Music of Iran  9
57-477  Music of the Spirit  6
57-478  Survey of Historical Recording  6
57-480  History of Black American Music  6

A minimum of 18 additional Music units must be approved by the Music advisor. A list of these selected courses must be filed in the BXA office.

Audio Recording & Production Required Courses (40 units)

57-101  Introduction to Music Technology  6
57-171  Introduction to Music Technology (self-paced)  3
57-181  Solfege I -Fall  3
57-180  Basic Solfege I
57-185  Advanced Solfege I
57-173  Survey of Western Music History -Fall (co-requisite: 57-188)  9
57-188  Repertoire and Listening for Musicians  1
57-337  Sound Recording  6
57-338  Sound Editing and Mastering  6
57-438  Multitrack Recording  9

Choose 59 units from:

57-153  Harmony II -Spring  9
57-150  Basic Harmony II
57-182  Solfege II  3
57-186  Advanced Solfege II
57-154  Advanced Solfege II
57-104  Introduction to Computing for Creative Practice  10
57-109  Twisted Signals: Multimedia Processing for the Arts  10
57-314  Physics of Musical Sound  9
54-166  Introduction to Sound Design for Theatre  6
54-275  History of Sound Design  3
54-666  Production Audio  6
57-344  Experimental Sound Synthesis  9
57-421  The Exploded Ensemble  6
57-425  Expanded Music Performance  9
57-427  Advanced Seminar in Film Musicology  9
57-478  Survey of Historical Recording  6
57-622  Independent Study in Sound Recording Production  3
57-500  3D Media Studio II  5
60-210  Electronic Media Studio: Introduction to Interactivity  10

Note: Students completing an IDeATe minor may double-count up to two of the IDeATe minor courses towards the Audio Recording & Production concentration.

Sound Theory & Practice Required Courses (47 units)

57-101  Introduction to Music Technology  6
57-171  Introduction to Music Technology (self-paced)  3
57-181  Solfege I -Fall  3
57-180  Basic Solfege I
57-185  Advanced Solfege I
57-173  Survey of Western Music History -Fall (co-requisite: 57-188)  9
57-188  Repertoire and Listening for Musicians  1
57-180  Twisted Signals: Multimedia Processing for the Arts  10
57-911  Music Since 1945  9
57-616  Independent Study in Sound Studies  9

Choose 52 units from:

57-153  Harmony II -Spring  9
57-150  Basic Harmony II
57-182  Solfege II  3
57-186  Advanced Solfege II
15-104  Introduction to Computing for Creative Practice  10
15-322 Introduction to Computer Music (pre-requisite: 15-112) 9
15-323 Computer Music Systems and Information Processing (pre-requisite: 15-122) 9
33-114 Physics of Musical Sound 9
57-337 Sound Recording 6
57-343 Interdisciplinary Studies in Listening, Culture, and Technology 9
57-344 Experimental Sound Synthesis 9
57-347 Electronic and Computer Music (pre-requisite: 57-101 or 57-171) 6
57-421 The Exploded Ensemble 6
57-425 Expanded Music Performance 9
57-438 Multitrack Recording 9
57-829 Contemporary Soundscapes 9
60-131 3D Media Studio II 5
60-210 Electronic Media Studio: Introduction to Interactivity 10

Note: Students completing an IDEATe minor may double-count up to two of the IDEATe minor courses towards the Sound Theory & Practice concentration.

IV. Free Electives
(approximately 4 courses, 40 units minimum)
Take any Carnegie Mellon course. A maximum of 9 units of physical education and/or military science may be counted toward this requirement. Physical education and military science courses will not be calculated in a student’s QPA.

Academic Standards

Academic Actions

The academic performance of each student is reviewed at the end of each semester. Academic actions are initiated by the Director of the BXA Intercollege Degree Programs when students have not met minimum academic progress standards. A recommendation is presented to the associate deans of the appropriate colleges and Academic Actions Committee of the College of Fine Arts for confirmation. An appeals process is available to the student. The academic actions listed below do not follow a particular sequence; any of these actions may be imposed at any time.

BHA Academic Actions

BHA students are expected to maintain a 3.0 quality point average (QPA). If a student’s QPA falls below 3.0 at the end of the semester this signals an advising response. The student will be asked to meet with the Director of the BHA Program to discuss strategies to improve his/her academic performance.

If a student has two consecutive semesters with a QPA below 3.0, the Director will meet with the student and carefully evaluate the situation in consultation with the student’s advisors in DC and CFA. If it seems in the best interest of the student, the student may be advised to transfer out of the BHA Program and into DC or CFA.

Warning

A Warning is intended to notify the student of unsatisfactory performance and to suggest that the student take steps to determine and correct the cause of the difficulty. A Warning is imposed when a student receives a “D” in a required DC concentration course, or if the student’s semester QPA is between 2.0 and 2.49, or if the cumulative QPA drops below a 2.75.

Conditions for removing a Warning: the student must receive at least a 3.0 QPA in the following semester, and at least a 2.75 cumulative QPA, with at least 36 units, no incompletes, and no grades less than a “C”. Otherwise the student may continue on Warning, or, depending on individual grades, the action could escalate to Probation, Final Probation, or Drop from the BHA Program.

Probation

Probation is imposed when a student receives a “D” or “R” grade in a required CFA concentration course, or an “R” in a required DC course, or if the student’s semester QPA is below a 2.0.

Conditions for removing Probation: the student must receive at least a 3.0 QPA in the following semester, with at least 36 units, no incompletes and no grades less than a “C”. The student will be moved to Warning if they meet these conditions, but the cumulative QPA is still between 2.0 and 2.75. Otherwise the student may continue on Probation, or, depending on the individual grades, the action could escalate to Final Probation, or Drop from the BHA Program.

Final Probation

Final Probation is imposed when a student receives two or more “D” or “R” grades in required H&SS or CFA concentration courses, or if the student’s semester QPA is below 2.0 (1.75 for freshmen) for the second consecutive semester.

Conditions for removing Final Probation: the student must receive at least a 3.0 QPA in the following semester, with at least 36 units, no incompletes, and no grades less than a “C”. The student will be moved to Probation if they meet these conditions but their cumulative QPA is still between 2.0 and 2.49. They will be moved to Warning if they meet these conditions but their cumulative QPA is between a 2.5 and 2.75. Otherwise the student may continue on Final Probation or, depending on individual grades, the action could escalate to Drop from the BHA Program.

Drop from the BHA Program

If a student has two consecutive semesters receiving “D” or “R” grades in required DC and/or CFA concentration courses, the Director will carefully evaluate the student’s situation in consultation with the student’s DC and CFA advisors. At this time, the student may be advised to transfer out of the BHA Program, or they may be dropped from the BHA Program.

If a student has two consecutive semesters with a cumulative QPA below 2.5, and the student shows no progress or improvement in their academic performance, they will be dropped from the BHA Program.

If a student is dropped from BHA, they may be able to successfully transfer into DC or CFA as a traditional full major, depending on their academic performance. If the student is doing poorly in both DC and CFA courses, then the student should consider the following options:

- Transfer to another department/school within the university. The student is responsible for contacting the department/school of choice to discuss possible transfer.
- Request Transitional Student status in the College of Fine Arts for one semester. A student must make an appointment with the Associate Dean of the College of Fine Arts to discuss this option.
- Withdraw from Carnegie Mellon University. A Withdrawal/Leave of Absence form is available in the BHA office or in Enrollment Services.

BSA Academic Actions

BSA students are expected to maintain a 3.0 quality point average (QPA). If a student’s QPA falls below 2.75 at the end of the semester this signals an advising response. The student will be asked to meet with the Director of the BSA Program to discuss strategies to improve their academic performance.

If a student receives “C” and “D” grades in calculus and/or physics courses the student will be required to consult with their MCS advisor to discuss strategies to improve their academic performance.

If a student has two consecutive semesters with a QPA below 2.75, the Director will meet with the student and carefully evaluate the situation in consultation with the student’s advisors in MCS and CFA. If it seems in the best interest of the student, the student may be advised to transfer out of the BSA Program and into MCS or CFA.

Warning

A Warning is intended to notify the student of unsatisfactory performance and to suggest that the student take steps to determine and correct the cause of the difficulty. A Warning is imposed when a student receives a “D” in a required MCS concentration course, or if the student’s semester QPA is between a 2.0 and 2.49, or if the cumulative QPA drops below a 2.75.

Conditions for removing a Warning: the student must receive at least a 3.0 QPA in the following semester, and at least a 2.5 cumulative QPA, with at least 36 units, no incompletes, and no grades less than a “C”. Otherwise the student may continue on Warning, or, depending on individual grades, the action could escalate to Probation, Final Probation, or Drop from the BSA Program.

Probation

Probation is imposed when a student receives a “D” or “R” grade in a required CFA concentration course, or an “R” in a required MCS course, or if the student’s semester QPA is below a 2.0.

Conditions for removing Probation: the student must receive at least a 3.0 QPA in the following semester, with at least 36 units, no incompletes and no grades less than a “C”. The student will be moved to Warning if they meet these conditions, but the cumulative QPA is still between 2.0 and 2.75. Otherwise the student may continue on Probation, or, depending on the
individual grades, the action could escalate to Final Probation, or Drop from the BSA Program.

**Final Probation**

Final Probation is imposed when a student receives two or more “D” or “R” grades in required MCS or CFA concentration courses, or if the student’s semester QPA is below 2.0 (1.75 for freshmen) for the second consecutive semester.

Conditions for removing Final Probation: the student must receive at least a 3.0 QPA in the following semester, with at least 36 units, no incompletes, and no grades less than a “C”. The student will be moved to Probation if they meet these conditions but their cumulative QPA is still between 2.0 and 2.49. They will be moved to Warning if they meet these conditions but their cumulative QPA is between 2.5 and 2.75. Otherwise the student may continue on Final Probation or, depending on individual grades, the action could escalate to Drop from the BCSA Program.

**Drop from the BSA Program**

If a student has two consecutive semesters receiving “D” or “R” grades in required MCS and/or CFA concentration courses, the Director will carefully evaluate the student’s situation in consultation with the student’s MCS and CFA advisors. If this time, the student may be advised to transfer out of the BSA Program, or they may be dropped from the BSA Program.

If a student has two consecutive semesters with a cumulative QPA below 2.5, and the student shows no progress or improvement in their academic performance, they will be dropped from the BSA Program.

If a student is dropped from BSA, they may be able to successfully transfer into MCS or CFA as a traditional full major, depending on their academic performance. If the student is doing poorly in both MCS and CFA courses, then the student should consider the following options:

- Transfer to another department/school within the university. The student is responsible for contacting the department/school of choice to discuss possible transfer.
- Request Transitional Student status in the College of Fine Arts for one semester. A student must make an appointment with the Associate Dean of the College of Fine Arts to discuss this option.
- Withdraw from Carnegie Mellon University. A Withdrawal/Leave of Absence form is available in the BSA office or in Enrollment Services.

**BCSA Academic Actions**

BCSA students are expected to maintain a 3.0 quality point average (QPA). If a student’s QPA falls below 2.5 at the end of the semester this signals an advising response. The student will be asked to meet with the Director of the BCSA Program to discuss strategies to improve his/her academic performance.

If a student receives “C” or “D” grades in computer science courses (15-xxx) the student will be required to consult with their SCS advisor to discuss strategies to improve their academic performance.

If a student has two consecutive semesters with a QPA below 2.5, the Director will meet with the student and carefully evaluate the situation in consultation with the student’s advisors in SCS and CFA. If it seems in the best interest of the student, the student may be advised to transfer out of the BCSA Program and into SCS or CFA.

**Warning**

A Warning is intended to notify the student of unsatisfactory performance and to suggest that the student take steps to determine and correct the cause of the difficulty. A Warning is imposed when a student’s cumulative QPA drops below a 2.75.

Conditions for removing a Warning: the student must receive at least a 3.0 QPA in the following semester, and at least a 2.5 cumulative QPA, with at least 36 units, no incompletes, and no grades less than a “C”. Otherwise the student may continue on Warning, or, depending on individual grades, the action could escalate to Probation, Final Probation, or Drop from the BCSA Program.

**Probation**

Probation is imposed when a student receives a “D” or “R” grade in a required CFA concentration course, or an “R” in a required SCS course, or if the student’s semester QPA is below a 2.0 (1.75 for freshmen).

Conditions for removing Probation: the student must receive at least a 3.0 QPA in the following semester, with at least 36 units, no incompletes and no grades less than a “C”. The student will be moved to Warning if they meet these conditions, but the cumulative QPA is still between 2.5 and 2.75. Otherwise the student may continue on Probation, or, depending on the individual grades, the action could escalate to Final Probation, or Drop from the BCSA Program.

**Final Probation**

Final Probation is imposed when a student receives two or more “D” or “R” grades in required SCS or CFA concentration courses, or if the student’s semester QPA is below 2.0 (1.75 for freshmen) for the second consecutive semester.

Conditions for removing Final Probation: the student must receive at least a 3.0 QPA in the following semester, with at least 36 units, no incompletes, and no grades less than a “C”. The student will be moved to Probation if they meet these conditions but their cumulative QPA is still between 2.0 and 2.49. They will be moved to Warning if they meet these conditions but their cumulative QPA is between 2.5 and 2.75. Otherwise the student may continue on Final Probation or, depending on individual grades, the action could escalate to Drop from the BCSA Program.

**Drop from the BCSA Program**

If a student has two consecutive semesters receiving “D” or “R” grades in required SCS and/or CFA concentration courses, the Director will carefully evaluate the student’s situation in consultation with the student’s SCS and CFA advisors. At this time, the student may be advised to transfer out of the BCSA Program, or they may be dropped from the BCSA Program.

If a student has two consecutive semesters with a cumulative QPA below 2.0, and the student shows no progress or improvement in their academic performance, they will be dropped from the BCSA Program.

If a student is dropped from BCSA, they may be able to successfully transfer into SCS or CFA as a traditional major, depending on their academic performance. If the student is doing poorly in both SCS and CFA courses, then the student should consider the following options:

- Transfer to another department/school within the university. The student is responsible for contacting the department/school of choice to discuss possible transfer.
- Request Transitional Student status in the College of Fine Arts for one semester. A student must make an appointment with the Associate Dean of the College of Fine Arts to discuss this option.
- Withdraw from Carnegie Mellon University. A Withdrawal/Leave of Absence form is available in the BCSA office or in Enrollment Services.

**School Suspension**

School Suspension is not applicable to the BHA, BSA, and BCSA Programs.

**University Suspension**

University Suspension is imposed for exceptionally poor performance or for personal problems that create an impediment to any academic achievement. The student is required to withdraw from the university for a specific period. Re-admission is subject to conditions specified in each case by the Director of the BXA Intercollege Degree Programs.

**Study Abroad While on Academic Action**

BXA students with a cumulative QPA between 2.5 - 3.0 wishing to spend a semester abroad will need the Director’s special permission.

BXA students with a cumulative QPA below 2.5 will not be allowed to pursue studies abroad.

**Disabilities**

Students with a learning disability or a physical disability are encouraged to email access@andrew.cmu.edu. The circumstances will remain confidential to the extent desired. The university has a formal procedure for documenting disabilities, notifying advisors and faculty, and making arrangements to utilize university resources in support of expressed needs, but will take no action until contacted by the student. The BXA Academic Advisors will work with the student to coordinate assistance.

**Grading Policies**

University grading policies may vary depending on the particular school/department. Please consult the Undergraduate Academic Regulations (http://coursecatalog.web.cmu.edu/servicesandoptions/undergraduateacademicregulations).

**Intercollege Deans’ List**

Students who earn 36 graded units (no “pass/no pass” grades) with a grade point average of 3.5 or higher, no “incompletes” and no grades qualify for the BHA, BSA, & BCSA Deans’ List. The BHA, BSA, & BCSA Intercollege Deans’ List Honors are posted in the BXA office each semester.
Intercollege Honors
BHA, BSA, and BCSA students who successfully complete a BXA Capstone Project under the guidance of a faculty member will graduate with BHA, BSA, or BCSA Intercollege Honors if all of the following conditions are met:

- grade of “A” achieved in 62-401 and 62-402
- overall QPA of 3.25 or higher
- research results presented at Meeting of the Minds Undergraduate Research Symposium

As a citizen of two colleges, a BHA, BSA, or BCSA student also has the opportunity to graduate with DC College Honors, CFA College Honors, and MCS College Honors. These particular honors are defined by each college. Students will receive honors color cords during the BXA/CFA Commencement Honors Ceremony.

University Honors
Students who graduate with an overall QPA of 3.5 or higher will graduate with University Honors. Students will receive an honors medallion during the CFA Commencement Honors Ceremony.

BXA Internal Transfer Process
For current Carnegie Mellon students who wish to apply to the BHA, BSA, or BCSA program, an internal transfer application process takes place in both the fall and spring semester. Applications are available online and in the BXA office and are reviewed by a committee of BHA, BSA, and BCSA advisors in October and in March.

Withdrawal or Leave of Absence
A student who decides to leave the university must meet with the Director of the BXA Intercollege Degree Programs and complete a Withdrawal or Leave of Absence form located in the BXA office or the HUB. Withdrawal means temporarily leaving the university with a stated intention to return. A withdrawal or leave of absence from the university at any time up to and including the last day of classes (excluding the final examination period), means that no grades will be recorded for the semester. Financial responsibility for the semester is dependent upon the date of and the reasons for filing the form. Questions about financial responsibility should be directed to the HUB.

A leave of absence may be voluntary or involuntary. If the leave is voluntary, the student may return any time within four years following the beginning of the leave by filing an Application for Return from Leave of Absence form. If the leave is involuntary, that is, required for academic or disciplinary reasons, the conditions for return will be stated.