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 curriculum. 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 Computer Science and Arts (BCSA), the Bachelor of Humanities and Arts (BHA), the Bachelor of Science and Arts (BSA) and the additional major in Engineering and Arts (EA), housed under the BXA Intercollege Degree Programs, is to allow a select group of students who demonstrate interest and accomplishment in the fine arts and computer science, engineering, humanities, social sciences or natural sciences 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 computer science, engineering, natural sciences or humanities 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 five 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 computer science, engineering, humanities and social sciences, or the natural and mathematical sciences.

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 non-profits 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 Degree Programs 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 DCE/MCC/SCS concentration area
- Ability to describe the connections between these concentrations and how the student integrates them
- Ability to communicate ideas textually, visually and orally
- 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 DCE/MCC/SCS/SCS concentration
- Experience in designing, researching and completing a large-scale, object-based project that integrates both areas of concentration

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 BCSA Degree Program, 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.

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 | 121 |
| II. SCS Concentration | 111 |
| III. CFA Concentration | 108 |
| IV. Free Electives | 40 |
| Total BCSA Degree Requirements | 380 |

BCSA General Education
(15 courses, 122 units minimum)

- Writing (1 course, 9 units, 76-101 required)
- Mathematics (2 courses, 19 units minimum, 21-122 and either 21-259 or 21-241 required). Probability (1 course, 9 units minimum)
- Science & Engineering (2 courses, 18 units minimum)
- Economic, Political, & Social Institutions OR Cognition, Choice & Behavior (1 course, 9 units minimum)
- Two additional courses from Dietrich or CFA (2 course, 18 units minimum)
- University Requirement (1 course, 3 units, 99-101 required)
- BCSA 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)
Broader consideration, 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 |
| or 76-102 Advanced First Year Writing: Special Topics |
| or 76-106 Writing about Literature, Art and Culture |
| & 76-107 and Writing about Data |
| & 76-108 and Writing about Public Problems |

All undergraduate students must complete the First-Year Writing requirement—the Department of English does not accept any Advanced Placement exemptions. This requirement can be completed in two different ways. Enroll in one of two full-semester courses 101 or 102 (by invitation only), 9 units, or enroll in two of three half-semester mini courses (back-to-back within a single semester) 106/107/108, 4.5 + 4.5 units.

Course options and topics: www.cmu.edu/hss/english/first_year/index.html
Mathematics & Probability (3 courses, 28 units minimum)

Choose two mathematics courses (19 units minimum):
- 21-122 Integration and Approximation
- 21-259 Calculus in Three Dimensions
  or 21-241 Matrices and Linear Transformations

Choose one probability course (9 units minimum):
- 15-259 Probability and Computing
- 21-325 Probability
- 36-218 Probability Theory for Computer Scientists

Science & Engineering (2 courses, 18 units minimum)

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

02-223 Personalized Medicine: Understanding Your Own Genome
02-261 Quantitative Cell and Molecular Biology Laboratory
03-121 Modern Biology
03-125 Evolution
03-132 Basic Science to Modern Medicine
03-133 Neurobiology of Disease
06-100 Introduction to Chemical Engineering
09-105 Introduction to Modern Chemistry I
09-141 Organic Chemistry I
09-225 Climate Change: Chemistry, Physics and Planetary Science
12-100 Exploring CEE: Infrastructure and Environment in a Changing World
12-201 Geology
18-100 Introduction to Electrical and Computer Engineering
24-101 Fundamentals of Mechanical Engineering
27-100 Engineering the Materials of the Future
33-104 Experimental Physics
33-114 Physics of Musical Sound
33-120 Science and Science Fiction
33-121 Physics I for Science Students
33-151 Matter and Interactions I
42-101 Introduction to Biomedical Engineering
85-219 Biological Foundations of Behavior

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
- 70-332 Business, Society and Ethics
- 73-102 Principles of Microeconomics
- 73-103 Principles of Macroeconomics
- 79-245 Capitalism and Individualism in American Culture
- 79-320 Women, Politics, and Protest
- 79-331 Body Politics: Women and Health in America
- 79-341 The Cold War in Documents and Film
- 79-383 The History of Capitalism
- 80-135 Introduction to Political Philosophy
- 80-136 Social Structure, Public Policy & Ethics
- 80-244 Environmental Ethics
- 80-245 Medical Ethics
- 80-335 Social and Political Philosophy
- 84-104 Decision Processes in American Political Institutions
- 84-275 Comparative Politics

84-322 Nonviolent Conflict and Revolution
84-326 Theories of International Relations
84-362 Diplomacy and Statecraft
84-380 Grand Strategy in the United States
84-386 The Privatization of Force
84-389 Terrorism and Insurgency

Cognition, Choice, and Behavior

This requirement explores the process of thinking, decision making, and behavior in the context of the individual.

- 70-311 Organizational Behavior
- 80-130 Introduction to Ethics
- 80-150 Nature of Reason
- 80-180 Nature of Language
- 80-221 Philosophy of Social Science
- 80-242 Conflict and Dispute Resolution
- 80-270 Philosophy of Mind
- 80-271 Philosophy and Psychology
- 85-102 Introduction to Psychology
- 85-211 Cognitive Psychology
- 85-213 Human Information Processing and Artificial Intelligence
- 85-221 Principles of Child Development
- 85-241 Social Psychology
- 85-251 Personality
- 85-261 Abnormal Psychology
- 88-120 Reason, Passion and Cognition

* Indicates co-requisites and/or prerequisites required.

Complete Two additional courses from Dietrich or CFA (2 courses, complete 18 units minimum)

These courses must be non-technical/non-studio. Each CFA concentration has recommended courses for this category; consult with your BXA advisor to determine the best courses to fulfill this requirement.

University Requirement (1 course, 3 units)

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

99-101 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
52-191 BXA Seminar II: Transferring Knowledge
52-391 BXA Seminar III: Deconstructing Disciplines
52-401 BXA Seminar IV: Capstone Project Research
52-402 BXA Seminar V: Capstone Project Production

School of Computer Science Concentration

Computer Science Concentration (111 units minimum)

Prerequisite

15-112 Fundamentals of Programming and Computer Science

Computer Science Core Requirements (5 courses, 56 units)

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

Concepts of Mathematics (1 course, 10 units)
21-127 Concepts of Mathematics (co-requisite for 15-122; prerequisite for 15-150) 10

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, 15-351, 16-223, 17-206, 17-333, 17-562. 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
10-335 Art and Machine Learning 12
11-291 Applied Computational Intelligence Lab 9
11-344 Machine Learning in Practice 12
11-411 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
15-451 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 Humanoids 12
16-362 Mobile Robot Algorithms Laboratory 12
16-374 IDeATe: Art of Robotic Special Effects 12
16-384 Robot Kinematics and Dynamics 12
16-385 Computer Vision 12
16-423 Designing Computer Vision Apps 12
16-455 IDeATe: Human-Machine Virtuosity 12
16-465 Game Engine Programming 10
16-467 Human Robot Interaction 12
17-214 Principles of Software Construction: Objects, Design, and Concurrency 12
17-313 Foundations of Software Engineering 12
17-356 Software Engineering for Startups 12
17-437 Web Application Development 12

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 (7 courses, 52 units minimum)
48-100 Architecture Design Studio: Foundation I -Fall, Freshman year 10-15
or 48-095 Spatial Concepts for Non-Majors 5
62-122 Digital Media I -Fall, Freshman year 6

62-125 Drawing I -Fall, Freshman year 6
62-123 Digital Media II -Spring, Freshman year 6
62-126 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)
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
60-280 Introduction to Contextual Practice 10

Media Studios (3 courses, 30 units minimum)
Complete three courses. 3D mini courses count as half a course:
60-150 2D Media Studio: Drawing 10
60-160 2D Media Studio: Imaging 10
60-131 3D Media Studio I (mini-1) 5
60-132 3D Media Studio I (mini-2) 5
60-133 3D Media Studio II (mini-3) 5
60-134 3D Media Studio II (mini-4) 5
60-250 2D Media Studio: Painting 10
60-251 2D Media Studio: Print Media 10
60-110 Electronic Media Studio: Introduction to the Moving Image 10
60-210 Electronic Media Studio: Introduction to Interactivity 10-12
or 60-212 Electronic Media Studio: Interactivity and Computation for Creative Practice 10-12

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 Senior Critique Seminar 10
Advanced Electronic and Time-Based Work (ETB) (course numbers 60-410 through 60-429) 10
Advanced Sculpture, Installation and Site-Work (SIS) (course numbers 60-430 through 60-447) 10
Advanced Contextual Practice (CP) (course numbers 60-448 through 60-449) 10
Advanced Drawing, Painting, Print Media and Photography (DP3) (course numbers 60-450 through 60-498) 10
60-499 Studio Independent Study (one only) 10

* Courses offered intermittently; speak with a BXA advisor to determine course availability.

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

Note: Critical Theory I & II are strongly recommended.

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 Required Courses (13 courses, 95 units)
51-101         Studio: Survey of Design (Fall, Freshman year) 10
51-121         Visualizing (Fall, Freshman year) 10
51-171         Placing (Fall, Freshman year) 10
51-102         Design Lab (Spring, Freshman year) 10
51-122         Collaborative Visualizing (Spring, Freshman year) 10
51-172         Systems (Spring, Freshman year) 9

Choose Two Studios (Fall, Sophomore year): 4.5+4.5
51-225 Communications Studio I: Understanding Form & Context or 51-245 Products Studio I: Understanding Form & Context or 51-265 Environments Studio I: Understanding Form & Context

Choose Two Corresponding Labs (Fall, Sophomore year): 4.5+4.5
51-227 Prototyping Lab I: Communications 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 I (Fall, Junior year or later) 4.5
51-373 Futures II (Fall, Junior year or later) 4.5

Design Electives (13 units)
A minimum of 13 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)
Options available in the following areas: 1) Design, 2) Directing, 3) Dramaturgy, 4) Production Technology and Management

Required Courses for All Concentration Options (5 courses, 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 (2 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.

Director's Colloquium (13 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 (9 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
54-159-54-159 Production Practicum-Production Practicum (two times, 12 units total) 12
54-200-54-200 Dramaturgy Forum-Dramaturgy Forum (Fall, two semester) 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 29 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 (2 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)
Options available in the following areas: 1) Music Performance (instrumental, piano, organ, voice), 2) Composition 3) Musicology, 4) Audio Recording & Production 5) Sound Theory & Practice

Required Course for All Concentration Options (1 course, 9 units)
57-152 Harmony I 9
or 57-149 Basic Harmony I

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

Music Performance and Composition Required Courses (12 courses, 76 units)
57-161 Eurhythmics I (recommended co-requisite: 57-181) 3
57-181 Solfege I or 57-180 Basic Solfege I or 57-185 Advanced Solfege I
57-173 Survey of Western Music History (co-requisite: 57-188) 9
57-188 Repertoire and Listening for Musicians 1
57-49x 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 (8 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
### Audio Recording & Production Required Courses (7 courses, 40 units)

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>57-101</td>
<td>Introduction to Music Technology</td>
<td>6</td>
</tr>
<tr>
<td>or 57-171</td>
<td>Introduction to Music Technology (self-paced)</td>
<td>3</td>
</tr>
<tr>
<td>57-181</td>
<td>Solfege I</td>
<td>3</td>
</tr>
<tr>
<td>or 57-180</td>
<td>Basic Solfege I</td>
<td>3</td>
</tr>
<tr>
<td>or 57-185</td>
<td>Advanced Solfege I</td>
<td>3</td>
</tr>
<tr>
<td>57-173</td>
<td>Survey of Western Music History (co-requisite: 57-188)</td>
<td>9</td>
</tr>
<tr>
<td>57-188</td>
<td>Repertoire and Listening for Musicians</td>
<td>1</td>
</tr>
<tr>
<td>57-337</td>
<td>Sound Recording</td>
<td>6</td>
</tr>
<tr>
<td>57-338</td>
<td>Sound Editing and Mastering</td>
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<tr>
<td>57-438</td>
<td>Multitrack Recording</td>
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Choose **59** units from:

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

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 (7 courses, 47 units)

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>57-101</td>
<td>Introduction to Music Technology</td>
<td>6</td>
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<tr>
<td>or 57-171</td>
<td>Introduction to Music Technology (self-paced)</td>
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</tr>
<tr>
<td>57-181</td>
<td>Solfege I</td>
<td>3</td>
</tr>
<tr>
<td>or 57-180</td>
<td>Basic Solfege I</td>
<td>3</td>
</tr>
<tr>
<td>or 57-185</td>
<td>Advanced Solfege I</td>
<td>3</td>
</tr>
<tr>
<td>57-173</td>
<td>Survey of Western Music History (co-requisite: 57-188)</td>
<td>9</td>
</tr>
<tr>
<td>57-188</td>
<td>Repertoire and Listening for Musicians</td>
<td>1</td>
</tr>
<tr>
<td>18-090</td>
<td>Twisted Signals: Multimedia Processing for the Arts</td>
<td>10</td>
</tr>
<tr>
<td>57-911</td>
<td>Music Since 1945</td>
<td>9</td>
</tr>
<tr>
<td>57-616</td>
<td>Independent Study in Sound Studies</td>
<td>9</td>
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Choose **52** units from:

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<tr>
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<th>Course Title</th>
<th>Units</th>
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<tbody>
<tr>
<td>57-153</td>
<td>Harmony II</td>
<td>9</td>
</tr>
<tr>
<td>or 57-150</td>
<td>Basic Harmony II</td>
<td>9</td>
</tr>
</tbody>
</table>

### Free Electives

(approximately 4 courses, 39 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.

### 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 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.

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 and an advisor in DC for their humanities/social sciences concentration. This network of advisors guides each student through their curriculum.

### BHA Curriculum

<table>
<thead>
<tr>
<th>Units</th>
<th>I. BHA General Education</th>
<th>111</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>II. DC Concentration</td>
<td>81</td>
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BHA General Education

(14 courses, 111 units minimum)

- Communicating: Language and Interpretations (3 courses, 27 units minimum, 76-101 required, 2 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 required)
- University Requirement (1 course, 3 units, 99-101 required)
- BXA Required Courses (5 courses, 36 units required)

Communication: 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
76-102 Advanced First Year Writing: Special Topics 9
76-106 Writing about Literature, Art and Culture 9
76-107 Writing about Data 9
76-108 Writing about Public Problems 9

All undergraduate students must complete the First-Year Writing requirement—the Department of English does not accept any Advanced Placement exemptions. This requirement can be completed in two different ways. Enroll in one of two full-semester courses 101 or 102 (by invitation only), 9 units, or enroll in two of three half-semester mini courses (back-to-back within a single semester) 106/107/108, 4.5 + 4.5 units. Course options and topics: 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

Course topics can be found on the Department of History website (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
80-110 Nature of Mathematical Reasoning 9
80-210 Logic and Proofs 9
80-211 Logic and Mathematical Inquiry 9

Natural Science

03-121 Modern Biology 9
03-125 Evolution 9
03-132 Basic Science to Modern Medicine 9
03-133 Neurobiology of Disease 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
33-114 Physics of Musical Sound 9
33-115 Physics for Future Presidents 9
33-124 Introduction to Astronomy 9

Other Courses

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
33-120 Science and Science Fiction 9
80-220 Philosophy of Science 9
80-226 Revolutions in Science 9
80-312 Mathematical Revolutions 9
80-327 Philosophy of Neuroscience 9
85-370 Perception 9
88-275 Bubbles: Data Science for Human Minds 9
99-236 Introduction to Environmental Ideas 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.

80-200 Reasoning with Data -REQUIRED 9
05-292 iDeAte: Learning in Museums 12
73-102 Principles of Microeconomics 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
80-242 Conflict and Dispute Resolution 9
80-244 Environmental Ethics 9
80-245 Medical Ethics 9
80-270 Philosophy of Mind 9
80-271 Philosophy and Psychology 9
80-305 Choices, Decisions, and Games 9
80-330 Ethical Theory 9
80-348 Health, Human Rights, and International Development 9
80-405 Game Theory 9
80-447 Global Justice 9
84-104 Decision Processes in American Political Institutions 9
84-315 Contemporary Debates in Human Rights 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

Total BHA Degree Requirements 378
Dietrich College of Humanities and Social Sciences Concentration
(9 courses, 81 units minimum)
BHA students declare an 81-unit DC concentration based on existing DC programs, through consultation with their BXA advisor and the DC concentration advisors. A completed DC Concentration Declaration form must be approved by the concentration advisor and submitted to the BXA office, by the end of the student’s sophomore year.

Curriculum for several BHA DC concentration options are outlined below, though this list is not exhaustive of all concentrations possible in DC.

BHA students who are admitted as freshmen are undeclared until they have met with a concentration advisor and have submitted their signed Declaration form. BHA students who are admitted through internal transfer must have chosen a DC concentration at any time following the initial declaration must meet with the advisor of their intended concentration area to complete a new Declaration form, which will be reviewed during the internal transfer application period.

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: 79-201 Introduction to Anthropology and 79-400 Global Studies Research Seminar, 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 Proficiency Requirement
Demonstrating intermediate to advanced level proficiency in a language other than English is a crucial component of the concentration in Anthropology. 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. If needed these courses may be counted toward the BHA General Education Communicating: Language and Interpretations category.

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.

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Required Anthropological Methods Course (1 course, 9 units)
Students must take one course in ethnographic, archaeological, or other anthropological methods selecting from the list below. Other courses may fulfill these requirements, with permission of the BHA Anthropology faculty advisor.

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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.

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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 Statistics & Data Science Methods 9
88-251 Empirical Research Methods 9
88-252 Causal Inference in the Field 9

Economics Courses (2 courses, 18 units)
73-102 Principles of Microeconomics 9
73-160 Foundations of Microeconomics: Applications and Theory 9
or 73-230 Intermediate Microeconomics 9

Psychology Courses (2 courses, 18 units)
88-120 Reason, Passion and Cognition 9
(freshman or sophomore year)
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 these neural circuits are in turn influenced by behavioral experiences. Students with a concentration in Cognitive Neuroscience are expected to learn about 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.

Introductory and Survey Coursework (4 courses, 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 (2 courses, 18 units)
36-309 Experimental Design for Behavioral & Social Sciences 9
or 85-309 Experimental Design for Behavioral & Social Sciences - Psychology 9
85-314 Cognitive Neuroscience Research Methods 9

* 85-310 Research Methods in Cognitive Psychology may be substituted if necessary.

Distribution Requirements (3 courses, 27 units)
Complete three courses with at least one from each category below.

Approaches to Cognitive Neuroscience:
15-386 Neuronal Computation 9
15-883 Computational Models of Neural Systems 12
36-746 Statistical Methods for Neuroscience and Psychology 12
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
85-356 Music and Mind: The Cognitive Neuroscience of Sound 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
85-435 Neural and Cognitive Models of Adaptive Decisions 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
15-410 or 21-111 Differential and Integral Calculus 10
15-211 and 21-112 Differential Calculus and Integral Calculus 10
21-127 Concepts of Mathematics 10

Statistics Course (1 course, 9 units)
36-309 Experimental Design for Behavioral & Social Sciences 9
or 85-309 Experimental Design for Behavioral & Social Sciences - Psychology 9

Computational/Cognitive Modeling Core (3 courses, 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
85-435 Neural and Cognitive Models of Adaptive Decisions 9

Cognitive Psychology Core (4 courses, 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
85-359 Introduction to Music Cognition Research 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
85-414 Language and Thought 9
80-310 Formal Logic 9
80-314 Causal Discovery, Statistics, and Machine Learning 9
80-315 Modal Logic 9
80-381 Meaning in Language 9
80-383 Language in Use 9

Cognitive Science Elective (1 course, 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)

76-222 Creative Writing Matters -Fall, Freshman year (co-requisite: 76-101) 9
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 R 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: Magazines and Journals 9
76-465 Advanced Poetry Workshop 9
76-469 Screenwriting Workshop: Screenwriting/Television Writing 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, 48 units)

73-102 Principles of Microeconomics 9
85-102 Introduction to Psychology 9
88-120 Reason, Passion and Cognition (freshman or sophomore year) 9
88-223 Decision Analysis 12
88-302 Behavioral Decision Making 9

Research Methods (2 courses, 18 units)

36-202 Statistics & Data Science Methods 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:

85-350 Psychology of Prejudice 9
85-352 Evolutionary Psychology 9
85-375 Crosscultural Psychology 9
85-377 Attitudes and Persuasion 9
85-442 Health Psychology 9
85-444 Relationships 9
85-446 Psychology of Gender 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:

70-332 Business, Society and Ethics 9
80-208 Critical Thinking 9
80-221 Philosophy of Social Science 9
80-244 Environmental Ethics 9
80-245 Medical Ethics 9
80-246 Moral Psychology 9
80-249 AI, Society, and Humanity 9
80-271 Philosophy and Psychology 9
80-305 Choices, Decisions, and Games 9
80-321 Causation, Law, and Social Policy 9
80-324 Philosophy of Economics 9
88-275 Bubbles: Data Science 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
73-265 Economics and Data Science 9
73-347 Game Theory for Economists 9
80-405 Game Theory 9
Environmental & Sustainability Studies Concentration (81 units minimum)

The BHA concentration in Environmental & Sustainability Studies (ESS) 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. The curriculum is designed to help students apply social and scientific perspectives to environmental problems; to distinguish among scientific methods for evaluating environmental problems; to identify and assess sources of environmental data; and to identify environmental justice issues within the context of proposed policy solutions.

Environmental Core Course (1 course, 9 units)
99-236 Introduction to Environmental Ideas 9

Scientific Foundation Course (1 course, 9 units)
Take one of the following courses:

- 03-128 Biology for Life Special Topics (Fall 2019, Section A only) 9
- 09-105 Introduction to Modern Chemistry I 10
- 09-103 Atoms, Molecules and Chemical Change 9
- 09-225 Climate Change: Chemistry, Physics and Planetary Science 9
- 33-115 Physics for Future Presidents 9
- 12-201 Geology 9

Environmental Electives (7 courses, 63 units)
Students must take seven elective courses addressing aspects of environment and sustainability chosen from the list below. Other courses may fulfill these requirements, with permission of the ESS concentration advisor. At least five Environmental Elective courses must come from Dietrich College departments.

- 73-427 Sustainability, Energy, and Environmental Economics 9
- 76-319 Environmental Rhetoric 9
- 79-278 How (NOT) to Change the World 9
- 79-280 Coffee and Capitalism 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 9
- 79-315 Thirsty Planet: The Politics of Water in Global Perspective 9
- 79-334 Climate Change and Climate Justice: Global Perspectives 6
- 79-380 Hostile Environments: The Politics of Pollution in Global Perspective 9
- 80-244 Environmental Ethics 9
- 80-348 Health, Human Rights, and International Development 9
- 09-108 The Illusion and Magic of Food 6
- 09-225 Climate Change: Chemistry, Physics and Planetary Science 9
- 12-201 Geology 9
- 51-377 Design Center: Sensing Environments 9
- 62-315 IDeATe: Shaping the Built Environment: Experiments in Geometry and Matter Var.
- 70-376 Energy Systems 9

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 EHP encourages specialization, internship experiences, and research in a wide range of policy areas.

Foundations of Public Policy Requirement (1 course, 9 units)
Choose one 9-unit course from the list below.

- 73-102 Principles of Microeconomics 9
- 84-104 Decision Processes in American Political Institutions 9
- 84-110 Foundations of Political Economy 9

History Core (3 courses, 27 units)
Choose one 9-unit course from each category below. (Students must earn a final grade of "C" or better for these courses to count toward the concentration).

**Policy History:**
- 79-300 Guns in American History: Culture, Violence, and Politics 9

**U.S. History:**
- 79-240 Development of American Culture 9
- 79-242 African American History: Reconstruction to the Present 9
- 79-244 Women in American History 9
- 79-245 Capitalism and Individualism in American Culture 9
- 79-249 20th & 21st Century U.S. History 9
- 79-320 Women, Politics, and Protest 9

**Non-U.S. History:**
Non-US Survey
- 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 Century Europe 9
- 79-223 Mexico: From the Aztec Empire to the Drug War 9
- 79-226 African History: Earliest Times to 1780 9
- 79-227 Modern Africa: The Slave Trade to the End of Apartheid 9
- 79-229 Origins of the Arab-Israeli Conflict, 1880-1948 9
- 79-230 Arab-Israeli Conflict Since 1948 9
- 79-237 Comparative Slavery 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 9
- 79-265 Russian History: From the First to the Last Tsar 9
- 79-266 Russian History and Revolutionary Socialism 9
- 79-307 Religion and Politics in the Middle East 9

Philosophy Core (3 courses, 27 units)
Choose one course from three of the four categories below. No more than 9 units at the 100-level may be counted toward this requirement.

**Ethics:**
- 80-130 Introduction to Ethics 9
- 80-330 Ethical Theory 9

**Political Philosophy:**
- 80-135 Introduction to Political Philosophy 9
- 80-335 Social and Political Philosophy 9

**Foundations of Social Science:**
- 80-221 Philosophy of Social Science 9
- 80-321 Causation, Law, and Social Policy 9
- 80-324 Philosophy of Economics 9

**Applied Philosophy:**
- 80-136 Social Structure, Public Policy & Ethics 9
- 80-244 Environmental Ethics 9
- 80-245 Medical Ethics 9
- 80-249 AI, Society, and Humanity 9
- 80-336 Philosophy of Law 9
- 80-348 Health, Human Rights, and International Development 9
- 80-447 Global Justice 9

**Elective Courses (2 courses, 18 units)**
Choose any two courses from any of the following categories.

**Engineering and Public Policy:**
- 19-424 Energy and the Environment 9

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

**Economics:**
- 73-352 Public Economics 9
- 73-359 Benefit-Cost Analysis 9
- 73-365 Firms, Market Structures, and Strategy 9
- 73-372 International Money and Finance 9
- 73-408 Law and Economics 9
- 73-476 American Economic History 9

**English:**
- 76-492 Rhetoric of Public Policy 9

**History:**
- 79-206 Crime and Punishment in Early Modern Europe 9
- 79-228 The Civil Rights Movement and the World 9
- 79-233 The United States and the Middle East since 1945 9
- 79-234 Technology and Society 9
- 79-242 African American History: Reconstruction to the Present 9
- 79-247 African Americans, Imprisonment, and the Carceral State 9
- 79-267 The Soviet Union in World War II: Military, Political, and Social History 9
- 79-288 Bananas, Baseball, and Borders: Latin America and the United States 9
- 79-298 Mobile Phones & Social Media in Development & Human Rights: A Critical Appraisal 6
- 79-299 From Newton to the Nuclear Bomb: History of Science, 1750-1950 9
- 79-301 History of Surveillance: From the Plantation to Data Capitalism 6
- 79-303 Pittsburgh and the Transformation of Modern Urban America 6
- 79-305 Moneyball Nation: Data in American Life 9
- 79-310 Modern U.S. Business History: 1870 to the Present 9
- 79-315 Thirsty Planet: The Politics of Water in Global Perspective 9
- 79-320 Women, Politics, and Protest 9
- 79-322 Stalin and the Great Terror 9
- 79-325 U.S. Gay and Lesbian History 6
- 79-330 Medicine and Society 9
- 79-331 Body Politics: Women and Health in America 9
- 79-336 Oil & Water: Middle East Perspectives 6
- 79-338 History of Education in America 9
- 79-339 Juvenile Delinquency & Film: From Soul of Youth (1920) to West Side Story (1961) 6
- 79-340 Juvenile Delinquency & Film: From "Boyz N the Hood"(1991) to "The Wire"(2002-08) 6
Topics in Film & Visual Media Studies (2 courses, 18 units)

79-342 Introduction to Science and Technology Studies 9
79-343 Education, Democracy, and Civil Rights 9
79-349 United States and the Holocaust 6
79-370 Disasters in American History (2): Epidemics & Fires 6
79-371 African American Urban History 9
79-381 Energy and Empire: How Fossil Fuels Changed the World 9
79-397 Environmental Crises and the City 6

Philosophy:

80-256 Modern Moral Philosophy 9
80-305 Choices, Decisions, and Games 9
80-405 Game Theory 9

Institute for Politics and Strategy:

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

Social and Decision Sciences:

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

Note: Other elective courses may be approved at the discretion of the EHPP faculty advisor. A list of these courses must be filed in the BXA office.

Film & Visual Media Studies (81 units minimum)

The BHA concentration in Film & Visual Media Studies trains students through a combination of coursework in visual media, film history and analysis, screenwriting, and production of film and other visual media. This concentration offers a comprehensive education in film and visual media, from theoretical framing and historical-cultural contextualization to training skills in both creating and analyzing film, and developing a complex blend of creative, professional, and technical competencies. CMU’s Department of English is an ideal home for the Film & Visual Media Studies concentration due to the department’s combination of creative writers, film and media studies scholars, film makers, digital humanities, and visual communication researchers.

Introductory Courses (2 courses, 18 units)

76-239 Introduction to Film Studies 9
76-259 Introduction to Film History 9

Production Course (1 course, 9 units)

76-292 Film Production 9

Screenwriting Course (1 course, 9 units)

76-269 Survey of Forms: Screenwriting 9

Topics in Film & Visual Media Studies (2 courses, 18 units)

76-312 Crime and Justice in American Film 9
76-338 The American Cinema 9
76-339 Topics in Film and Media: Hollywood vs. the World (Can be taken more than once.) 9
76-353 Transnational Feminisms: Fiction and Film 9
76-367 Fact Into Film: Translating History into Cinema 9
76-377 Shakespeare and Film 9
76-438 The Wire: Crime, Realism, and Long-Form TV 9
76-439 Seminar in Film and Media Studies: Class, Race, & Gender in Film 9
76-448 Shakespeare on Film 9
76-449 Race and Media 9
79-214 Paris in Revolt: History, Literature, Film 6
79-225 West African History in Film 9
79-306 Fact into Film: Translating History into Cinema 9
79-308 Crime and Justice in American Film 9
79-309 The Chinese Revolution Through Film (1949-2000) 9
79-319 India Through Film 6
79-326 German History through Film 9
79-339 Juvenile Delinquency & Film: From Soul of Youth (1920) to West Side Story (1961) 6
79-340 Juvenile Delinquency & Film: From "Boy's N the Hood"(1991) to "The Wire"(2002-08) 6
79-341 The Cold War in Documents and Film 9
82-215 Arab Culture Through Film & Literature 9
82-278 Japanese Film and Literature: The Art of Storytelling 9
82-284 Multicultural Pittsburgh: A Creative Media Exploration of Cmmnty, Lang & Identit 9
82-296 A Century of Russian Film 9
82-355 Tpcs in Hispanic Std: Beyond the Film Screen: The Hispanic World Through Film 9

Courses in Film Production, Screenwriting, Digital Media, Literature & Culture, and/or Film & Visual Media Studies (3 courses, 27 units)

Students may take an additional three Dietrich College courses for a minimum of 27 units of courses offered in the categories listed above. Because there are dozens of options available, including many of the courses listed above, please consult with the Department of English academic advisor for guidance.

German Studies Concentration (81 units minimum)

A BHA concentration in German Studies promotes not just language proficiency but also an understanding of German 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

Intermediate level proficiency in German. This is equivalent to the completion of four courses (two at the 100-level and two at the 200-level) or exemption based on Advanced Placement, International Baccalaureate or Carnegie Mellon internal placement test scores.

Core Courses in German (3 courses, 27 units)

82-320 Contemporary Society in Germany, Austria and Switzerland 9
82-323 Germany, Austria and Switzerland in the 20th Century 9
82-327 The Emergence of the German Speaking World 9

Note: A 400-level course may be substituted with the major advisor’s approval.

Core Courses in Modern Languages (2 courses, 12 units)

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

82-280 Learning About Language Learning 9
82-281 Tutoring for Community Outreach Var.
82-282 Community Service Learning Var.
82-383 Second Language Acquisition: Theories and Research 9
82-388 Understanding Second Language Fluency 9
82-480 Social and Cognitive Aspects of Bilingualism 9
82-580 Senior Seminar in Modern Languages 3

Note: In consultation with the major advisor, students may substitute a Modern Languages course elective with one related to language analysis, language learning, or acquisition of language and culture from the listings in German Studies or from another department. Examples: 80-180 Nature of Language, 85-421 Language and Thought.

German Studies and Interdisciplinary Electives (5 courses, 42 units minimum)

Complete four courses from German Electives and one course from Interdisciplinary Electives, or a minimum of three courses from German Electives and two courses from Interdisciplinary Electives in consultation with the German advisor.
The BHA concentration in Global Studies is designed for students interested in an interdisciplinary approach to understanding complex interactions among global processes, regional and local cultures, and societal structures. BHA concentration students 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 (https://www.cmu.edu/dietrich/students/undergraduate/programs/senior-honors). 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 Proficiency 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. If needed these courses may be counted toward the BHA General Education Communicating: Language and Interpretations category. Additional 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.

- 79-201 Introduction to Anthropology 9
- 79-211 Modern Southeast Asia: Colonialism, Capitalism, and Cultural Exchange 9
- 79-278 How (NOT) to Change the World 9
- 79-280 Coffee and Capitalism 9
- 79-289 Animal Planet: An Environmental History of People and Animals 9
- 79-314 The Politics and Culture of Memory 9
- 79-315 Thirsty Planet: The Politics of Water in Global Perspective 9
- 79-317 Art, Anthropology, and Empire 9
- 79-318 Sustainable Social Change: History and Practice 9
- 79-379 Extreme Ethnography 9
- 79-380 Hostile Environments: The Politics of Pollution in Global Perspective 9
- 79-381 Energy and Empire: How Fossil Fuels Changed the World 9
- 79-383 The History of Capitalism 9

Global Studies Concentration (81 units minimum)

The BHA concentration in Global Studies is designed for students interested in a holistic approach 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 (https://www.cmu.edu/dietrich/students/undergraduate/programs/senior-honors). 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 Proficiency 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. If needed these courses may be counted toward the BHA General Education Communicating: Language and Interpretations category. Additional 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.

- 79-201 Introduction to Anthropology 9
- 79-211 Modern Southeast Asia: Colonialism, Capitalism, and Cultural Exchange 9
- 79-278 How (NOT) to Change the World 9
- 79-280 Coffee and Capitalism 9
- 79-289 Animal Planet: An Environmental History of People and Animals 9
- 79-314 The Politics and Culture of Memory 9
- 79-315 Thirsty Planet: The Politics of Water in Global Perspective 9
- 79-317 Art, Anthropology, and Empire 9
- 79-318 Sustainable Social Change: History and Practice 9
- 79-379 Extreme Ethnography 9
- 79-380 Hostile Environments: The Politics of Pollution in Global Perspective 9
- 79-381 Energy and Empire: How Fossil Fuels Changed the World 9
- 79-383 The History of Capitalism 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:

- 76-353 Transnational Feminisms: Fiction and Film
- 76-384 Race, Nation, and the Enemy
- 76-440 Postcolonial Theory: Diaspora and Transnationalism
- 79-224 Mayan America
- 79-233 The United States and the Middle East since 1945
- 79-237 Comparative Slavery
- 79-276 Beyond the Border
- 79-280 Coffee and Capitalism
- 79-282 Europe and the World Since 1800
- 79-283 Hungry World: Food and Famine in Global Perspective
- 79-288 Bananas, Baseball, and Borders: Latin America and the United States
- 79-333 Sex, Gender & Anthropology
- 79-350 Early Christianity
- 79-368 Un-natural Disasters: Societies and Environmental Hazards in Global Perspective
- 79-385 Out of Africa: The Making of the African Diaspora
- 80-348 Health, Human Rights, and International Development
- 80-447 Global Justice
- 82-283 Language Diversity & Cultural Identity
- 82-304 The Francophone World
- 82-345 Introduction to Hispanic Literary & Cultural Studies
- 84-322 Nonviolent Conflict and Revolution
- 84-326 Theories of International Relations
- 84-370 Global Nuclear Politics
- 84-389 Terrorism and Insurgency

Regional Courses:

Africa
- 79-225 West African History in Film
- 79-226 African History: Earliest Times to 1780
- 79-227 Modern Africa: The Slave Trade to the End of Apartheid
- 79-291 Globalization in East African History
- 79-386 Entrepreneurs in Africa, Past, Present and Future

Eastern and Southern Asia and the Pacific
- 79-211 Modern Southeast Asia: Colonialism, Capitalism, and Cultural Exchange
- 79-264 Tibet and China: History and Propaganda
- 88-411 Rise of the Asian Economies

Europe
- 79-202 Flesh and Spirit: Early Modern Europe, 1400-1750
- 79-203 Social and Political Change in 20th Century Central and Eastern Europe
- 79-205 20th Century Europe
- 79-208 Witchcraft and Witch-Hunting
- 79-268 World War I: The Twentieth Century’s First Catastrophe
- 79-270 Anti-Semitism Then and Now: Perspectives from the Middle Ages to the Present
- 79-323 Family, Gender, and Sexuality in European History, 500-1800
- 82-320 Contemporary Society in Germany, Austria and Switzerland
- 82-415 Topics in French and Francophone Studies
- 82-441 Studies in Peninsular Literature and Culture

The Middle East
- 79-229 Origins of the Arab-Israeli Conflict, 1880-1948
- 79-230 Arab-Israeli Conflict Since 1948
- 79-307 Religion and Politics in the Middle East
- 79-336 Oil & Water: Middle East Perspectives
- 79-398 Documenting the 1967 Arab-Israeli War
- 84-323 War and Peace in the Contemporary Middle East

The Americas
- 79-223 Mexico: From the Aztec Empire to the Drug War
- 79-235 Caribbean Cultures
- 82-245 New Directions in Hispanic Studies
- 82-343 Latin America Language and Culture
- 82-451 Studies in Latin American Literature and Culture
- 82-455 Topics in Hispanic Studies
- 82-456 Topics in Hispanic Studies
- 84-308 Political Economy of Latin America

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
- 76-386 Language & Culture
- 76-449 Race and Media
- 76-450 Law, Culture, and the Humanities
- 76-468 Space and Mobilities
- 79-228 The Civil Rights Movement and the World
- 79-281 Introduction to Religion
- 79-286 Archaeology: Understanding the Ancient World
- 79-313 “Unwanted”: Refugees, Asylum Seekers, and Patterns of Global Migration
- 79-316 Photography, the First 100 Years, 1839-1939
- 79-324 #MeToo: Naming and Resisting Gender Violence
- 79-330 Medicine and Society
- 79-343 Education, Democracy, and Civil Rights
- 79-349 United States and the Holocaust
- 79-397 Environmental Crises and the City
- 80-244 Environmental Ethics
- 80-335 Social and Political Philosophy
- 82-215 Arab Culture Through Film & Literature
- 82-541 Special Topics: Hispanic Studies
- 84-275 Comparative Politics
- 84-310 International Political Economy
- 84-318 Politics of Developing Nations
- 84-362 Diplomacy and Statecraft

Nation-based Courses:

- 79-214 Paris in Revolt: History, Literature, Film
- 79-216 Genghis Khan and the Mongol Empire
- 79-256 Sex, Guns, and Rock ‘n Roll: Youth Rebellion in 1960s & 1970s Europe
- 79-257 Germany and the Second World War
- 79-258 French History: From the Revolution to De Gaulle
- 79-259 France During World War II
- 79-261 The Last Emperors: Chinese History and Society, 1600-1900
- 79-262 Modern China: From the Birth of Mao ... to Now
- 79-263 Mao and the Chinese Cultural Revolution
- 79-265 Russian History: From the First to the Last Tsar
- 79-266 Russian History and Revolutionary Socialism
The BHA concentration in Global Systems & Management (GSM) is intended for students wishing to develop skills essential for participating in emerging opportunities in global business systems, systems development, product development and global project management. GSM exposes students to contemporary issues and practices facing organizations, managers and individuals working on a global scale across political, cultural and temporal boundaries. GSM presents an opportunity for students to learn about being part of an organization that works globally with its employees, business partners, customers and supply chains.

Students will learn about global project management, outsourcing and cross-cultural communications from theoretical and practical viewpoints. An organized elective structure enables students to tailor the concentration to reflect their specific interests.

Required Information Systems Course (1 course, 9 units)

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

67-329 Contemporary Themes in Global Systems 9

Required Communications Courses (2 courses, 18 units)

Students must take two courses from the list below. Other courses may fulfill these requirements, with permission of the BHA GSM advisor.

05-341 Organizational Communication 9
70-321 Negotiation and Conflict Resolution 9
70-340 Business Communications 9
70/85/88-341 Team Dynamics and Leadership 9
70-342 Managing Across Cultures 9
70-350 Acting for Business 9
70-483 Advertising and Marketing Communications 9
73-341 Within the Firm: Managing through Incentives 9
76-270 Writing for the Professions 9
76-318 Communicating in the Global Marketplace 9
76-386/786 Language & Culture 9
76-428 Visual Verbal Communication 9

Global Systems & Management (81 units minimum)

85-375 Crosscultural Psychology 9
88-419 International Negotiation 9

Global Systems Management Electives (6 courses, 54 units)

Students distribute their electives between the two categories listed below. Students must complete a minimum of 18 units in each category.

Humans, Heritage and Culture:

82-215 Arab Culture Through Film & Literature 9
82-238 Topics in Chinese Culture 9
82-253 Korean Culture Through Film 9
82-254 World of Korea, Then and Now 9
82-273 Introduction to Japanese Language and Culture 9
82-278 Japanese Film and Literature: The Art of Storytelling 9
82-293 Russian Cinema: From the Bolshevik Revolution to Putin’s Russia 9
82-303 Introduction to French Culture 9
82-304 The Francophone World 9
82-305 French in its Social Contexts 9
82-311 Advanced Arabic I 9
82-312 Advanced Arabic II 9
82-320 Contemporary Society in Germany, Austria and Switzerland 9
82-323 Germany, Austria and Switzerland in the 20th Century 9
82-333 Introduction to Chinese Language and Culture 9
82-342 Spain: Language and Culture 9
82-343 Latin America Language and Culture 9
82-345 Introduction to Hispanic Literary & Cultural Studies 9
82-361 Italian Language and Culture I 9
82-362 Italian Language and Culture II 9
82-399 Special Topics: Russian in Context 9
82-400 Russian Studies Topics 6
82-415/416 Topics in French and Francophone Studies 9
82-425 Topics in German Language and Culture 9
82-433 Topics in Contemporary Culture of China 9
82-441 Studies in Peninsular Literature and Culture 9
82-450 Advanced Research in Hispanic Language & Culture 9
82-456 Topics in Hispanic Studies 9
82-473/474 Topics in Japanese Studies 9
84-275 Comparative Politics 9
84-312 Gender and Development in Sub-Saharan Africa 6
84-315 Contemporary Debates in Human Rights 9
84-389 Terrorism and Insurgency 9

Note: History Department courses numbered 79-200 or above covering international/regional studies that are outside of U.S. history may also count in this category, with prior approval of the GSM advisor.

International Management:

19-411 Global Competitiveness: Firms, Nations and Technological Change 9
70-342 Managing Across Cultures 9
70-364 Business Law 9
70-365 International Trade and International Law 9
70-430 International Management 9
70-480 International Marketing 9
73-341 Within the Firm: Managing through Incentives 9
73-372 International Money and Finance 9
84-310 International Political Economy 9
84-311 International Development: Theory and Praxis 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 in the Contemporary Middle East 9
84-362 Diplomacy and Statecraft 9
International Relations and Politics Concentration (81 units minimum)

Offered through the Institute for Politics and Strategy (IPS), 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 concentration 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 decision science, 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. Also, the concentration taps into and contributes to CMU’s strengths in other social sciences that combine analytical and empirical methods. IRP includes an innovative initiative that incorporates decision science in international relations. It enables students to 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 intern in Washington for one semester. Courses taken through CMU/WSP will count toward the elective sequence in politics and public policy for the IRP concentration.

IRP students interested in developing their research skills are encouraged to apply for a research position with the Center for International Relations and Politics or work directly with a member of the IPS faculty. Students 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. Students are also encouraged to submit their work for publication in the CIRP Journal (https://www.cmu.edu/iricirp-journal), an online and print publication that analyzes current problems facing the United States and the international system.

Pre-requisites

84-110 Foundations of Political Economy 9
or 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 Statistics & Data Science Methods 9

Language Requirement

BHA IRP students are required to complete the intermediate (200) level or the equivalent in a modern language other than English. The 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, 21 units minimum)

International Relations and Politics BHA students will either:

Option 1

Take 21 units (three courses) from the elective lists below. At least two courses 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
79-298 Mobile Phones & Social Media in Development & Human Rights: A Critical Appraisal 6
79-301 History of Surveillance: From the Plantation to Data Capitalism 6
79-302 Killer Robots: The Ethics, Law, and Politics of Lethal Autonomous Weapons Systems 6
80-135 Introduction to Political Philosophy 9
80-321 Causation, Law, and Social Policy 9
80-335 Social and Political Philosophy 9
84-250 Writing for Political Science and Policy 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 in the Contemporary Middle East 9
84-324 The Future of Democracy 6
84-325 Contemporary American Foreign Policy 9
84-362 Diplomacy and Statecraft 9
84-363 Comparative Legal Systems 9
84-364 Comparative Presidential Behavior: Leadership, Personality, and Decision Making 9
84-366 The American Presidency 9
84-370 Global Nuclear Politics 9
84-372 Space and National Security 9
84-373 Emerging Technologies and the Law 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 9
84-388 Concepts of War and Cyber War 6
84-389 Terrorism and Insurgency 9
84-390 Social Media, Technology, and Conflict 9
84-393 Legislative Decision Making: US Congress 6
84-402 Judicial Politics and Behavior 6
84-405 The Future of Warfare 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
73-328 Health Economics 12
73-332 Political Economy 9
79-386 Entrepreneurs in Africa, Past, Present and Future 9
80-136 Social Structure, Public Policy & Ethics 9
80-244 Environmental Ethics 9
80-249 AI, Society, and Humanity 9
80-348 Health, Human Rights, and International Development 9
80-447 Global Justice 9
84-308 Political Economy of Latin America 9
84-310 International Political Economy 9
84-311 International Development: Theory and Praxis 9
84-312 Gender and Development in Sub-Saharan Africa 6
84-313 International Organizations and Law 9
84-315 Contemporary Debates in Human Rights 9
84-318 Politics of Developing Nations 9
84-411 Rise of the Asian Economies 9

International Cultures
76-318 Communicating in the Global Marketplace 9
76-386 Language & Culture 9
79-205 20th Century Europe 9
79-223 Mexico: From the Aztec Empire to the Drug War 9
79-224 Mayan America 9
79-227 Modern Africa: The Slave Trade to the End of Apartheid 9
79-229 Origins of the Arab-Israeli Conflict, 1880-1948 9
79-230 Arab-Israeli Conflict Since 1948 9
79-233 The United States and the Middle East since 1945 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 and Revolutionary Socialism 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
79-313 "Unwanted": Refugees, Asylum Seekers, and Patterns of Global Migration 6
79-314 The Politics and Culture of Memory 9
79-318 Sustainable Social Change: History and Practice 9
79-320 Women, Politics, and Protest 9
79-338 History of Education in America 9
79-342 Introduction to Science and Technology Studies 9
79-343 Education, Democracy, and Civil Rights 9
79-377 Food, Culture, and Power: A History of Eating 9
79-381 Energy and Empire: How Fossil Fuels Changed the World 9
79-385 Out of Africa: The Making of the African Diaspora 9
79-388 Documenting the 1967 Arab-Israeli War 9
85-375 Crosscultural Psychology 9
300 or 400- level language course

Option 2
Complete their electives via the Carnegie Mellon University Washington Semester Program (CMU/WSP) Politics and Public Policy elective sequence.

The Washington Semester Program (CMU/WSP) Politics and Public Policy Elective Sequence includes:
84-450-84-450 Policy Forum-Policy Forum (This course will count as the Policy Forum Core Course Requirement) 12
84-360 CMU/WSP Internship Seminar 12
84-3xx CMU/WSP Elective Seminars (Take 24 units from the elective list) 24
CMU/WSP Politics and Public Policy Elective Seminars
84-330 The Shading of Democracy: The Influence of Race on American Politics 6

84-331 Money, Media, and the Power of Data in Decisionmaking 6
84-332 Effects of US Policy on Businesses: Perspectives of Asian Americans 6
84-333 Power and Levers for Change in Washington, DC 12
84-334 Presidential Power in a Constitutional System 6
84-336 Implementing Public Policy: From Good Idea To Reality 12
84-337 Biomedical Science Research, Policy, and Governance 6
84-343 Language and Power: How to Understand and Use Political Speech 6
84-346 Legal Issues in Public Administration 6
84-348 Advocacy, Policy and Practice 6

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 (4 courses, 39 units)
82-272 Intermediate Japanese II * 12
82-273 Introduction to Japanese Language and Culture 9
82-371 Advanced Japanese I 9
82-372 Advanced Japanese II 9

* Students who place out of 82-272 Intermediate Japanese II must take 12 units chosen from the Japanese Studies and Interdisciplinary Electives category below.

Core Courses in Modern Languages (2 courses, 12 units)
Complete one 9 unit course plus the Senior Seminar (3 units).
82-280 Learning About Language Learning 9
82-281 Tutoring for Community Outreach Var.
82-262 Community Service Learning Var.
82-383 Second Language Acquisition: Theories and Research 9
82-388 Understanding Second Language Fluency 9
82-480 Social and Cognitive Aspects of Bilingualism 9
82-580 Senior Seminar in Modern Languages 3

Japanese Studies and Interdisciplinary Electives (4 courses, 30 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 be chosen from the History department courses, or with permission of the advisor students are encouraged to complete at least one Japanese history course at the University of Pittsburgh, one in Japan when they study abroad, or in a summer program at any other university.

Japanese Electives
82-373 Structure of the Japanese Language 9
82-374 Technical Japanese 9
82-473/474 Topics in Japanese Studies (Students may repeat with new topics.) 9
82-505 Undergraduate Internship Var.
82-571/572 Special Topics in Japanese Studies Var.
Interdisciplinary Electives
This list is compiled from possibilities such as but not limited to the following. Students should consult SIO and their 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
76-239 Introduction to Film Studies 9
76-386 Language & Culture 9
76-387 Writing in the Disciplines 6
History
79-261 The Last Emperors: Chinese History and Society, 1600-1900 9
79-262 Modern China: From the Birth of Mao ... to Now 9
79-275 Introduction to Global Studies 9
Modern Languages
82-234 Topics in Chinese History 9
82-278 Japanese Film and Literature: The Art of Storytelling 9
82-280 Learning About Language Learning 9
82-281 Tutoring for Community Outreach Var.
82-282 Community Service Learning Var.
82-283 Language Diversity & Cultural Identity 9
82-373 Structure of the Japanese Language 9
82-374 Technical Japanese 9
82-383 Second Language Acquisition: Theories and Research 9
82-480 Social and Cognitive Aspects of Bilingualism 9
Music
57-306 World Music 9
Philosophy
80-180 Nature of Language 9
80-280 Linguistic Analysis 9
80-380 Philosophy of Language 9
Psychology
85-375 Crosscultural Psychology 9
85-421 Language and Thought 9

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.

Introductory Course (1 course, 9 units)
80-180 Nature of Language 9

Linguistics Core (2 courses, 18 units)
Take one course each in 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:
80-381 Meaning in Language 9
80-383 Language in Use 9

Extended Core (3 courses, 27 units)
Choose three courses from Extended Core or additional courses from the Linguistics Core above.
80-283 It Matters How You Say It 9
80-284 Invented Languages 9
80-286 Words and Word Formation: Introduction to Morphology 9
80-287 Language Variation and Change 9
80-288 Intonation: Transcription and Analysis 9
80-382 Phonetics and Phonology II 9
80-384 Linguistics of Turkic Languages 9
80-385 Linguistics of Germanic Languages 9
80-388 Linguistic Typology: Diversity and Universals 9

Elective Courses (3 courses, 27 units)
Take three additional electives. These can be additional courses from the Core or Extended Core courses listed above, the electives list below, 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. Additional appropriate courses are offered irregularly or on a one-off basis. The Director will provide students with a list of possible electives each semester, and will assist students in selecting electives that are consistent with their goals and interests. A list of these courses must be filed in the BXA office.

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

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

Modern Languages:
82-283 Language Diversity & Cultural Identity 9
82-305 French in its Social Contexts 9
82-373 Structure of the Japanese Language 9
82-383 Second Language Acquisition: Theories and Research 9
82-585 Topics in Second Language Acquisition 9

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

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

Philosophy Concentration (81 units minimum)
The BHA Concentration 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
80-135 Introduction to Political Philosophy
80-136 Social Structure, Public Policy & Ethics
80-244 Environmental Ethics
80-245 Medical Ethics
80-248 Engineering Ethics
80-330 Ethical Theory
80-335 Social and Political Philosophy
80-348 Health, Human Rights, and International Development
80-430 Ethics and Medical Research
80-447 Global Justice

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

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

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

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

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.

Prerequisite English Elective

Students with a concentration in Professional Writing must complete one prerequisite 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.

Foundation Courses (5 courses, 39 units)
76-26x Survey of Forms (Nonfiction, Fiction, Poetry, or Screenwriting)
76-271 Introduction to Professional and Technical Writing
76-300 Professional Seminar
76-373 Argument
76-390 Style

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 Environment Rhetoric
76-351 Rhetorical Invention
76-355 Leadership, Dialogue, and Change
76-386 Language & Culture
Required Intro Course:
85-102 Introduction to Psychology

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

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

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

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 & Social Sciences - Fall
or 85-309 Experimental Design for Behavioral & Social Sciences - Psychology

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
79-420 Historical Research Seminar - Fall, Senior year

Required Survey Courses (2 courses, 18 units)
79-202 Flesh and Spirit: Early Modern Europe, 1400-1750
79-203 Social and Political Change in 20th Century Central and Eastern Europe
79-205 20th Century Europe
79-206 Crime and Punishment in Early Modern Europe
79-211 Modern Southeast Asia: Colonialism, Capitalism, and Cultural Exchange
79-223 Mexico: From the Aztec Empire to the Drug War
79-225 West African History in Film
79-226 African History: Earliest Times to 1780
79-227 Modern Africa: The Slave Trade to the End of Apartheid
79-229 Origins of the Arab-Israeli Conflict, 1880-1948 9
79-230 Arab-Israeli Conflict Since 1948 9
79-233 The United States and the Middle East since 1945 9
79-235 Caribbean Cultures 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
79-244 Women in American History 9
79-245 Capitalism and Individualism in American Culture 9
79-249 20th & 21st Century U.S. History 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 and Revolutionary Socialism 9
79-269 Russian History: From Socialism to Capitalism 9
79-288 Bananas, Baseball, and Borders: Latin America and the United States 9
79-307 Religion and Politics in the Middle East 9
79-320 Women, Politics, and Protest 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.
79-257 Germany and the Second World War 9
79-268 World War I: The Twentieth Century's First Catastrophe 9
79-276 Beyond the Border 6
79-278 How (NOT) to Change the World 9
79-280 Coffee and Capitalism 9
79-299 From Newton to the Nuclear Bomb: History of Science, 1750-1950 9
79-300 Guns in American History: Culture, Violence, and Politics 9
79-302 Killer Robots: The Ethics, Law, and Politics of Lethal Autonomous Weapons Systems 6
79-303 Pittsburgh and the Transformation of Modern America 6
79-305 Moneyball Nation: Data in American Life 9
79-309 The Chinese Revolution Through Film (1949-2000) 9
79-314 The Politics and Culture of Memory 9
79-316 Photography, the First 100 Years, 1839-1939 9
79-317 Art, Anthropology, and Empire 9
79-318 Sustainable Social Change: History and Practice 9
79-322 Stalin and the Great Terror 9
79-323 Family, Gender, and Sexuality in European History, 500-1800 9
79-331 Body Politics: Women and Health in America 9
79-338 History of Education in America 9
79-339 Juvenile Delinquency & Film: From Soul of Youth (1920) to West Side Story (1961) 6
79-345 Roots of Rock & Roll 9
79-346 American Political Humor 9
79-350 Early Christianity 9
79-352 Christianity Divided: The Protestant and Catholic Reformations, 1450-1650 9
79-359 Truth, Lies, and Propaganda: A Historical Inquiry 9
79-363 The Rise of Modern Golf, 1860 to the Present 6
79-371 African American Urban History 9
79-372 Cities, Technology, and the Environment 6
79-377 Food, Culture, and Power: A History of Eating 9
79-381 Energy and Empire: How Fossil Fuels Changed the World 9
79-385 Out of Africa: The Making of the African Diaspora 9
79-395 The Arts in Pittsburgh 9
79-396 Music and Society in 19th and 20th Century Europe and the U.S. 9

Students may satisfy the elective requirements in SPH with up to 27 units of the following courses offered by other departments in Dietrich College:
73-476 American Economic History 9
76-230 Literature & Culture in the 19th Century: Environmentalisms 9
76-239 Introduction to Film Studies 9
76-295 Topics in Russian Language & Culture: 20th Century Russian Masterpieces 9
76-449 Race and Media 9
80-135 Introduction to Political Philosophy 9
80-226 Revolutions in Science 9
80-335 Social and Political Philosophy 9
82-208 Topics in European Studies 9
82-245 New Directions in Hispanic Studies 9
82-247 The Hispanic World: History, Culture and Globalization 9
82-293 Russian Cinema: From the Bolshevik Revolution to Putin's Russia 9
82-327 The Emergence of the German Speaking World 9
82-420 The Crucible of Modernity: Vienna 1900 9
82-427 Nazi and Resistance Culture 9
84-275 Comparative Politics 9
84-308 Political Economy of Latin America 9
84-322 Nonviolent Conflict and Revolution 9
84-324 The Future of Democracy 6
84-325 Contemporary American Foreign Policy 9
84-362 Diplomacy and Statecraft 9
84-364 Comparative Presidential Behavior: Leadership, Personality, and Decision Making 9
84-366 The American Presidency 9
84-380 Grand Strategy in the United States 9
84-386 The Privatization of Force 9
84-389 Terrorism and Insurgency 9
85-380 In Search of Mind: The History of Psychology 9
88-281 Topics in Law: 1st Amendment 9
88-284 Topics in Law: The Bill of Rights 9

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 10
21-240 Matrix Algebra with Applications 10
or 21-241 Matrices and Linear Transformations 10
or 21-242 Matrix Theory 10

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

Statistics Core (6 courses, 54 units)
36-202 Statistics & Data Science Methods 9
or 36-290 Introduction to Statistical Research Methodology 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 listed below. Students will consult with the Statistics advisor to select the Special Topics and Electives courses that best fit for their areas of interest.

36-303 Sampling, Survey and Society 9
36-311 Statistical Analysis of Networks 9
36-315 Statistical Graphics and Visualization 9
36-490 Undergraduate Research 9
36-46x Special Topics (topics and offerings vary) 9
36-497 Corporate Capstone Project 9

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 and Computer Science Pre-requisites
These five 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
15-112 Fundamentals of Programming and Computer Science 12

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 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

Data Analysis Electives (1 course, 9 units)
Students must take one course from the Statistics Electives listed below. Students will consult with the Statistics advisor to select the Special Topics and Electives courses that best fit for their areas of interest.

36-303 Sampling, Survey and Society 9
36-311 Statistical Analysis of Networks 9
36-315 Statistical Graphics and Visualization 9
36-46x Special Topics (topics and offerings vary) 9
36-490 Undergraduate Research 9
36-497 Corporate Capstone Project 9

Machine Learning Core (2 courses, 22 units)
15-122 Principles of Imperative Computation 10
10-301 Introduction to Machine Learning 12

Machine Learning Elective (1 course, 9 units minimum)
Students must take one course from the ML Electives listed below. Students will consult with the Statistics & Machine Learning advisor to choose an elective that best fits their area of interest. This course may have additional pre-requisites. Keep in mind this is not an exhaustive list and other applicable courses can be reviewed to be approved as an ML elective - please speak with your Statistics & Machine Learning advisor about this.

10-405 Machine Learning with Large Datasets (Undergraduate) 12
or 10-605 Machine Learning with Large Datasets 12
10-703 Deep Reinforcement Learning & Control 12
10-707 Topics in Deep Learning 12
11-411 Natural Language Processing 12
11-441 Machine Learning for Text Mining 9
11-661 Language and Statistics 12
or 11-761 Language and Statistics 12
15-281 Artificial Intelligence: Representation and Problem Solving 12
15-386 Neural Computation 9
15-387 Computational Perception 9
16-311 Introduction to Robotics 12
16-385 Computer Vision 12
or 16-720 Computer Vision 12

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, develop information management systems, 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
or 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 (6 courses, 54 units)
76-26x Survey of Forms (Nonfiction, Fiction, Poetry, or Screenwriting) 9
76-271 Introduction to Professional and Technical Writing 9
76-300 Professional Seminar 3
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 Corpus Rhetorical Analysis 9
76-388 Coding for Humanists 9
76-395 Science Writing 9
76-425 Science in the Public Sphere 9
Architecture Required Courses (7 courses, 52 units minimum)

- 48-100 Architecture Design Studio: Foundation I - Fall, Freshman year
- 48-126 Drawing II - Spring, Freshman year
- 48-240 Historical Survey of World Architecture and Urbanism I - Spring, Freshman year
- 48-241 Modern Architecture - Fall, Sophomore year
- 48-245 Writing for Design (mini-1)
- 48-246 Writing for Design (mini-2)
- 48-247 Writing for Design (mini-3)

Architecture 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 CONCENTRATION (108 UNITS MINIMUM)**

Architecture Required Courses (7 courses, 52 units minimum)

- 48-100 Architecture Design Studio: Foundation I - Fall, Freshman year
- 48-126 Drawing II - Spring, Freshman year
- 48-240 Historical Survey of World Architecture and Urbanism I - Spring, Freshman year
- 48-241 Modern Architecture - Fall, Sophomore year
- 48-245 Writing for Design (mini-1)
- 48-246 Writing for Design (mini-2)
- 48-247 Writing for Design (mini-3)

Electives (1 course, 9 units)

Students with a TW concentration take one course 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 College. Students in the TC track typically select courses from engineering, design, HCl, computer science, math or statistics. Students should work with their faculty advisor to select courses that are meaningful for their track.

**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)**

Concept Studios (2 courses, 20 units)

Complete two courses:

- 60-101 Concept Studio: The Self and the Human Being
- 60-201 Concept Studio: Space and Time

Media Studios (3 courses, 30 units minimum)

Complete three courses. 3D mini courses count as half a course:

- 60-150 2D Media Studio: Drawing
- 60-160 2D Media Studio: Imaging
- 60-131 3D Media Studio I (mini-1)
- 60-132 3D Media Studio I (mini-2)
- 60-133 3D Media Studio II (mini-3)
- 60-134 3D Media Studio II (mini-4)
- 60-250 2D Media Studio: Painting
- 60-251 2D Media Studio: Print Media
- 60-110 Electronic Media Studio: Introduction to the Moving Image
- 60-210 Electronic Media Studio: Introduction to Interactivity
- 60-212 Electronic Media Studio: Interactivity and Computation for Creative Practice

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.

**Critical Studies (2 courses, 18 units)**

- 60-205 Critical Theory in Art III - Fall
- 60-206 Critical Theory in Art IV - Spring

Note: Critical Theory I & II are strongly recommended.
DRAMA CONCENTRATION (108 UNITS MINIMUM)

Options available in the following areas: 1) Design, 2) Directing, 3) Dramaturgy, 4) Production Technology and Management

Note: There is no BHA Acting or Musical Theatre option.

Required Courses for All Concentration Options (5 courses, 20 units)

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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
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<tbody>
<tr>
<td>54-159-54-159</td>
<td>Production Practicum-Production Practicum</td>
<td>12</td>
</tr>
<tr>
<td>54-517</td>
<td>Director’s Colloquium</td>
<td>1</td>
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</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.

Directing Required Courses (9 courses, 53 units minimum)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>54-109</td>
<td>Dramaturgy 1: Approaches to Text</td>
<td>9</td>
</tr>
<tr>
<td>54-184</td>
<td>Dramaturgy 2: Introduction to Production</td>
<td>9</td>
</tr>
<tr>
<td>54-121</td>
<td>Directing I: Sources</td>
<td>9</td>
</tr>
<tr>
<td>54-159-54-159</td>
<td>Production Practicum-Production Practicum</td>
<td>12</td>
</tr>
<tr>
<td>54-200-54-200</td>
<td>Dramaturgy Forum-Dramaturgy Forum</td>
<td>2</td>
</tr>
</tbody>
</table>

A minimum of 29 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 (2 courses, 26 units)

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)

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

Required Course for All Concentration Options (1 course, 9 units)

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.

Music Performance and Composition Required Courses (12 courses, 76 units)

A minimum of 99 additional Music units must be approved by the Music advisor. A list of these selected courses must be filed in the BXA office.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>57-152</td>
<td>Harmony I</td>
<td>9</td>
</tr>
<tr>
<td>57-149</td>
<td>Basic Harmony I</td>
<td>9</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>57-161</td>
<td>Eurythmics I (recommended co-requisite: 57-181)</td>
<td>3</td>
</tr>
<tr>
<td>57-181</td>
<td>Solfege I (recommended co-requisite: 57-181)</td>
<td>3</td>
</tr>
<tr>
<td>or 57-180</td>
<td>Basic Solfege I</td>
<td>9</td>
</tr>
<tr>
<td>or 57-185</td>
<td>Advanced Solfege I</td>
<td>9</td>
</tr>
<tr>
<td>57-173</td>
<td>Survey of Western Music History (co-requisite: 57-188)</td>
<td>9</td>
</tr>
<tr>
<td>57-188</td>
<td>Repertoire and Listening for Musicians</td>
<td>1</td>
</tr>
<tr>
<td>57-49x</td>
<td>BXA Studio (4 semesters)</td>
<td>36</td>
</tr>
<tr>
<td>57-xxx</td>
<td>Major Ensemble (4 semesters)</td>
<td>24</td>
</tr>
</tbody>
</table>

A minimum of 9 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 (8 courses, 45 units)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>57-283</td>
<td>Music History I (co-requisite: 57-190)</td>
<td>9</td>
</tr>
<tr>
<td>57-284</td>
<td>Music History II (co-requisite: 57-289)</td>
<td>9</td>
</tr>
<tr>
<td>57-285</td>
<td>Music History III (co-requisite: 57-290)</td>
<td>9</td>
</tr>
<tr>
<td>57-189</td>
<td>Introduction to Repertoire and Listening for Musicians</td>
<td>3</td>
</tr>
<tr>
<td>57-190</td>
<td>Repertoire and Listening for Musicians I</td>
<td>3</td>
</tr>
<tr>
<td>57-289</td>
<td>Repertoire and Listening for Musicians II</td>
<td>3</td>
</tr>
</tbody>
</table>
Choose 36 units from:

- 57-209 The Beatles
- 57-306 World Music
- 57-404 String Quartet: A Social History
- 57-405 Concerto: Virtuosity and Contrast
- 57-409 Puccini's Operas
- 57-427 Advanced Seminar in Film Musicology
- 57-476 How Music Works: An Affective History
- 57-477 Music of the Spirit
- 57-478 Survey of Historical Recording
- 57-480 History of Black American Music
- 57-485 History of the Symphony

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 (7 courses, 40 units)

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

Choose 59 units from:

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

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

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 interdisciplinary 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.

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>Category</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. BSA General Education</td>
<td>129</td>
</tr>
<tr>
<td>II. MCS Concentration</td>
<td>114-134</td>
</tr>
<tr>
<td>III. CFA Concentration</td>
<td>108</td>
</tr>
<tr>
<td>IV. Free Electives</td>
<td>9-29</td>
</tr>
<tr>
<td><strong>Total BSA Degree Requirements</strong></td>
<td>380</td>
</tr>
</tbody>
</table>

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 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/schools-colleges/melloncollegeofscience/#generaleducationrequirementstextcontainer).

**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 10

**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 9

Nontechnical 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
- or 76-102 Advanced First Year Writing: Special Topics
- or 76-106 Writing about Literature, Art and Culture
- & 76-107 and Writing about Data
- & 76-108 and Writing about Public Problems

**Total BSA Degree Requirements**

All undergraduate students must complete the First-Year Writing requirement—the Department of English does not accept any Advanced Placement exemptions. This requirement can be completed in two different ways. Enroll in one of two full-semester courses 101 or 102 (by invitation only), 9 units, or enroll in two of three half-semester mini courses (back-to-back within a single semester) 106/107/108, 4.5 + 4.5 units. Course options and topics: www.cm.edu/hss/english/first_year/index.html

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

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. However, this course requirement cannot be satisfied with AP/IB/Cambridge exam credit.

- 57-173 Survey of Western Music History
- 57-209 The Beatles
- 57-306 World Music
- 70-342 Managing Across Cultures
- 76-221 Books You Should Have Read by Now: 16th & 17th C. Pop Culture
- 76-227 Comedy
- 76-232 Introduction to Black Literature
- 76-239 Introduction to Film Studies
- 76-241 Introduction to Gender Studies
- 76-386 Language & Culture
- 79-104 Global Histories
- 79-201 Introduction to Anthropology
- 79-202 Flesh and Spirit: Early Modern Europe, 1400-1750
- 79-205 20th Century Europe
- 79-210 Identity, Nationhood, and State
- 79-211 Modern Southeast Asia: Colonialism, Capitalism, and Cultural Exchange
- 79-223 Mexico: From the Aztec Empire to the Drug War
- 79-227 Modern Africa: The Slave Trade to the End of Apartheid
- 79-229 Origins of the Arab-Israeli Conflict, 1880-1948
- 79-230 Arab-Israeli Conflict Since 1948
- 79-232 Arabian Peninsula Environmental History
- 79-233 The United States and the Middle East since 1945
- 79-235 Caribbean Cultures
- 79-240 Development of American Culture
- 79-241 African American History: Africa to the Civil War
- 79-242 African American History: Reconstruction to the Present
- 79-244 Women in American History
- 79-245 Capitalism and Individualism in American Culture
- 79-261 The Last Emperors: Chinese History and Society, 1600-1900
- 79-262 Modern China: From the Birth of Mao ... to Now
- 79-263 Mao and the Chinese Cultural Revolution
- 79-265 Russian History: From the First to the Last Tsar
- 79-266 Russian History and Revolutionary Socialism
- 79-267 The Soviet Union in World War II: Military, Political, and Social History
Humantes and Social Sciences (2 courses, 18 units)

To fulfill this requirement, students must complete a minimum of two (2) nontechical 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.cm.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.cm.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
- 52-391 BXA Junior Portfolio 0
- 52-392 BXA Seminar III: Deconstructing Disciplines 9
- 52-401 BXA Seminar IV: Capstone Project Research 9
- 52-402 BXA Seminar V: Capstone Project Production 9

Mellon College of Science Concentration

(number of courses vary, 114-134 units)

BSA students declare one of the following concentrations, through consultation with their BXA advisor and the MCS concentration advisors. A completed MCS Concentration Declaration form must be approved by the concentration advisor and submitted to the BXA office, by the end of the student’s first year.

- Biological Sciences (114 units)
- Chemistry (121 units)
- Mathematical Sciences (123 units)
- Neurobiology (114 units)
- Physics (134 units)

BSA students who are admitted as freshmen are undeclared until they have met with a concentration advisor and have submitted their signed Declaration form. BSA students who are admitted through internal transfer must have chosen an MCS concentration at the time of their application (which serves as declaration). All BSA students wishing to change their concentration by focusing on interdisciplinary approaches and arts-based research techniques.

Biological Sciences Concentration (114 units minimum)

Biological Sciences Required Courses (11 courses, 96 units minimum)

- 03-201 Undergraduate Colloquium for Sophomores 2
- 03-220 Genetics (co-requisite: 03-343) 9
- 03-231 Honors Biochemistry - Spring, Sophomore year 9
- 03-320 Cell Biology - Fall, Junior year 9
- 03-343 Experimental Techniques in Molecular Biology - Fall, Junior year 12
- 09-106 Modern Chemistry II 10
- 09-207 Techniques in Quantitative Analysis 9
- 09-208 Techniques for Organic Synthesis and Analysis or 03-344 Experimental Biochemistry or 03-345 Experimental Cell and Development Biology or 03-346 Experimental Neuroscience 9
- 09-217 Organic Chemistry I 9
- 09-218 Organic Chemistry II 9
- 33-122 Physics II for Biological Sciences and Chemistry Students 9

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 (14 courses, 103 units)

- 09-219 Modern Organic Chemistry 10
- 09-220 Modern Organic Chemistry II 10
- 09-231 Physical Chemistry 9
- or 09-344 Physical Chemistry (Quantum): Microscopic Principles of Physical Chemistry 9
- or 09-345 Physical Chemistry (Thermo): Macroscopic Principles of Physical Chemistry 9
- 09-348 Inorganic Chemistry 10
- 09-221 Laboratory I: Introduction to Chemical Analysis 12
- 09-222 Laboratory II: Organic Synthesis and Analysis 12
- 09-321 Laboratory III: Molecular Design and Synthesis 12
- or 09-323 Bioorganic Chemistry Laboratory 0
- 09-204 Professional Communication Skills in Chemistry 3
- 09-201-09-202 Undergraduate Seminar I - Undergraduate Seminar II: Safety and Environmental Issues for Chemists - Undergraduate Seminar III 3
- 09-402 Undergraduate Seminar VI 3
- 33-122 Physics II for Biological Sciences and Chemistry Students 9

Note: Students who have a strong chemistry background, should enroll in this 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 (9 courses, 87 units minimum)

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

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

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)
03-161 Molecules to Mind 9
or 85-219 Biological Foundations of Behavior 9
03-201 Undergraduate Colloquium for Sophomores 2
03-220 Genetics - Fall, Sophomore year 9
03-231 Honors Biochemistry - Spring, Sophomore year 9
03-320 Cell Biology - Fall, Junior year 9
03-342 Introduction to Biological Laboratory Practices - Fall, Junior year 1
03-343 Experimental Techniques in Molecular Biology - Fall, Junior year 12
03-362 Cellular Neuroscience 9
03-363 Systems Neuroscience 9
09-217 Organic Chemistry I 9
33-122 Physics II for Biological Sciences and Chemistry 9
Students
85-211 Cognitive Psychology 9

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 (16 courses, 116 units)
21-259 Calculus in Three Dimensions 9
33-104 Experimental Physics 9
33-142 Physics II for Engineering and Physics Students 12
or 33-152 Matter and Interactions II 12
33-201 Physics Sophomore Colloquium I -Fall 2
33-202 Physics Sophomore Colloquium II -Spring 2
33-311 Physics III: Modern Essentials 10
33-228 Electronics I 10
33-231 Physical Analysis 10
33-232 Mathematical Methods of Physics 10
33-234 Quantum Physics 10
33-301 Physics Upperclass Colloquium I -Fall 1
33-302 Physics Upperclass Colloquium II -Spring 1
33-331 Physical Mechanics I 10
33-338 Intermediate Electricity and Magnetism I 10
33-340 Modern Physics Laboratory 10
33-341 Thermal Physics I 10

Physics Electives (2 courses, 18 units)
Two courses to be pre-approved by the Physics Department.
33-xxx Two Physics Electives 18

Note: 33-114 Physics of Musical Sound (9 units) is highly recommended for students with a Music concentration.

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 (7 courses, 52 units minimum)
48-100 Architecture Design Studio: Foundation I - Fall, Freshman year 10-15
or 48-095 Spatial Concepts for Non-Majors 6
62-112 Digital Media I - Fall, Freshman year 6
62-123 Digital Media II - Spring, Freshman year 6
62-126 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)

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
60-280 Introduction to Contextual Practice 10

Media Studios (3 courses, 30 units minimum)
Complete three courses. 3D mini courses count as half a course:
60-150 2D Media Studio: Drawing 10
60-160 2D Media Studio: Imaging 10
60-131 3D Media Studio I (mini-1) 5
60-132 3D Media Studio I (mini-2) 5
60-133 3D Media Studio II (mini-3) 5
60-134 3D Media Studio II (mini-4) 5
60-250 2D Media Studio: Painting 10
60-251 2D Media Studio: Print Media 10
60-110 Electronic Media Studio: Introduction to the Moving Image 10
60-210 Electronic Media Studio: Introduction to Interactivity 10
or 60-212 Electronic Media Studio: Interactivity and Computation for Creative Practice 12

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 Senior Critique Seminar 10
Advanced Electronic and Time-Based Work (ETB) (course numbers 60-410 through 60-429) 10
Advanced Sculpture, Installation and Site-Work (SIS) (course numbers 60-430 through 60-447) 10
Advanced Contextual Practice (CP) (course numbers 60-448 through 60-449) 10
Advanced Drawing, Painting, Print Media and Photography (DP3) (course numbers 60-450 through 60-498) 10
60-499 Studio Independent Study (one only) 10

* Courses offered intermittently; speak with a BXA advisor to determine course availability.

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

Note: Critical Theory I & II are strongly recommended.

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.
- 60-200 Sophomore Review -Spring 0
- 60-400 Senior Review -Fall 0

**DESIGN CONCENTRATION (108 UNITS MINIMUM)**

Design Required Courses (13 courses, 95 units)
- 51-101 Studio: Survey of Design (Fall, Freshman year) 10
- 51-121 Visualizing (Fall, Freshman year) 10
- 51-171 Placing (Fall, Freshman year) 10
- 51-102 Design Lab (Spring, Freshman year) 10
- 51-122 Collaborative Visualizing (Spring, Freshman year) 10
- 51-172 Systems (Spring, Freshman year) 9

Choose Two Studios (Fall, Sophomore year): 4.5+4.5
- 51-225 Communications Studio I: Understanding Form & Context
  or 51-245 Products Studio I: Understanding Form & Context
  or 51-265 Environments Studio I: Understanding Form & Context

Choose Two Corresponding Labs (Fall, Sophomore year): 4.5+4.5
- 51-227 Prototyping Lab I: Communications
  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 I (Fall, Junior year or later) 4.5
- 51-373 Futures II (Fall, Junior year or later) 4.5

Design Electives (13 units)
A minimum of 13 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)**

Options available in the following areas: 1) Design, 2) Directing, 3) Dramaturgy, 4) Production Technology and Management

Note: There is no BHA Acting or Musical Theatre option.

Required Courses for All Concentration Options (5 courses, 20 units)
- 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 (2 courses, 26 units)
- 54-151-54-152 Stagecraft-Stagecraft (13 units + 13 units)

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 (10 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 (9 courses, 53 units minimum)
- 54-109 Dramaturgy I: Approaches to Text 9
- 54-184 Dramaturgy 2: Introduction to Production Dramaturgy 9
- 54-121 Directing I: Sources 9
- 54-159-54-159 Production Practicum-Production Practicum (two times, 12 units total) 12
- 54-200-54-200 Dramaturgy Forum-Dramaturgy Forum -Fall 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 29 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 (2 courses, 26 units)
- 54-151-54-152 Stagecraft-Stagecraft (13 units + 13 units)

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)**

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

Required Course for All Concentration Options (1 course, 9 units)
- 57-152 Harmony I
  or 57-149 Basic Harmony I 9

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

Music Performance and Composition Required Courses (12 courses, 76 units)
- 57-161 Eurythmics I (recommended co-requisite: 57-181) 3
- 57-181 or 57-180 or 57-185 Solfege I
  Basic Solfege I
  Advanced Solfege I
- 57-173 Survey of Western Music History (co-requisite: 57-188) 9
- 57-188 Repertoire and Listening for Musicians 1
Choose units

Audio Recording & Production Required Courses (7 courses, 40 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
57-404 String Quartet: A Social History 9
57-405 Concerto: Virtuosity and Contrast 9
57-409 Puccini's Operas 9
57-427 Advanced Seminar in Film Musicology 9
57-476 How Music Works: An Affective History 6
57-477 Music of the Spirit 6
57-478 Survey of Historical Recording 6
57-480 History of Black American Music 6
57-485 History of the Symphony 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.

Musicology Required Courses (8 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 59 units from:

57-153 Harmony II 9
57-150 Basic Harmony II 9
57-182 Solfege II 3
57-186 Advanced Solfege II 3
57-104 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 I 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 (7 courses, 47 units)

57-101 Introduction to Music Technology 6
57-171 Introduction to Music Technology (self-paced) 6
57-181 Solfege I 3
57-180 Basic Solfege I 3
57-185 Advanced Solfege I 3
57-173 Survey of Western Music History (co-requisite: 57-188) 9
57-188 Repertoire and Listening for Musicians 1
57-090 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 9
57-150 Basic Harmony II 9
57-182 Solfege II 3
or 57-186 Advanced Solfege II 3
57-104 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
57-478 Survey of Historical Recording 6
57-829 Contemporary Soundscape 9
60-131 3D Media Studio I 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.

Free Electives

(approximately 1-3 courses, 9-29 units)

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.

Engineering and Arts Additional Major

Carnegie Mellon recognizes that there are STEM-minded students who want the opportunity to formally incorporate their fine arts talents with their current study in engineering. In order to accommodate students who wish to pursue an education in both areas, while retaining the full engineering curriculum and licensure, we offer an additional major that combines the strengths of the College of Fine Arts (CFA) and the College of Engineering (E). The Engineering and Arts (EA) additional major is an interdisciplinary program that offers a unique group of qualified Engineering students the foundation to develop their skills and interests in an area of the fine arts and engineering.
The EA curriculum has two main components: BXA requirements and fine arts concentration requirements. Each student’s course of study is structured so it can be completed alongside their primary engineering major.

The EA Additional Major Program is governed by faculty and administrators from both colleges and led by the director of the BXA Intercollege Degree Programs. Students receive extensive advising support. The academic advisors in the BXA Intercollege Degree Programs are the advisors and liaisons between CFA and Engineering. Each student has two additional academic advisors: an advisor in the admitting school of CFA to guide their focus in the arts, and their primary advisor in Engineering to guide their full major in engineering.

**EA Curriculum**

<table>
<thead>
<tr>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. BXA Requirements</td>
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<tr>
<td>II. CFA Concentration</td>
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<tr>
<td>Total EA Additional Major Requirements</td>
</tr>
</tbody>
</table>

**BXA Requirements**

**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 or 52-291: BXA Seminar I: Building the Wunderkammer (9 units)
- 52-391: BXA Junior Portfolio (0 units)
- 52-392: BXA Seminar III: Deconstructing Disciplines (9 units)
- 52-401: BXA Seminar IV: Capstone Project Research (9 units)
- 52-402: BXA Seminar V: Capstone Project Production (9 units)

**College of Fine Arts Concentration**

**Art Concentration (108 units minimum)**

Concept Studios (2 courses, 20 units)

Complete two courses:

- 60-101: Concept Studio: The Self and the Human Being (10 units)
- 60-201: Concept Studio: Space and Time (10 units)
- 60-202: Concept Studio: Systems and Processes (10 units)
- 60-280: Introduction to Contextual Practice (10 units)

Media Studios (3 courses, 30 units Minimum)

Complete three courses. 3D mini courses count as half a course:

- 60-150: 2D Media Studio: Drawing (10 units)
- 60-160: 2D Media Studio: Imaging (10 units)
- 60-131: 3D Media Studio I (mini-1) (5 units)
- 60-132: 3D Media Studio I (mini-2) (5 units)
- 60-133: 3D Media Studio II (mini-3) (5 units)
- 60-134: 3D Media Studio II (mini-4) (5 units)
- 60-250: 2D Media Studio: Painting (10 units)
- 60-251: 2D Media Studio: Print Media (10 units)
- 60-110: Electronic Media Studio: Introduction to the Moving Image (10 units)
- 60-210: Electronic Media Studio: Interactivity (10-12 units)
- 60-212: Electronic Media Studio: Interactivity and Computation for Creative Practice

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 DP). They may take all courses in one media area if a focus is desired.

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

**Critical Studies (2 courses, 18 units)**

- 60-205: Critical Theory in Art III -Fall (9 units)
- 60-206: Critical Theory in Art IV -Spring (9 units)

Note: Critical Theory I & II are strongly recommended.

**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.

- 60-200: Sophomore Review -Spring (0 units)
- 60-400: Senior Review -Fall (0 units)

**Academic Policies**

**Professional and Community Standards**

As a condition of enrollment BXA, and as a student in the College of Fine Arts, we expect you to positively contribute to the community in order to fully engage in the intellectual life at CFA. Classrooms, studios, rehearsal and performance spaces, exhibition venues and off-campus curricular destinations are safe spaces for expression and self-identification. Students are expected to treat everyone with respect, regardless of race, country of origin, gender identity and expression, sexual orientation, disability, physical appearance, age, religion, political affiliation or marital status.

Lack of respect and harassment includes offensive comments related to any protected personal characteristic, deliberate intimidation, sustained disruption of speech, inappropriate physical contact and unwelcome sexual attention. Violations of this agreement are subject to a response to be determined by the BXA Director and CFA Associate Deans.

**Academic Standards and Actions**

Academic standards are established to ensure a student is progressing well in their desired CMU degree. Deviation from these standards will prompt an academic action, which notifies both the student and their advisors so appropriate responses can be considered.

At the end of every semester, the academic performance of each BXA student is evaluated based on the established academic standards listed below. As the College of Fine Arts is the unifying body among the BXA degrees, the BXA Director presents recommendations for academic actions to the College of Fine Arts Academic Advisory Council (CFA-AAC) for a final review and council vote in accordance with CFA-AAC protocol. Once the actions are approved, the student will receive written notice of the action. Copies of all communications will also be sent to their BXA, CFA and academic college advisors.

**Academic Standards**

BXA students are expected to maintain a cumulative QPA of 2.0 or higher and to make satisfactory progress toward their academic degree. Meeting one or more of the following conditions in the semester will result in an academic action. Note that meeting a singular criterion more than once within the current semester is equivalent to meeting 2 or more criteria:

- Semester QPA below 2.0
- Cumulative QPA below 2.0
- Grade of D or R in a required concentration course*
- Grade of R in a general education course

* Grade of D or R in a required concentration course is considered an academic action.

**Academic Standards and Actions**

<table>
<thead>
<tr>
<th>Courses</th>
<th>Units</th>
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<tbody>
<tr>
<td>60-190: BXA Seminar I: Building the Wunderkammer</td>
<td>9</td>
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<tr>
<td>60-191: BXA Seminar II: Transferring Knowledge</td>
<td>9</td>
</tr>
<tr>
<td>60-391: BXA Junior Portfolio</td>
<td>0</td>
</tr>
<tr>
<td>60-392: BXA Seminar III: Deconstructing Disciplines</td>
<td>9</td>
</tr>
<tr>
<td>60-401: BXA Seminar IV: Capstone Project Research</td>
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<tr>
<td>60-402: BXA Seminar V: Capstone Project Production</td>
<td>9</td>
</tr>
<tr>
<td>60-205: Critical Theory in Art III -Fall</td>
<td>9</td>
</tr>
<tr>
<td>60-206: Critical Theory in Art IV -Spring</td>
<td>9</td>
</tr>
<tr>
<td>60-200: Sophomore Review -Spring</td>
<td>0</td>
</tr>
<tr>
<td>60-400: Senior Review -Fall</td>
<td>0</td>
</tr>
</tbody>
</table>
Students have the right to appeal academic actions. If a student believes that the matter has not been adequately resolved, or if no decision has been rendered by the appropriate date, the student may appeal at the university level. To appeal at the university level, the student must present copies of all previously submitted documents and a formal letter of appeal to the provost. The provost or another designated university officer will respond in writing with a final resolution, including the basis for it, within thirty (30) days when possible.

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. Please note that requests for accommodations are not retroactive; you must ask that accommodation requests be put in place before you anticipate needing them.

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 BCSCA, BHA or BSA Deans’ List. The BXA Intercollege Deans’ List Honors are posted online each semester.

Intercollege Honors
BXA students who successfully complete a BXA Capstone Project under the guidance of a faculty member will graduate with BCSCA, BHA, BSA or EA 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 BXA student also has the opportunity to graduate with CFA College Honors, DC College Honors, E College Honors and MCS College Honors. These particular honors are defined by each college. BXA students will receive honors color cords during the BXA/CFA Commencement Honors Ceremony and EA additional major students at the College of Engineering 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 BXA/CFA Commencement Honors Ceremony.
**Internal Transfer/Additional Major Process**

For current Carnegie Mellon students who wish to apply to a BXA program, an internal transfer and additional major (EA) 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 BCSA, BHA, BSA and EA advisors in October and in March. However, certain concentrations consider applications only once a year; please consult with a BXA advisor for guidance on scheduling your application.

All students applying for internal transfer should meet with their current advisor, a BXA advisor, and an advisor in their target area, as well as take preliminary coursework in their target area before applying. For all concentrations, there are required courses that must be taken before an application will be considered; please consult with a BXA advisor for guidance on scheduling these courses.

Current BXA students who wish to change their BXA program (e.g. BHA to BCSA) or change their CFA concentration (e.g BHA architecture to BHA art) or delineated options within CFA concentrations (e.g. music performance to music composition) must apply for that change through the internal transfer process. Current BHA and BSA students who wish to change their academic college concentration after declaring (e.g. BHA creative writing to BHA psychology, BSA physics to BSA mathematical sciences) must submit a new DC/MCS Concentration Declaration form for approval of that change, which will be reviewed at the internal transfer committee meeting each semester. Current BXA students seeking internal transfer out of BXA into another college program must apply and meet entry requirements to that program.

**Study Abroad**

Studying abroad is encouraged to broaden BXA students’ interdisciplinary experiences through traditional and non-traditional study abroad, from coursework and artistic studios to for-credit internships, volunteer service and research opportunities.

Courses taken while studying abroad may count toward your BXA concentration requirements, your general education requirements or your free electives. Studying abroad should not delay your graduation, as long as you work with your study abroad advisor and your BXA advisor to plan the most appropriate courses.

The timing and length of program are important considerations while planning. Due to required BXA coursework, students should avoid studying abroad in their last three semesters (junior spring, senior fall/spring). Spending an entire year abroad is not typically possible for BXA students without intending to take an additional semester at Carnegie Mellon. Many students study abroad during the spring of their sophomore year or the fall semester of their junior year, as well during the summer, and over winter and spring breaks. Talk to your BXA academic advisor early in your academic career to identify the best time for study abroad.

When studying abroad, students are still enrolled at Carnegie Mellon. A student never takes a leave of absence to study abroad. Prior to studying abroad, all students must attend a required pre-departure orientation offered by the Office of International Education (OIE).

Students must also complete a Study Abroad Transfer Credit (SATC) form prior to departure for study abroad, which must be signed after completion by the BXA advisor. The SATC will guarantee transfer credit for courses taken abroad, and is filled out by the corresponding departments to the coursework being transferred. Unlike regular transfer credit, there is no limit to the number of courses transferable from study abroad, but there may exist stricter limits on the use of coursework to fulfill concentration or general education requirements.

Students will receive credit for courses for which they receive a grade of “C” or better. However, grades received abroad do not count toward a student’s Carnegie Mellon University GPA.

**Transfer Credit**

Once a BXA student enrolls at Carnegie Mellon University as a degree candidate, they may transfer a maximum of five courses from another institution (excepting official study abroad programs through the CMU Office of International Education) for credit towards their BXA degree. This applies to courses taken at other institutions in the United States, as well as courses taken internationally in the student’s home country.

Individual departments may impose stricter limits regarding the number or type of courses students propose to take elsewhere to fulfill requirements. Some departments may not accept transfer credit from online courses.

Students must have prior approval to transfer courses from their BXA advisor, as well as concentration advisors, to use coursework towards requirements. To receive permission, students must complete the BXA Transfer Credit Request form and provide course information (syllabi) to the corresponding department for evaluation of appropriate credit. When the course is finished, official transcripts must be sent to Carnegie Mellon University before credit will be recorded.

Transfer courses must be taken for a letter grade and students must earn a C (2.00) or above (B or above at a community college). Transfer credit is not factored into a student’s CMU QPA.

The following courses must be taken at CMU and cannot be transferred in:

- First-Year Writing Requirement Course (76101, 76102, 76106/78)
- 79-104: Global Histories
- 36-200: Statistical Reasoning (AP credit only)
- 99-101: Computing @ Carnegie Mellon

Students currently on university suspension are permitted to take no more than three courses per semester at another institution and no more than a total of five courses.

**Withdrawal or Leave of Absence**

A student who decides to leave the university must meet with their BXA advisor and complete a Withdrawal or Leave of Absence form. Withdrawal means leaving the university with no intention of returning. Leave of Absence 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 grades of W will be recorded for all classes 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.

**BXA Intercollege Degree Programs**

For current BXA students seeking internal transfer out of BXA into other concentrations, there are required courses that must be taken before an application will be considered; please consult with a BXA advisor for guidance on scheduling these courses.

Current BXA students seeking internal transfer out of BXA into another college program must apply and meet entry requirements to that program.

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