57-337	Sound Recording	6
57-338	Sound Editing and Mastering	6
57-344	Experimental Sound Synthesis	9
57-347	Electronic and Computer Music (prerequisite: 57-101 or 57-171)	6
57-358	Introduction to Electronic Music (with instructor permission as space allows)	9
57-438	Multitrack Recording	9
57-478	Survey of Historical Recording	6
57-616	Independent Study in Sound Studies	9

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 0-4 courses, 0-33 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.

Bachelor of Engineering Studies and Arts Degree Program

The Bachelor of Engineering Studies and Arts (BESA) intercollege degree program combines the strengths of the College of Fine Arts (CFA) and the College of Engineering (ENG). This degree is tailored for students seeking to apply knowledge from duel fields to advance maker culture in novel and creative ways. Students choose their arts concentration from the following schools in CFA: Architecture (p. 9), Art (p. 9), Design (p. 9), Drama (p. 10) or Music (p. 10). Students choose their engineering studies concentration established by the College of Engineering. Options within the concentration include: biomedical engineering (p. 7), chemical engineering (p. 7), civil & environmental engineering (p. 7), electrical & computer engineering (p. 8), materials science & engineering (p. 8) or mechanical engineering (p. 8).

The BESA curriculum has three main components: general education requirements (p. 6), fine arts concentration requirements (p. 9) and engineering studies concentration requirements (p. 6). Each student's course of study is structured so they can complete this rigorous program in four years.

Students receive extensive advising support. The academic advisors in the BXA Intercollege Degree Programs are the primary advisors and liaisons between CFA and ENG. Each student has two additional academic advisors: an advisor in the admitting school of CFA to guide their focus in the arts and an advisor in ENG to guide their focus in engineering studies.

BESA Curriculum

	Units
I. BESA General Education	**92**
II. ENG Concentration	**93-120**
III. CFA Concentration	**108-144**
IV. Free Electives	**24-87**
Total BESA Degree Requirements	**380**

BESA GENERAL EDUCATION

(11 courses, 92 units minimum)

- Writing (1 course, 9 units, 76-101 required)
- Mathematics (2 courses, 20 units, 21-120 and 21-122 required)
- Science and Technology (2 courses, 24 units, 15-112 and 33-141 required)
- University Requirement (1 course, 3 units, 99-101 required)
- BXA Required Courses (5 courses, 36 units, 52-190, 52-291, 52-392, 52-401, 52-402)

Writing (1 course, 9 units)

76-101	Interpretation and Argument -First-year	9
or 76-102	Advanced First Year Writing: Special Topics	
or 76-106 & 76-107 & 76-108	Writing about Literature, Art and Culture and Writing about Data 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 (2 courses, 20 units)

21-120	Differential and Integral Calculus (prerequisite: 21-090)	10
21-122	Integration and Approximation	10

Science and Technology (2 courses, 24 units)

15-112	Fundamentals of Programming and Computer Science (15-110 or 15-112 for MechE concentration option only)	12
33-141	Physics I for Engineering Students	12

University Requirement (1 course, 3 units)

This foundational pass/no pass course is to be completed online in the first semester to develop core competency skills.

99-101	Core@CMU -Fall, First-year (section B; pass/no pass)	3

BXA Required Courses (5 courses, 36 units)

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 -Spring, First-year (mini-3)	4.5
52-291	BXA Seminar II: Transferring Knowledge -Spring, Sophomore year (mini-4)	4.5
52-392	BXA Seminar III: Deconstructing Disciplines -Spring, Junior year	9
52-401	BXA Seminar IV: Capstone Project Research -Fall, Senior year	9
52-402	BXA Seminar V: Capstone Project Production -Spring, Senior year	9

College of Engineering Concentration

(number of courses vary, 93-120 units)

BESA students declare one of the following concentrations, through consultation with their BXA advisor and the ENG concentration advisors. A completed ENG Concentration Declaration form must be approved by the concentration advisor and submitted to the BXA office, by spring mid-semester break of the student's first year.

- Biomedical Engineering (p. 7) (93 units)
- Chemical Engineering (p. 7) (102 units)
- Civil Engineering (p. 7) (99 units)
- Electrical & Computer Engineering (p. 8) (120 units)
- Environmental Engineering (p. 8) (95 units)
- Materials Science & Engineering (p. 8) (99 units)
- Mechanical Engineering (p. 8) (108 units)

BESA students who are admitted as freshmen are undeclared until they have met with a concentration advisor and have submitted their signed Declaration form. BESA students who are admitted through internal transfer must have chosen an ENG concentration at the time of their application (which serves as declaration). All BESA students wishing to change their ENG concentration at any time following the initial declaration must meet

with the advisor of their intended concentration area to complete a new Declaration form.

Biomedical Engineering Concentration

(93 units minimum)

Mathematics & Science Prerequisites

21-120	Differential and Integral Calculus -(Gen Ed; prerequisite: 21-090)	10
21-122	Integration and Approximation -(Gen Ed)	10
21-254	Linear Algebra and Vector Calculus for Engineers	11
21-260	Differential Equations	9
15-110	Principles of Computing	10
33-141	Physics I for Engineering Students -(Gen Ed)	12
33-142	Physics II for Engineering and Physics Students	12
03-121	Modern Biology	9

Biomedical Engineering Courses (7 courses, 66 units)

42-101	Introduction to Biomedical Engineering -First-year	12
xx-xxx	2nd Introduction to Engineering course, student's choice	12
42-202	Physiology -Sophomore year; prereq: 03-121/03-151	9
42-203	Biomedical Engineering Laboratory -Sophomore year; prereq: 42-101, 03-121/03-151	9
42-302	Biomedical Engineering Systems Modeling and Analysis -Junior year; prereq: 06-262/18-202/21-260	9
42-401	Foundation of BME Design -Fall, Senior year; prereq: 42-101	6
42-402	BME Design Project -Spring, Senior year	9

Electives (3 courses, 27 units minimum)

Choose 3 elective courses in BME tracks and/or ENG with prerequisites in consultation with the concentration advisor.

Chemical Engineering

(102 units minimum)

Mathematics & Science Prerequisites

21-120	Differential and Integral Calculus -(Gen Ed; prerequisite: 21-090)	10
21-122	Integration and Approximation -(Gen Ed)	10
21-254	Linear Algebra and Vector Calculus for Engineers -Fall, Sophomore year	11
15-110	Principles of Computing	10
33-141	Physics I for Engineering Students -(Gen Ed)	12
33-142	Physics II for Engineering and Physics Students	12
09-105	Introduction to Modern Chemistry I	10
09-106	Modern Chemistry II	10

Chemical Engineering Courses (7 courses, 75 units)

06-100	Introduction to Chemical Engineering -First-year; co-req: 09-105, 21-120	12
xx-xxx	2nd Introduction to Engineering course, student's choice	12
06-223	Chemical Engineering Thermodynamics -Fall, Sophomore year; prereq: 06-100, 33-121/33-141/ 33-151	12
06-261	Fluid Mechanics -Spring, Sophomore year; prereq: 06-223, 21-254	9
06-262	Mathematical Methods of Chemical Engineering -Spring, Sophomore year; prereq: 06-223, 21-254	12
06-323	Heat and Mass Transfer -Fall, Junior year; prereq: 06-261, 06-262/21-260, 33-122/33-142/33-152	9
06-361	Unit Operations of Chemical Engineering -Spring, Junior year; prereq: 06-323	9

Electives (3 courses, 27 units minimum)

Choose 27 units from the following ChemE and/or ENG courses with prerequisites in consultation with the concentration advisor:

06-310	Molecular Foundations of Chemical Engineering -Fall, Junior year; prereq: 06-223, 09-106	9
06-325	Numerical Methods and Machine Learning for Chemical Engineering -Fall, Junior year; prereq: 06-262, 15-110/15-112	6
06-326	Optimization Modeling and Algorithms -Fall, Junior year; prereq: 06-262	6
06-363	Transport Process Laboratory -Spring, Junior year; prereq: 06-261, 06-323	9
06-364	Chemical Reaction Engineering -Spring, Junior year; prereq: 06-310, 06-323	9
06-607	Physical Chemistry of Colloids and Surfaces -Spring, Senior year, offered every other year	9
06-612	Formulation Engineering -Spring, offered every other year	12
06-642	Data Science and Machine Learning in Chemical Engineering -Spring, Senior Year	6
06-643	Creating Scientific Research Software -Spring, Senior Year	6
27-xxx	Materials Science course	9

Note: With advisor approval, electives can instead be other ChemE/ENG courses as long as they are taken in proper order to follow the required prerequisites, not allowing 06-421.

Civil Engineering

(99 units minimum)

Mathematics & Science Prerequisites

21-120	Differential and Integral Calculus -(Gen Ed; prerequisite: 21-090)	10
21-122	Integration and Approximation -(Gen Ed)	10
21-254	Linear Algebra and Vector Calculus for Engineers	11
21-260	Differential Equations	9
15-110	Principles of Computing	10
33-141	Physics I for Engineering Students -(Gen Ed)	12
33-142	Physics II for Engineering and Physics Students	12
09-105	Introduction to Modern Chemistry I	10
or 09-111	Nanolegos: Chemical Building Blocks	

Civil Engineering Courses (9 courses, 72 units)

12-100	Exploring CEE: Infrastructure and Environment in a Changing World -First-year; co-req: 21-120, 33-141	12
xx-xxx	2nd Introduction to Engineering course, student's choice	12
12-200	CEE Challenges: Design in a Changing World -Fall, Sophomore year; prereq: 12-100	9
12-212	Statics -Fall, Sophomore year; co-req: 12-100, 21-122, 33-141	9
12-233	CEE Infrastructure Systems in Action -Fall, Sophomore year; prereq: 12-100	2
12-231	Solid Mechanics -Spring, Sophomore year; prereq: 12-212	9
12-234	Sensing and Data Acquisition for Engineering Systems -Spring, Sophomore year	4
12-271	Computation and Data Science for Civil & Environmental Engineering -Spring, Sophomore year; prereq: 15-110/15-112, 21-120, 21-122, 33-141	9
27-357	Introduction to Materials Selection -Spring, Junior year	6

Electives (3 courses, 27 units minimum)

Choose 27 units from the following CivE courses with prerequisites in consultation with the concentration advisor:

12-201	Geology -Sophomore year	9
12-301	CEE Projects: Integrating the Built, Natural and Information Environments -Fall, Junior year; prereq: 12-200, 12-271	9
12-335	Soil Mechanics -Spring, Junior year; prereq: 12-231, 33-142; co-req: 12-355	9
12-355	Fluid Mechanics -Fall, Junior year; prereq: 21-260	9
12-356	Fluid Mechanics Lab -Fall, Junior year; co-req: 12-355	2
12-351	Environmental Engineering -Fall, Junior year; prereq: 09-105/09-111; co-req: 21-260	9

12-635	Structural Analysis -Fall, Senior year; prereq: 12-231	12
12-631	Structural Design -Spring, Senior year: prereq: 12-231; co-req: 27-357, 12-358	12

Electrical & Computer Engineering

(120 units minimum)

Mathematics & Science Prerequisites

21-120	Differential and Integral Calculus -(Gen Ed; prerequisite: 21-090)	10
21-122	Integration and Approximation -(Gen Ed)	10
21-127	Concepts of Mathematics	12
15-112	Fundamentals of Programming and Computer Science	12
15-122	Principles of Imperative Computation	12
33-141	Physics I for Engineering Students -(Gen Ed)	12
33-142	Physics II for Engineering and Physics Students	12

Electrical & Computer Engineering Courses (7 courses, 84 units)

18-100	Introduction to Electrical and Computer Engineering -First-year; co-req: 21-120	12
xx-xxx	2nd Introduction to Engineering course, student's choice	12
18-202	Mathematical Foundations of Electrical Engineering -Sophomore year; prereq: 21-122 *	12
18-213	Introduction to Computer Systems -Sophomore year and above; prereq: 15-122	12
18-220	Electronic Devices and Analog Circuits -Sophomore year and above; prereq: 18-100; co-req: 33-142	12
18-240	Structure and Design of Digital Systems -Sophomore year and above; prereq: 18-100	12
18-290	Signals and Systems -Sophomore year and above; prereq: 18-100	12

** This course can also be substituted by a combination of two of the following courses: 21-254, 21-259, 21-260, 21-241, 21-242, 21-268.*

Electives (3 courses, 36 units minimum)

Choose 3 elective courses 18-3xx and above. At least 2 courses should be Area Courses from 1 of the 5 Areas within ECE and 1 course may be an additional Area Course from a second Area, a Coverage Course or ENG with prerequisites in consultation with the concentration advisor.

Environmental Engineering

(95 units minimum)

Mathematics & Science Prerequisites

21-120	Differential and Integral Calculus -(Gen Ed; prerequisite: 21-090)	10
21-122	Integration and Approximation -(Gen Ed)	10
21-254	Linear Algebra and Vector Calculus for Engineers	11
21-260	Differential Equations	9
15-110	Principles of Computing	10
33-141	Physics I for Engineering Students -(Gen Ed)	12
33-142	Physics II for Engineering and Physics Students	12
09-105	Introduction to Modern Chemistry I	10
or 09-111	Nanolegos: Chemical Building Blocks	

Environmental Engineering Courses (10 courses, 77 units)

12-100	Exploring CEE: Infrastructure and Environment in a Changing World -First-year; co-req: 21-120, 33-141	12
xx-xxx	2nd Introduction to Engineering course, student's choice	12
12-200	CEE Challenges: Design in a Changing World -Fall, Sophomore year; prereq: 12-100	9
12-221	Environmental Chemistry and Thermodynamics -Spring, Sophomore year; prereq: 09-105/09-111	9
12-222	Environmental Chemistry Laboratory -Spring, Sophomore year; co-req: 09-101, 12-221	3
12-271	Computation and Data Science for Civil & Environmental Engineering -Spring, Sophomore year; prereq: 15-110/15-112, 21-120, 21-122, 33-141	9
12-351	Environmental Engineering -Fall, Sophomore year; prereq: 09-105/09-111; co-req: 21-260	9
12-352	Environmental Engineering Lab -Spring, Junior year; co-req: 12-351	3
12-355	Fluid Mechanics -Fall, Junior year; prereq: 21-260	9
12-356	Fluid Mechanics Lab -Fall, Junior year; co-req: 12-355	2

Electives (2 courses, 18 units minimum)

Choose 18 units from the following EE courses with prerequisites in consultation with the concentration advisor:

12-201	Geology -Sophomore year	9
12-301	CEE Projects: Integrating the Built, Natural and Information Environments -Fall, Junior year; prereq: 12-200 and 12-271	9
12-353	Environmental Biology and Ecology -Spring, Junior year	9
12-612	Intro to Sustainable Engineering -Fall, Senior year	9
12-657	Water Resource Systems Engineering -Fall, Senior year; prereq: 12-355; co-req: 12-351	9
03-121	Modern Biology	9

Materials Science & Engineering

(99 units minimum)

Mathematics & Science Prerequisites

21-120	Differential and Integral Calculus -(Gen Ed; prerequisite: 21-090)	10
21-122	Integration and Approximation -(Gen Ed)	10
21-254	Linear Algebra and Vector Calculus for Engineers	11
21-260	Differential Equations	9
15-110	Principles of Computing	10
33-141	Physics I for Engineering Students -(Gen Ed)	12
33-142	Physics II for Engineering and Physics Students	12
09-105	Introduction to Modern Chemistry I	10

Materials Science & Engineering Courses (8 courses, 72 units)

27-100	Engineering the Materials of the Future -First-year; co-req: 21-120, 33-141	12
xx-xxx	2nd Introduction to Engineering course, student's choice	12
27-211	Structure of Materials (Minor Option) -Fall, Sophomore year *	6
27-212	Defects in Materials (Minor Option) -Spring, Sophomore year *	6
27-215	Thermodynamics of Materials -Fall, Sophomore year; co-req: 27-100, 21-259	12
27-216	Transport in Materials -Spring, Sophomore year; prereq: 27-215	9
27-227	Phase Relations and Diagrams (Minor Option) -Spring, Sophomore year *	9
27-357	Introduction to Materials Selection -Spring, Sophomore year	6

** In consultation with the concentrations advisor, students may choose to complete the version of the course with lab component.*

Electives (3 courses, 27 units minimum)

Choose 3 elective courses in MSE and/or ENG with prerequisites in consultation with the concentration advisor.

Mechanical Engineering

(108 units minimum)

Mathematics & Science Prerequisites

21-120	Differential and Integral Calculus -First-year (Gen Ed; prerequisite: 21-090)	10
21-122	Integration and Approximation -First-year (Gen Ed)	10
21-254	Linear Algebra and Vector Calculus for Engineers	11

21-260	Differential Equations	9
15-110	Principles of Computing -(Gen Ed)	10
33-141	Physics I for Engineering Students -First-year (Gen Ed)	12
33-142	Physics II for Engineering and Physics Students - First-year	12

Note: The BESA Gen Ed Science and Technology requirement can be filled with either 15-110 or 15-112. Students may start taking MechE Courses upon completion of Calculus I, Calculus II and Physics I.

Mechanical Engineering Courses (7 courses, 63 units)

24-101	Fundamentals of Mechanical Engineering -First-year; co-req: 21-120, 33-141	12
xx-xxx	2nd Introduction to Engineering course, student's choice	12
24-203	TechSpark: Manual Machining -Sophomore year	3
24-251	Electronics for Sensing and Actuation - Sophomore year (4 units)	3
24-261	Mechanics I: 2D Design -Fall, Sophomore year; prereq: 21-122, 33-151/33-141/ 33-121/33-106	10
24-262	Mechanics II: 3D Design -Spring, Sophomore year; prereq: 33-106/33-141/33-151, 24-261	10
24-370	Mechanical Design: Methods and Application - Fall, Junior year; prereq: 24-200, 24-202, 24-262	12

Electives (45 units minimum)

Choose 5 elective courses. Each course should be a minimum of 9 units. At least 3 courses should be from the following MechE courses and 2 of the courses may be ENG with prerequisites in consultation with the concentration advisor.

24-221	Thermodynamics -Fall; prereq: 21-122, 24-101, 33-106/33-121/33-141/33-151	10
24-231	Fluid Mechanics -Spring; prereq: 21-122, 33-106/33-141/33-151	10
24-291	Environmental Systems on a Changing Planet - Fall	9
or 24-381	Environmental Systems on a Changing Planet	
24-292	Renewable Energy Engineering -Spring; prereq: 33-106/33-141	9
24-300	or above	

COLLEGE OF FINE ARTS CONCENTRATION

(number of courses vary, 108-144 units minimum)

BCSA students choose one of the following concentrations:

- Architecture (p. 9) (108 units)
- Art (p. 9) (144 units)
- Design (p. 9) (108 units)
- Drama (p. 10) (130 units)
- Music (p. 10) (108 units)

Architecture Concentration

(108 units minimum)

Architecture Required Courses (9 courses, 57 units minimum)

48-100	Architecture Design Studio: POIESIS STUDIO 1 - Fall, First-year or Sophomore year	10-15
or 48-095	Spatial Concepts for Non-Architecture Majors	
48-104	Shop Skills -Fall, First-year	2
48-119	Design Ethics & Social Justice in Architecture - Fall, First-year or Sophomore year	3
48-120	Digital Media I -Fall, First-year	6
48-121	Drawing I -Fall, First-year	6
48-125	Digital Media II -Spring, First-year	6
48-126	Drawing II -Spring, First-year	6
48-240	History of World Architecture, I -Spring, First-year	9
48-241	Modern Architecture: History & Theory -Fall, Sophomore year	9

Architecture Electives (51 units minimum)

A minimum of **51** additional Architecture units must be approved by the Architecture advisor. A list of these selected courses must be filed in the BXA office. 48-025 First Year Seminar: Architecture Edition (3 units) is recommended in fall of the first year.

Art Concentration

(144 units minimum)

First-Year Seminar (1 course, 6 units)

60-104	Foundations: Art First-Year Seminar	6

Foundation Studios (3 courses, 30 units)

Complete three courses:

60-110	Foundations: Time-Based Media	10
60-120	Foundations: Digital Media	10
60-131	Foundations: Sculpture	10
60-135	Foundations: Sculpture II	10
60-150	Foundations: Drawing	10
60-170	Foundations: Paint/Print	10

Intermediate Studios (3 courses, 30 units)

Complete three courses:

60-2xx	Intermediate Studio Elective	10
60-2xx	Intermediate Studio Elective	10
60-2xx	Intermediate Studio Elective	10

Advanced Studios (6 courses, 60 units)

Students may take courses in any media area (ETB, SIS, SP or DP3). They may take all courses in one media area if a focus is desired. With approval from the concentration advisor, BXA students can take an additional intermediate studio in lieu of an advanced studio to increase breadth.

Complete six courses:

60-402	Senior Studio	10
60-403	Advanced 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 Social Practice (SP) (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 the concentration advisor to determine course availability.*

Critical Studies (2 courses, 18 units)

60-107	Foundations: Critical Studies -Spring	9
60-3xx	Critical Studies Elective	9

Review Requirement (1 required review, 0 units)

Complete required review:

60-200	Sophomore Review -Spring (pass/no pass)	0

Design Concentration

(108 units minimum)

Note: BXA design only considers internal transfer applicants currently enrolled in Design.

Design Required Courses (16 courses, 98 units)

51-101	Studio: Survey of Design -Fall, First-year	10
51-121	Visualizing -Fall, First-year	10
51-175	Design Studies: Place -Fall, First-year (mini-1)	5
51-177	Design Studies: Histories -Fall, First-year (mini-2)	5
51-102	Design Lab -Spring, First-year	10
51-122	Collaborative Visualizing -Spring, First-year	10
51-176	Design Studies: Futures -Spring, First-year (mini-3)	5

51-178	Design Studies: Experience -Spring, First-year (mini-4)	5
51-277	Design Studies: Systems -Fall, Sophomore year (mini-1)	5
51-279	Design Studies: Cultures -Fall, Sophomore year (mini-2)	5
51-282	Design Studies: Persuasion -Spring, Sophomore year (mini-3)	5
51-284	Design Studies: Power -Spring, Sophomore year (mini-4)	5
Choose One Studio -Fall, Sophomore year:		9
51-201	Communications Studio I: Understanding Form & Context	9
or 51-211	Products Studio I: Understanding Form & Context	
or 51-265	Environments Studio I: Understanding Form & Context	
Choose One Corresponding Lab -Fall, Sophomore year:		9
51-203	Prototyping Lab I: Communications	9
or 51-247	Prototyping Lab I: Products	
or 51-267	Prototyping Lab I: Environments	

Design Electives (10 units)

A minimum of **10** 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

(130 units minimum)

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

Note: BXA design only considers internal transfer applicants currently enrolled in Drama design. BXA dramaturgy only considers internal transfer applicants in the fall semester for spring enrollment, unless currently enrolled in Drama dramaturgy. BXA PTM only considers internal transfer applicants currently enrolled in Drama PTM.

Design/PTM Required Courses (10 courses, 79 units)

54-169	Studiocraft 1 -Fall, First-year	13
54-151	Stagecraft -Fall, First-year	10
54-159	Production Practicum -Fall, First-year	6
54-171	Basic Design 1 -Fall, First-year	6
54-170	Studiocraft 2 -Spring, First-year	8
54-152	Stagecraft -Spring, First-year	12
54-158	Production Planning -Spring, First-year	6
54-177	Foundations of Drama I -Spring, First-year or later if needed	6
54-281	Foundations of Drama II	6
54-381	Special Topics in Drama	6

Design/PTM Electives (51 units minimum)

A minimum of **51** additional Design/PTM units taken in the sophomore year or later must be approved by the Design/PTM faculty area chair. A list of these selected courses must be filed in the BXA office.

Dramaturgy Required Courses (13 courses, 80 units)

54-177	Foundations of Drama I -Fall, First-year	6
54-109	Dramaturgy 1: Approaches to Text -Fall, First-year	9
54-284	Fundamentals of Directing -Fall, First-year	6
54-200	Dramaturgy Forum -Fall, First-year	1
54-159	Production Practicum -Fall or Spring, First-year	6
54-281	Foundations of Drama II -Spring, First-year	6
54-184	Dramaturgy 2: Introduction to Production Dramaturgy -Spring, First-year	9
54-200	Dramaturgy Forum -Spring, First-year	1
54-117	Design Collaboration Project -Spring, First-year	3
54-241	Dramaturgy 3: Dramaturgy in Translation -Fall, Sophomore year	9
54-256	Dramaturgy 4: New Play Dramaturgy -Spring, Sophomore year	9
54-247	Dramaturgy 5: In Company-Fall, Juniojr year	9
54-381	Special Topics in Drama	6

Dramaturgy Electives (50 units minimum)

A minimum of **50** additional Dramaturgy units taken in the sophomore year or later must be approved by the Dramaturgy faculty area chair. 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) Audio Recording & Production, 2) Composition, 2) Music Performance (instrumental, organ, piano, voice), 4) Sound Theory & Practice

Note: BXA music performance only considers internal transfer applicants in the spring semester for fall enrollment, unless currently enrolled in Music performance.

Audio Recording & Production Required Courses (8 courses, 49 units)

57-152	Harmony I	9
or 57-149	Basic Harmony I	
57-101	Introduction to Music Technology	6
57-181	Solfege I	3
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
57-337	Sound Recording	6
57-338	Sound Editing and Mastering	6
57-438	Multitrack Recording	9

Audio Recording & Production Electives (59 units minimum)

Choose **59** units from:

57-153	Harmony II	9
or 57-150	Basic Harmony II	
57-182	Solfege II	3
or 57-186	Advanced Solfege II	
10-301	Introduction to Machine Learning	12
15-104	Introduction to Computing for Creative Practice	10
15-213	Introduction to Computer Systems	12
15-322	Introduction to Computer Music	9
33-114	Physics of Musical Sound	9
54-166	Introduction to Sound Design for Theatre	6
54-666	Production Audio (section B)	4
57-161	Eurhythmics I	3
57-162	Eurhythmics II	3
57-344	Experimental Sound Synthesis	9
57-347	Electronic and Computer Music	6
57-358	Introduction to Electronic Music (with instructor permission as space allows)	9
57-421	Exploded Ensemble	6
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	Foundations: Sculpture	10
85-415	Auditory Perception: Sense of Sound	9

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

Composition Required Courses (13 courses, 85 units)

57-152	Harmony I	9
or 57-149	Basic Harmony I	
57-161	Eurhythmics I (recommended co-requisite: 57-181)	3
57-181	Solfege I	3
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

Composition Electives (23 units minimum)

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 Required Courses (13 courses, 85 units)

57-152	Harmony I	9
or 57-149	Basic Harmony I	
57-161	Eurhythmics I (recommended co-requisite: 57-181)	3
57-181	Solfege I	3
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

Music Performance Electives (23 units minimum)

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.

Sound Theory & Practice Required Courses (7 courses, 44 units)

57-152	Harmony I	9
or 57-149	Basic Harmony I	
57-101	Introduction to Music Technology	6
57-181	Solfege I	3
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
57-421	Exploded Ensemble	6

Sound Theory & Practice Electives (64 units minimum)

Choose **64** units from:

57-153	Harmony II	9
or 57-150	Basic Harmony II	
57-182	Solfege II	3
or 57-186	Advanced Solfege II	
15-104	Introduction to Computing for Creative Practice	10
15-322	Introduction to Computer Music (prerequisite: 15-112)	9
33-114	Physics of Musical Sound	9
57-161	Eurhythmics I	3
57-162	Eurhythmics II	3
57-337	Sound Recording	6
57-338	Sound Editing and Mastering	6
57-344	Experimental Sound Synthesis	9
57-347	Electronic and Computer Music (prerequisite: 57-101 or 57-171)	6
57-358	Introduction to Electronic Music (with instructor permission as space allows)	9
57-438	Multitrack Recording	9
57-478	Survey of Historical Recording	6
57-616	Independent Study in Sound Studies	9

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 3-10 courses, 24-87 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.

Bachelor of Humanities and Arts Degree Program

The Bachelor of Humanities and Arts (BHA) intercollege degree program combines the strengths of the College of Fine Arts (CFA) and the Dietrich College of Humanities and Social Sciences (DC). This degree is designed for academically and artistically talented students who want to develop their interest in the fine arts, while also pursuing studies in the humanities and social/behavioral sciences. Students choose their fine arts concentration from the following schools in CFA: Architecture (p. 30), Art (p. 30), Design (p. 30), Drama (p. 31) or Music (p. 31). Students choose their humanities and social sciences concentration (p. 12) from the subject areas offered by DC. 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 program also provides enough flexibility for students to broaden or deepen their concentrations and to explore other areas in which they may be interested.

The BHA curriculum has three main components: general education requirements (p. 11), fine arts concentration requirements (p. 30) and humanities/social sciences concentration requirements (p. 12). Students must complete an array of courses defined by their chosen concentrations. Each student's course of study is unique, based on their background and interests, and course availability in the respective colleges.

Students receive extensive advising support. The academic advisors in the BXA Intercollege Degree Programs are the primary advisors and liaisons between CFA and DC. Each student has two additional academic advisors: an advisor in the admitting school of CFA to guide their focus in the arts and an advisor in DC to guide their focus in the humanities or social/behavioral sciences.

BHA Curriculum

	Units
I. BHA General Education	**126**
II. DC Concentration	**81-107**
III. CFA Concentration	**108-144**
IV. Free Electives	**1-63**
Total BHA Degree Requirements	**378**

BHA General Education

(16 courses, 126 units minimum)

- Communication (1 course, 9 units, 76-101 required)
- Contextual Thinking (1 course, 9 units)
- Intercultural and Global Inquiry (1 course, 9 units)
- Humanities (1 course, 9 units)
- Data Analysis (1 course, 9 units, 36-200 required)
- Social Sciences (1 course, 9 units)
- Equity and Justice (1 course, 9 units)
- Math, Science, and Computation (2 courses, 18 units)
- Disciplinary Perspectives within CMU (1 course, 6 units)
- University Requirement (1 course, 3 units, 99-101 required)
- BXA Required Courses (5 courses, 36 units, 52-190, 52-291, 52-392, 52-401, 52-402)

Communication (1 courses, 9 units)

76-101	Interpretation and Argument -First-year	9
or 76-102	Advanced First Year Writing: Special Topics	
or 76-106 & 76-107 & 76-108	Writing about Literature, Art and Culture and Writing about Data 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

Contextual Thinking (1 course, 9 units)

A list of courses for this requirement can be found on the DC GenEd website (https://www.cmu.edu/dietrich/gened/fall-2021-and-beyond/course-options/).

Intercultural and Global Inquiry (1 course, 9 units minimum)

A list of courses for this requirement can be found on the DC GenEd website (https://www.cmu.edu/dietrich/gened/fall-2021-and-beyond/course-options/).

Humanities (1 course, 9 units minimum)

A list of courses for this requirement can be found on the DC GenEd website (https://www.cmu.edu/dietrich/gened/fall-2021-and-beyond/course-options/).

Data Analysis (1 course, 9 units minimum)

36-200	Reasoning with Data	9

Social Sciences (1 course, 9 units minimum)

A list of courses for this requirement can be found on the DC GenEd website (https://www.cmu.edu/dietrich/gened/fall-2021-and-beyond/course-options/).

Perspectives on Justice and Injustice (1 course, 9 units minimum)

A list of courses for this requirement can be found on the DC GenEd website (https://www.cmu.edu/dietrich/gened/fall-2021-and-beyond/course-options/).

Math, Science, and Computation (2 courses, 18 units minimum)

Choose two of three categories: Computational Thinking, Scientific Inquiry, Logic/Mathematical Reasoning. A list of courses for this requirement can be found on the DC GenEd website (https://www.cmu.edu/dietrich/gened/fall-2021-and-beyond/course-options/).

Disciplinary Perspectives within CMU (1 course, 6 units)

Choose one non-DC or CFA course; DC Arts courses excluded.

University Requirement (1 course, 3 units)

This foundational pass/no pass course is to be completed online in the first semester to develop core competency skills.

99-101	Core@CMU-Fall, First-year (section B; pass/no pass)	3

BXA Required Courses (5 courses, 36 units)

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 - Spring, Freshman year (mini-3)	4.5
52-291	BXA Seminar II: Transferring Knowledge -Spring, Sophomore year (mini-4)	4.5
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

Dietrich College of Humanities and Social Sciences Concentrations

(number of courses vary, 81-107 units)

Curriculum for approved BHA DC concentration options are outlined below. BHA students declare a 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 spring mid-semester break of the student's sophomore year.

- Behavioral Economics (p. 12) (81 units)
- Chinese Studies (p. 13) (90 units)
- Cognitive Neuroscience (p. 13) (90 units)
- Cognitive Science (p. 13) (87 units)
- Creative Writing (p. 14) (81 units)
- Cybersecurity & International Conflict (p. 14) (81 units)
- Decision Science (p. 15) (84 units)
- Economics (p. 16) (84 units)
- Environmental & Sustainability Studies (p. 16) (93 units)
- Ethics, History, & Public Policy (p. 16) (81 units)
- Film & Visual Media (p. 17) (81 units)
- French & Francophone Studies (p. 17) (90 units)
- German Studies (p. 18) (90 units)
- Global Studies (p. 18) (81 units)
- Hispanic Studies (p. 20) (90 units)
- Humanities Analytics (p. 20) (81 units)
- Information Systems (p. 21) (107 units)
- International Relations & Political Science (p. 21) (81 units)
- Japanese Studies (p. 22) (96 units)
- Linguistics (p. 22) (81 units)
- Literature & Culture (p. 23) (81 units)
- Logic & Computation (p. 24) (81 units)
- Philosophy (p. 24) (81 units)
- Policy & Management (p. 25) (87 units)
- Politics & Public Policy (p. 25) (81 units)
- Professional Writing (p. 26) (84 units)
- Psychology (p. 27) (81 units)
- Russian Studies (p. 27) (93 units)
- Social & Political History (p. 27) (84 units)
- Statistics (p. 28) (81 units)
- Statistics & Machine Learning (p. 28) (87 units)
- Technical Writing (p. 29) (87 units)

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 the time of their application (which serves as declaration). All BHA students wishing to change their 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.

Behavioral Economics Concentration

(81 units minimum)

The new major of BE—the first of its kind among US undergraduate institutions—was designed to rigorously train students in the field of Behavioral Economics and to encourage them to critically consider its relevance to policy and organizations. The major emphasizes both theory and the practical promise of BE to solve problems of importance to policy makers and organizations through the largest undergraduate selection of BE courses of any university in the world. Towards this end, students will learn to collect original data, design field and laboratory experiments, analyze data and draw causal inferences, and develop interventions to improve economic outcomes and decisions. The core requirements include courses in Economics, Psychology, Behavioral Economics, and quantitative methods—including experimental design and econometrics. Students who complete the major will be well positioned to enter the private sector in a role involving data or people analytics, marketing, corporate strategy, or human resources, or to enter a wide range of graduate degree programs.

Quantitative Methods (3 courses, 27 units)

36-202	Methods for Statistics & Data Science	9
88-251	Empirical Research Methods	9
88-252	Causal Inference: from Data to Decisions	9
or 73-274	Econometrics I	

Economics Courses (2 courses, 18 units)

73-102	Principles of Microeconomics	9
or 73-104	Principles of Microeconomics Accelerated	

88-221	Markets, Democracy, and Public Policy	9
or 73-103	Principles of Macroeconomics	
or 73-155	Models, Math, and Markets	
or 73-230	Intermediate Microeconomics	
or 73-328	Health Economics	
or 73-347	Game Theory Applications for Economics and Business	
or 73-359	Benefit-Cost Analysis	
or 73-408	Law and Economics	
or 73-421	Emerging Markets	
or 73-427	Sustainability, Energy, and Environmental Economics	

Psychology Courses (2 courses, 18 units)

Students can elect to take 88-120 Reason, Passion and Cognition & 88-130 Behavioral Economics for Life or 88-120 Reason, Passion and Cognition & 88-302 Behavioral Decision Making. Students who have completed 88-302 Behavioral Decision Making or 88-360 Behavioral Economics cannot take 88-130 Behavioral Economics for Life.

88-120	Reason, Passion and Cognition -First-year or Sophomore year	9
88-130	Behavioral Economics for Life	9
or 88-302	Behavioral Decision Making	

Behavioral Economics Courses (2 courses, 18 units)

88-360	Behavioral Economics (prerequisite: 21-111)	9
88-367	Behavioral Economics & Field Experiments in Organizations	9
or 88-365	Behavioral Economics and Public Policy	

Chinese Studies Concentration

(90 units minimum)

A BHA concentration in Chinese Studies promotes not just language proficiency but also an understanding of Chinese 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 Chinese. This is equivalent to the completion of three courses (two at the 100-level and one at the 200-level) or may be demonstrated through CMU internal placement test scores.

Core Courses in Languages, Cultures, and Applied Linguistics (LCAL) (1 course, 9 units)

Complete one course.

82-239	Crazy Linguistically Rich Asian Languages	9
82-282	Interpreting Global Texts & Cultures	9
82-283	Language Diversity & Cultural Identity	9

Foundational Courses in Chinese Studies (6 courses, 54 units minimum)

82-232	Intermediate Chinese II	12
or 82-235	Fables, Legends and Stories from Ancient Chinese Civilization	
82-331	Reading Into a New China I: Population, Youth, Marriage, & Housing	9
82-332	Reading Into a New China II: Transportation, Education, Pop Culture, & Health	9
82-333	Chinese Language and Culture	9
82-3–5xx Two 300-, 400- or 500-level Chinese Language Content Course in Chinese		18

Chinese Studies Electives (3 courses, 27 units minimum)

In consultation with the concentration advisor, choose three additional courses, at least one of which must be taught in Chinese at the 300-, 400- or 500-level. Students may choose up to two Chinese culture courses taught in English. Students may substitute one relevant and related course from outside the program (i.e., another LCAL course) or from another department (e.g., History, CMIST, Philosophy, English).

Cognitive Neuroscience Concentration

(90 units minimum)

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

Introductory and Survey Coursework (4 courses, 36 units)

03-121	Modern Biology	9
03-363	Systems Neuroscience	9
85-110	Cognitive Psychology	9
or 85-213	Human Information Processing and Artificial Intelligence	
85-170	Foundations of Brain and Behavior	9

Research Methods Training (3 course, 27 units)

36-309	Experimental Design for Behavioral & Social Sciences	9
or 85-309	Statistical Concepts and Methods for Behavioral and Social Science	
85-300	Introduction to Research Methods	9
85-370	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	Neural Computation	9
85-412	Cognitive Modeling	9
85-414	Cognition in the Age of AI	9
85-417	Multilingual Minds and the Brain	9
85-419	Introduction to Parallel Distributed Processing	9
85-471	How the Brain Makes Meaning	9
85-472	Cognitive Neuropsychology	9

Cognitive Neuroscience Electives:

03-133	Neurobiology of Disease	9
03-362	Cellular Neuroscience	9
85-408	Visual Cognition	9
85-413	Perception	9
85-415	Auditory Perception: Sense of Sound	9
85-420	Biologically Intelligent Exploration	9
85-454	Health Psychology	9

Cognitive Science Concentration

(87 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.

Prerequisite Courses

15-112	Fundamentals of Programming and Computer Science	12
21-120	Differential and Integral Calculus (prerequisite: 21-090)	10-20
or 21-111 & 21-112	Differential Calculus and Integral Calculus	
21-127	Concepts of Mathematics	12

Statistics Course (1 course, 9 units)

36-218	Probability Theory for Computer Scientists	9
or 36-225	Introduction to Probability Theory	
or 36-309	Experimental Design for Behavioral & Social Sciences	
or 85-309	Statistical Concepts and Methods for Behavioral and Social Science	

Computational/Cognitive Modeling Core (3 courses, 33 units)

Complete two of the following courses:

15-122	Principles of Imperative Computation	12
15-150	Principles of Functional Programming	12
15-251	Great Ideas in Theoretical Computer Science	12

Plus one of the following courses:

85-412	Cognitive Modeling	9
85-414	Cognition in the Age of AI	9
85-419	Introduction to Parallel Distributed Processing	9
85-420	Biologically Intelligent Exploration	9

Cognitive Psychology Core (4 courses, 36 units minimum)

85-110	Cognitive Psychology	9
or 85-213	Human Information Processing and Artificial Intelligence	
85-300	Introduction to Research Methods	9

Plus two of the following (one of which must be 85-3xx or 85-4xx):

85-170	Foundations of Brain and Behavior	9
or 85-106	Animal Minds	
85-310	Research Methods in Cognitive Psychology	9
85-370	Cognitive Neuroscience Research Methods	9
85-408	Visual Cognition	9
85-411	Introduction to Music Cognition Research	9
85-413	Perception	9
85-416	Applications of Cognitive Science	9
85-418	Origins of Intelligence	9
85-421	Language and Thought	9
85-471	How the Brain Makes Meaning	9
85-472	Cognitive Neuropsychology	9
80-310	Formal Logic	9
80-315	Logics for Knowledge and Belief	9
80-381	Meaning in Language	9
80-383	Language in Use	9
05-413	Human Factors	9
11-344	Machine Learning in Practice	12

Cognitive Science Elective (1 course, 9 units)

Choose one elective in consultation with your concentration 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 genre writing courses, ideally in their sophomore year. Choices include Introduction to Writing Poetry (76-265), Introduction to Writing Fiction (76-260), Introduction to Screenwriting (76-269) and Introduction to Writing Nonfiction (76-261). In order to proceed into the upper level courses in the concentration (and in each of the genres), students must do well in these introductory courses (receive a grade of A or B). After completing the introductory genre writing courses, students take four workshops in fiction, poetry, screenwriting or nonfiction. At least two of the workshops must be taken in a single genre. Workshops may be taken more than once for credit. 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.

Introductory Genre Writing Courses (2 courses, 18 units)

76-260	Introduction to Writing Fiction	9
76-261	Intro to Writing Creative Nonfiction	9
76-265	Introduction to Writing Poetry	9
76-269	Introduction to Screenwriting	9

Note: A student must earn a grade of A or B in the Introductory Genre Writing course in order to be eligible to enroll in a workshop of that genre. A student who earns a grade of C in an Introductory Genre Writing course may enroll in a related workshop only with the permission of the workshop professor. A student who receives a D or R in an Introductory Genre Writing course 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
76-460	Beginning Fiction Workshop	9
76-462	Advanced Fiction Workshop	9
76-464	Creative Nonfiction Workshop	9
76-465	Advanced Poetry Workshop	9
76-469	Screenwriting Workshop	9

English Electives (3 courses, 27 units)

Complete three courses (27 units minimum) from the English Department's offerings. Reading in Forms classes are recommended. Please consult the list of courses published each semester by the Department for current offerings. Students should discuss curriculum choices with the concentration advisor to determine the best electives for their focus in Creative Writing.

Cybersecurity & International Conflict Concentration

(81 units minimum)

The BHA concentration in cybersecurity and international conflict, offered by the Carnegie Mellon Institute for Strategy and Technology (CMIST), analyzes the past, present, and future role of cyber conflict and cybersecurity in international politics. Cyber attacks by nation-states and their proxies have an important impact upon conflict. The complexity and policy challenges of cyber-engagements is immense. This minor addresses the role of deterrence, dissuasion, and attribution in cyber conflict, while also studying the nuances of key components of modern warfare—from the security dilemma to escalation management.

Courses in this concentration focus on the existing gaps in our understanding of cybersecurity and international conflict, such as whether cyberspace is offense or defense dominant (or over time fluid between the two), and which factors are important in determining the answer to this. Other relevant questions include how nation-states, their primary adversaries, and a bevy of nonstate actors engage online and in the virtual and information environments. Accordingly, the concentration exposes students to basic technology concepts, methods of attack and defense, potential strategy and goals for cyber-engagement, and response and forensics for cyber-engagements.

Alongside conventional methods of warfare, cybersecurity has rapidly developed into a centerpiece of a state's ability to project power. As the United States and other emerging cyber powers craft and implement doctrine in this domain, there is likely to be a rapid increase in activity, from efforts to disrupt the online activities of global terrorist networks, to cybersecurity offense and defense in the Russia-Ukraine war, to near daily raids on foreign networks designed to cripple states' cyberweapons before they can be deployed. In addition, the impact of cyberattacks on critical infrastructure, theft of intellectual property, pervasive identity theft, and hacking of sensitive databases have accumulated, gradually wearing down civilian networks and achieving strategic effects over time.

In the shifting landscape of cyber capabilities, how will laws, authorities, and policies keep pace? What are the implications and consequences of actions that may be considered "short of war" by some countries but "above the threshold" of conflict by others? Will a more aggressive defensive posture with respect to cybersecurity inadvertently increase the risk of conflict with states that sponsor malicious hacking groups? What is the proper balance between offense and defense in cybersecurity and how are cyber operations best integrated into a country's overall military strategy?

Unlike other kinds of conflicts, attribution of attacks presents significant challenges. Indeed, in many cases, it can be difficult to determine whether the attacker is a nation-state, a nonstate actor, a criminal gang, or a lone hacktivist. Investigators must combine technical and traditional methods to identify potentially responsible parties and to understand their intent. If the aggressor's identity cannot be confirmed, how can a counterattack be launched? Some attackers may seek to mount "false flag" attacks and

deception, for example, that misdirect defenders to counter-attack in the wrong direction.

Additionally, what are appropriate responses to attacks made on civil infrastructure and private business operations, such as in the areas of financial services, transportation, energy, entertainment, and health care? In other words, what are the appropriate rules of engagement for national systems, infrastructural systems, businesses, and individuals? When, for example, is a counterattack or a “kinetic” response permissible?

These questions have major implications for the study of war and peace. Those who seek to start a war may be harder to find and their motives more difficult to discern. The cybersecurity and international conflict concentration tackles the social-scientific dimensions of cybersecurity with a focus on the implications of the cyber age for modern statecraft, warfare, elections (local, state, and national), and domestic and international politics.

Foundational Courses (2 courses, 18 units)

Students must complete two of the following courses:

84-101	Introduction to Political Science	9
84-104	Decision Processes in American Political Institutions	9
84-226	International Relations	9
84-275	Comparative Politics	9

Core Courses (3 courses, 27 units)

84-387	Remote Systems and the Cyber Domain in Conflict	9
84-363	Click. Hack. Rule: Understanding the Power & Peril of Cyber Conflict	9
84-405	The Future of Warfare	9

Electives (4 courses, 36 units minimum)

At least two courses (18 units) must be taken from CMIST and have an 84-number.

84-200	Security War Game Simulation	6
84-274	An Introduction to Technology and War	9
84-280	Popcorn and Politics: American Foreign Policy at the Movies	12
84-304	Analysis of Current US National Security Priorities	6
84-312	Terrorism in Sub-Saharan Africa	6
84-314	Politics, Technological Change, and Economic Growth	9
84-319	Civil-Military Relations	9
84-323	War and Peace in the Contemporary Middle East	9
84-325	Contemporary American Foreign Policy	9
84-328	Military Strategy and Doctrine	9
84-329	Asian Strategies	6
84-331	Technology, Law, and Democracy	6
84-341	Transnational Criminal Networks & International Security	6
84-349	Digital Diplomacy: Cybersecurity Challenges and Global Governance	9
84-350	A Strategist's Introduction to Artificial Intelligence	9
84-356	Applied Political Data Analytics	9
84-365	The Politics of Fake News and Misinformation	9
84-368	Technology Ethics	9
84-370	Nuclear Security & Arms Control	9
84-371	International Governance of Artificial Intelligence	9
84-372	Space and National Security	9
84-373	International Law	9
84-380	US Grand Strategy	9
84-383	National Cyber Policy & Strategy	6
84-386	The Privatization of Force	9
84-389	Terrorism and Insurgency	9
84-390	Social Media, Technology, and Conflict	9
14-684	Cyber Law and Ethics	6
16-735	Ethics and Robotics	12
17-200	Ethics and Policy Issues in Computing	9
17-303	Cryptocurrencies, Blockchains and Applications	9
17-331	Information Security, Privacy, and Policy	12
17-333	Privacy Policy, Law, and Technology	9
17-334	Usable Privacy and Security	9
17-702	Current Topics in Privacy Seminar	3
79-301	History of Surveillance: From the Plantation to Data Capitalism	6
79-302	Killer Robots? The Ethics, Law, and Politics of Drones and A.I. in War	9
80-249	AI, Society, and Humanity	9
95-444	Cybersecurity Policy and Governance II	6

Decision Science Concentration

(84 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
or 73-104	Principles of Microeconomics Accelerated	
85-100	Introduction to Psychology	9
88-120	Reason, Passion and Cognition -First-year or Sophomore year	9
88-223	Decision Analysis	12
88-302	Behavioral Decision Making	9

Research Methods (2 courses, 18 units)

36-202	Methods for Statistics & Data Science	9
or 36-309	Experimental Design for Behavioral & Social Sciences	
or 85-309	Statistical Concepts and Methods for Behavioral and Social Science	
88-251	Empirical Research Methods	9

Electives (2 course, 18 units minimum)

Complete two courses (at least 18 units) from the following category of courses. Note that not all elective courses are offered every year.

88-150	Managing Decisions	9
88-221	Markets, Democracy, and Public Policy	9
88-230	Human Intelligence and Human Stupidity	9
88-231	Thinking in Person vs. Thinking Online	9
88-234	Negotiation: International Focus	9
88-235	Negotiation: Strategies and Behavioral Insights	9
88-252	Causal Inference: from Data to Decisions	9
88-255	Strategic Decision Making	9
88-261	Health Policy and Decision Making	9
88-262	Rationality and Irrationality in Medicine	9
88-275	Bubbles: Data Science for Human Minds	9
88-285	Deconstructing and Dismantling Discrimination	9
88-290	Confessions, Lies, and Gossip	9
88-300	Programming and Data Analysis for Social Scientists	9
88-312	Decision Models and Games	9
88-342	The Neuroscience of Decision Making	9
88-344	Systems Analysis: Environmental Policy	9
88-360	Behavioral Economics	9
88-365	Behavioral Economics and Public Policy	9
88-366	Behavioral Economics of Poverty and Development	9
88-367	Behavioral Economics & Field Experiments in Organizations	9
88-372	Social and Emotional Brain	9
88-379	Data-Driven Decision Analysis	9
88-451/452	Policy Analysis Senior Project	12
88-454	Decision Science Capstone	9

Economics Concentration

(84 units minimum)

The BHA concentration in Economics provides a solid understanding of economic theory and quantitative economic analysis. The core disciplinary sequences in economic theory and quantitative analysis are combined with calculus and data analysis to provide students with knowledge and skills that allow for creative problem-solving. Students pursuing the BHA concentration in Economics will hold a Dietrich College affiliation.

Mathematics Prerequisites

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

21-120	Differential and Integral Calculus (prerequisite: 21-090)	10
21-256	Multivariate Analysis	9

Economic Theory Requirements (4 courses, 36 units)

73-102	Principles of Microeconomics *	9
or 73-104	Principles of Microeconomics Accelerated	
73-103	Principles of Macroeconomics	9
73-230	Intermediate Microeconomics	9
73-240	Intermediate Macroeconomics	9

* *Students who place out of* 73-102 *based on the economics placement exam will receive a prereq waiver for* 73-102 *and are waived from taking* 73-102.

Quantitative Analysis Requirements (2 courses, 18 units)

These courses require 36-200 Reasoning with Data as a pre-requisite. 36-200 also fulfills a general education Data Analysis requirement.

73-265	Economics and Data Science	9
73-274	Econometrics I	9

Advanced Economics Electives (2 courses, 18 units)

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

Senior Work (1 course, 12 units)

73-497	Senior Project	12

Environmental & Sustainability Studies **Concentration**

(93 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.

Core Courses (3 course, 27 units)

24/09-291	Environmental Systems on a Changing Planet - Spring	9
66-236	Introduction to Environmental Ideas	9
66-506	Senior Capstone -Fall (Interdisciplinary Research: Capstone in ESS)	9

Earth and Environmental Science (1 course, 9 units)

Choose one course from the list below.

03-128	Biology for Life Special Topics (Section S, Tropical Ecology)	9
03-140	Ecology and Environmental Science	9
33-115	Physics for Future Presidents	9

Global Course (1 course, 3 units)

99-xxx	Each semester, a new course is offered on Global themes, in partnership with University of Pittsburgh's Global Studies Center.	3

Political Economy (1 course, 9 units minimum)

Choose one course from the list below.

19-101	Introduction to Engineering and Public Policy	12
79-300	Controversial Topics in the History of American Public Policy	9
84-110	The Economics of Politics and Technology	9
84-226	International Relations	9
84-325	Contemporary American Foreign Policy	9
88-344	Systems Analysis: Environmental Policy	9

Electives (5 courses, 45 units minimum)

Choose three DC Electives and two MCS/ENG Electives in consultation with the concentration advisor.

DC Electives:

76-241	Introduction to Gender Studies	9
76-354	Watchdog Journalism	9
76-395	Science Writing *	9
76-450	Law, Culture, and the Humanities	9
79-201	Introduction to Anthropology	9
79-275	Introduction to Global Studies	9
79-278	How (Not) to Change the World	9
79-288	Bananas, Baseball, and Borders: Latin America and the United States	9
79-297	Technology and Work	9
79-331	Body Politics: Women and Health in America	9
79-377	Food, Culture, and Power: A History of Eating	9
79-379	Experimental Ethnography	9
79-383	The History of Capitalism	9
80-135	Introduction to Political Philosophy	9
80-244	Environmental Ethics	9
84-110	The Economics of Politics and Technology	9
84-275	Comparative Politics	9
84-325	Contemporary American Foreign Policy	9

MCS/ENG Electives:

12-201	Geology	9
19-101	Introduction to Engineering and Public Policy	12
27-505	Exploration of Everyday Materials	9
03-140	Ecology and Environmental Science	9

* *Additional prerequisite*

Ethics, History, & Public Policy Concentration

(81 units minimum)

The BHA concentration in Ethics, History, & Public Policy (EHPP) prepares students to be leaders is a vital goal of colleges and universities in every democratic society. The intellectual challenges facing public and private sector leaders have expanded dramatically since the pioneering EHPP program began in 1996, but the need remains as great as ever for broadly educated, ethically sensitive, and technically skilled leaders.

EHPP prepares students to demonstrate sophistication and flexibility in their command of interdisciplinary knowledge; deep historical understanding of how modern-day policy problems have emerged and evolved; and clear, rational criteria for ethical and socially just decision making. The curriculum provides students with a strong humanistic foundation for developing such high-level, historically grounded, and ethically attuned leadership capacities. It also offers ample room for specialization in a wide range of policy areas in which the History and Philosophy departments have special expertise, e.g., medicine and public health, criminal justice, environment, technology, artificial intelligence (AI), gender, civil rights, immigration, and education.

Foundation Courses in History and Philosophy (2 courses, 18 units)

Choose one of the following two courses:

79-189	Democracy and History: Thinking Beyond the Self	9
79-248	U.S. Constitution & the Presidency	9

Choose one of the following two courses:

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

Ethics and Policy Core (3 courses, 27 units)

Choose three of the courses below:
No more than one course may be taken at the 100 level and at least one course must be taken at the 300 level or above.

80-135	Introduction to Political Philosophy	9
80-136	Social Structure, Public Policy & Ethics	9
80-208	Critical Thinking	9
80-221	Philosophy of Social Science	9
80-234	Race, Gender, and Justice	9
80-244	Environmental Ethics	9
80-245	Medical Ethics	9
80-249	AI, Society, and Humanity	9
80-305	Game Theory	9
80-306	Decision Theory	9
80-324	Philosophy of Economics	9
80-330	Ethical Theory	9
80-335	Social and Political Philosophy	9
80-336	Philosophy of Law	9
80-348	Health, Human Rights, and International Development	9
80-447	Global Justice	9

History and Policy Core (3 courses, 27 units)

Choose three of the courses below:

79-145	Genocide and Weapons of Mass Destruction	9
79-175	Moneyball Nation: Data in American Life	9
79-178	Equality Under the Law	9
79-212	Jim Crow America	9
79-215	Environmental Justice from Conservation to Climate Change	9
79-230	The Arab-Israeli Conflict and Peace Process Through 1948 to Present	9
79-234	Technology and Society	9
79-246	War, Genocide, and Gender in Modern Europe	9
79-248	U.S. Constitution & the Presidency	9
79-250	Voting Rights: An Introduction	9
79-260	Nazi Germany: A Practical History	9
79-270	Anti-Semitism Then and Now: Perspectives from the Middle Ages to the Present	9
79-278	How (Not) to Change the World	9
79-289	Animal Planet: An Environmental History of People and Animals	9
79-290	The Slave Passage: From West Africa to the Americas	9
79-296	Religion in American Politics	6
79-300	Controversial Topics in the History of American Public Policy	9
79-302	Killer Robots? The Ethics, Law, and Politics of Drones and A.I. in War	9
79-320	Women, Politics, and Protest	9
79-321	Documenting Human Rights	9
79-329	LGBTQ+ History	9
79-330	Medicine and Society: Health, Healers, and Hospitals	9
79-343	Education, Democracy, and Civil Rights	9
79-360	Crime, Policing, and the Law: Historical and Contemporary Perspectives	9
79-380	Hostile Environments: The Politics of Pollution in Global Perspective	9

Foundation Courses in Law and Social Science (1 course, 9 units minimum)

Choose one of the courses below:

17-200	Ethics and Policy Issues in Computing	9
19-101	Introduction to Engineering and Public Policy	12
70-332	Business, Society and Ethics	9
73-102	Principles of Microeconomics	9
73-103	Principles of Macroeconomics	9
84-104	Decision Processes in American Political Institutions	9
84-110	The Economics of Politics and Technology	9
84-352	Representation and Voting Rights	9
84-393	The US Congress: Legislative Progress or Paralysis?	9
84-402	Judicial Politics and Behavior	9
88-281	Topics in Law: 1st Amendment	9
88-284	Topics of Law: The Bill of Rights	9

Film & Visual Media Concentration

(81 units minimum)

The BHA concentration in Film & Visual Media 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 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	Film History	9

Production Course (1 course, 9 units)

76-292	Introduction to Film Production	9

Screenwriting Course (1 course, 9 units)

76-269	Introduction to Screenwriting	9

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

Options include but are not limited to:

76/82-278	Japanese Film and Literature: The Art of Storytelling	9
76-312	Crime and Justice in American Film	9
76-320	The Writer's Room: TV Writing	9
76-339	Topics in Film and Media (Can be taken more than once.)	9
76-348	Adaptation: Fiction to Film	9
76-367	Fact Into Film: Translating History into Cinema	9
76-401	Hollywood vs. the World	9
76-439	Seminar in Film and Media Studies	9
76-454	Rise of the Blockbuster	9
76-482	Rise of the Art Film	9
76-493	Science Fictions/Speculative Futures: Utopian/ Dystopian Visions in Film & Media	9
79-225	West African History in Film	9
82-268	Introduction to Italian Film	9
82-279	Anime - Visual Interplay between Japan and the World	9
82-284	Multicultural Pittsburgh: VR Storytelling	6

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 concentration advisor for guidance. Recommended courses include 76-310 Advanced Studies in Film and Media and 76-374 Mediated Narrative.

French & Francophone Studies Concentration

(90 units minimum)

A BHA concentration in French & Francophone Studies promotes not just language proficiency but also an understanding of French and francophone cultures. 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

Elementary-level proficiency in French. This is equivalent to the completion of two courses (two at the 100-level) or may be demonstrated through CMU internal placement test scores.

Core Courses in Languages, Cultures & Applied Linguistics (LCAL) (2 courses, 18 units)

82-282	Interpreting Global Texts & Cultures	9
82-283	Language Diversity & Cultural Identity	9

Foundational Courses in French & Francophone Studies (6 courses, 54 units)

82-201	Intermediate French I	9
or 82-203	Intermediate French I Online	
82-202	Intermediate French II	9
or 82-204	Intermediate French II Online	
82-303	French & Francophone Cultures (may be repeated)	9
82-304	French & Francophone Sociolinguistics (may be repeated)	9

French & Francophone Studies Electives (2 courses, 18 units)

In consultation with the concentration advisor, choose two additional courses related to French & Francophone Studies.

German Studies Concentration

(90 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

Elementary-level proficiency in German. This is equivalent to the completion of two courses (at the 100-level) or may be demonstrated through CMU internal placement test scores.

Core Courses in Languages, Cultures & Applied Linguistics (LCAL) (1 course, 9 units)

82-28x	Choose one LCAL course	9

Foundational Courses in German Studies (6 courses, 54 units)

82-221	Intermediate German I	9
82-222	Intermediate German II	9
82-320	Contemporary Society in Germany, Austria and Switzerland	9
82-323	Germany, Austria and Switzerland in the 20th Century	9
82-425	Topics in German Literature and Culture -Fall	9
82-426	Topics in German Literature and Culture -Spring	9

German Studies and Interdisciplinary Electives (3 courses, 27 units)

In consultation with the concentration advisor, choose three additional courses taught in either German or English, for example, additional 400-level courses in German Studies or a departmental elective.

Global Studies Concentration

(81 units minimum)

The BHA concentration in Global Studies is designed for students interested in humanistic approaches to understanding past and present processes of globalization. Participating faculty in the departments of History, Languages, Cultures, and Applied Linguistics 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 Advanced Seminar in Global Studies (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 and the Global Studies concentration advisor 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 Advanced Seminar in Global Studies), 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 concentration advisor 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	Advanced Seminar in Global Studies	12

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	How Do We Remember? The Politics and Cultures of Memory	9
79-315	The Politics of Water in Global Perspective	9
79-317	Art, Anthropology, and Empire	9
79-318	Sustainable Social Change: History and Practice	9
79-377	Food, Culture, and Power: A History of Eating	9
79-379	Experimental Ethnography	9
79-380	Hostile Environments: The Politics of Pollution in Global Perspective	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:

76-337	Intersectional Feminism	9
76-353	Transnational Feminisms: Fiction and Film	9
76-384	Race, Nation, and the Enemy	9
76-440	Postcolonial Theory: Diaspora and Transnationalism	9
79-153	Ancient Rome: How Often Should You Think about It?	9
79-237	Comparative Slavery	9
79-270	Anti-Semitism Then and Now: Perspectives from the Middle Ages to the Present	9
79-273	Jews & Arabs: From the Time of Muhammad to the Present	9
79-276	Beyond the Border	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
79-313	"Unwanted": Refugees, Asylum Seekers, and Patterns of Global Migration	6
79-333	African Americans, Race, and the Fight for Reparations	9
79-350	Early Christianity	9
79-368	Un-natural Disasters: Societies and Environmental Hazards in Global Perspective	6
79-385	Out of Africa: The Making of the African Diaspora	9
79-510	Global Studies Guided Reading	3
80-348	Health, Human Rights, and International Development	9
80-447	Global Justice	9
82-283	Language Diversity & Cultural Identity	9
82-304	French & Francophone Sociolinguistics	9
82-345	Using Spanish in Social Contexts	9
84-226	International Relations	9
84-322	Nonviolent Conflict and Revolution	9
84-370	Nuclear Security & Arms Control	9
84-389	Terrorism and Insurgency	9

Regional Courses:

Africa

79-225	West African History in Film	9
79-226	African History: Earliest Times to 1780	9
79-227	Modern Africa: The Slave Trade to the End of Apartheid	9
79-290	The Slave Passage: From West Africa to the Americas	9

Eastern and Southern Asia and the Pacific

79-207	Asian American History through the Novel	9
79-210	Identity, Ethnicity, and Place in Modern China	9
79-211	Modern Southeast Asia: Colonialism, Capitalism, and Cultural Exchange	9
79-264	Tibet and China: History and Propaganda	9
88-411	Rise of the Asian Economies	9

Europe

79-202	Flesh and Spirit: Early Modern Europe, 1400-1750	9
79-203	The Other Europe: The Habsburgs, Communism, & Central/Eastern Europe, 1740-1990	9
79-205	20th Century Europe	9
79-208	Witchcraft and Witch-Hunting	9
79-268	World War I: The Twentieth Century's First Catastrophe	9
79-270	Anti-Semitism Then and Now: Perspectives from the Middle Ages to the Present	9
79-272	Coexistence and Conflict: Muslims, Christians and Jews in Spain and Portugal	9
82-320	Contemporary Society in Germany, Austria and Switzerland	9
82-415	Topics in French and Francophone Studies	9
82-441	Studies in Peninsular Literature and Culture	9

The Middle East

79-229	The Origins of the Palestinian-Israeli Conflict, 1880-1948	9
79-230	The Arab-Israeli Conflict and Peace Process Through 1948 to Present	9
82-215	Minorities in the Middle East and North Africa	9
84-323	War and Peace in the Contemporary Middle East	9

The Americas

79-223	Mexico: From the Aztec Empire to the Drug War	9
82-245	New Directions in Hispanic Studies	9
82-343	Cultures of Latin America	9
82-451	Studies in Latin American Literature and Culture	9
82-455	Topics in Hispanic Studies	9
82-456	Topics in Hispanic Studies	9

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 concentration advisor. The concentration advisor 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	9
70-365	International Trade and International Law	9
76-241	Introduction to Gender Studies	9
76-386	Language & Culture	9
76-450	Law, Culture, and the Humanities	9
76-468	Space and Mobilities	9
79-101	Making History: How to Think About the Past (and Present)	9
79-204	American Environmental History	9
79-281	Introduction to Religion	9
79-316	Photography, the First 100 Years, 1839-1939	9
79-330	Medicine and Society: Health, Healers, and Hospitals	9
79-343	Education, Democracy, and Civil Rights	9
80-244	Environmental Ethics	9
80-335	Social and Political Philosophy	9
82-215	Minorities in the Middle East and North Africa	9
82-541	Special Topics in Hispanic Studies	Var.
84-275	Comparative Politics	9
84-310	Policy in a Global Economy 1: International Trade and Trade Policy	6
84-318	Politics of Developing Nations	9
84-362	Diplomacy and Statecraft	9
88-234	Negotiation: International Focus	9

Area-based Courses:

79-257	Germany and the Second World War	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: Game of Thrones	9
79-266	Russian History and Revolutionary Socialism	9
79-267	The Soviet Union in World War II: Military, Political, and Social History	9
79-269	Russian History: From Socialism to Capitalism	9
79-319	India Through Film	6
79-320	Women, Politics, and Protest	9
79-322	Stalin and the Great Terror	9
79-331	Body Politics: Women and Health in America	9
82-253	Korean Society through Film and Literature	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
82-294	19th Century Russian Masterpieces	9
82-295	20th Century Russian Masterpieces	Var.
82-303	French & Francophone Cultures	9
82-305	French in its Social Contexts	9
82-333	Chinese Language and Culture	Var.
82-342	Cultures of Spain	9
82-344	U.S. Latine Cultures	9

82-361	Italian Language and Culture I	9
82-420	The Crucible of Modernity:Vienna 1900	9
82-425	Topics in German Literature and Culture	9
82-427	Nazi and Resistance Culture	9
82-428	History of German Film	9
82-433	Topics in Contemporary Culture of China	9
82-434	Studies in Chinese Traditions	9
82-440	Studies in Chinese Literature & Culture	9
82-473	Topics in Japanese Studies	9

Hispanic Studies Concentration

(90 units minimum)

A BHA concentration in Hispanic Studies promotes not just language proficiency but also an understanding of its varied cultures. 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 Spanish. This is equivalent to the completion of four courses (two at the 100-level and two at the 200-level) or may be demonstrated through CMU internal placement test scores.

Core Courses in Languages, Cultures and Applied Linguistics (LCAL) (1 course, 9 units)

Complete one course.

82-280	Billingual & Bicultural Experiences in the US	9
82-282	Interpreting Global Texts & Cultures	9
82-283	Language Diversity & Cultural Identity	9
82-482	Introduction to Translation	9

Foundational Courses in Hispanic Studies (4 courses, 36 units)

82-342	Cultures of Spain	9
82-343	Cultures of Latin America	9
82-344	U.S. Latine Cultures	9
82-345	Using Spanish in Social Contexts	9

Complete required course.

82-345	Using Spanish in Social Contexts	9

Hispanic Studies Electives (5 courses, 45 units)

In consultation with the concentration advisor, choose five additional courses taught in Spanish at the 400-level or above. Students may substitute one relevant and related course from outside the program (i.e., another LCAL course) or from another department (e.g., History, CMIST, Philosophy, English).

Humanities Analytics Concentration

(81 units minimum)

The human experience that is traditionally at the core of a humanities education is being dramatically transformed by the emergence of big data, digital platforms, computational thinking, and digital connectivity. Spurred by such developments, the concentration in Humanities Analytics (HumAn), offered by the Department of English, trains students in the processes involved in analyzing, digitizing, quantifying and visualizing different types of humanities and cultural phenomena, including printed books, manuscripts, historical records, art, music and film. The HumAn concentration trains students to work with cultural objects (like texts, film, historical records, etc.) but also to turn words and images into data; to move from one cultural object (like a Victorian novel, for instance) to a corpus consisting of tens of thousands of other novels published in the same period, and to combine close reading with distant reading (aggregating and analyzing massive amounts of data) for maximum insight and accuracy.

Students will develop a broad technical understanding of state-of-the-art computer-assisted methods for humanistic study, such as: social network analysis, text analysis and data mining, topic modeling, classification techniques and visualization. Students will also investigate the histories and historical contexts of such methods, learning to consider their applicability in specific domains. Finally, students will learn to turn a critical eye on the corpora and infrastructures that increasingly underpin humanistic research.

Required Courses (5 courses, 45 units)

76-275	Introduction to Critical Writing	9
76-380	Methods in Humanities Analytics	9

Three core courses from the following list:

76-314	Data Stories	9
76-388	Coding for Humanists	9
76-425	Rhetoric, Science, and the Public Sphere	9
76-429	Introduction to Digital Humanities	9
88-275	Bubbles: Data Science for Human Minds	9
88-300	Programming and Data Analysis for Social Scientists	9

Electives (4 courses, 36 units minimum)

Choose four courses from the following categories. One course must come from List A, two from List B, and the fourth in consultation with your Humanities Analytics advisor.

List A: One elective course relevant to digital and analytics methods (at least 9 units):

05-391	Designing Human Centered Software	12
05-434/11-344	Machine Learning in Practice	12
11-411	Natural Language Processing	12
11-441/741	Machine Learning with Graphs (Course is very mathematical, and is therefore appropriate only to students with such a preparation.)	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
16-223	IDeATe Portal: Creative Kinetic Systems	10
16-385	Computer Vision	12
17-340	Green Computing	9
17-450	Crafting Software	12
17-562	Law of Computer Technology	9
36-202	Methods for Statistics & Data Science	9
36-204	Discovering the Data Universe	3
36-226	Introduction to Statistical Inference	9
36-311	Statistical Analysis of Networks	9
36-315	Statistical Graphics and Visualization	9
36-350	Statistical Computing	9
36-462	Special Topics: Statistical Machine Learning	9
48-095	Spatial Concepts for Non-Architecture Majors	10
48-120	Digital Media I	6
51-229	Digital Photographic Imaging	9
53-451	Research Issues in Game Development: Designing for XR	12
60/62-142	Digital Photography I	10
62-150	IDeATe Portal: Introduction to Media Synthesis and Analysis	10

List B: Two elective courses relevant to broad humanities expertise (at least 18 units):

76-210	Banned Books	9
76-245	Shakespeare: Tragedies & Histories	9
76-247	Shakespeare: Comedies and Romances	9
76-325	Intertextuality	9
76-339	Topics in Film and Media	9
76-373	Argument	9
76-476	Rhetoric of Science	9
79-175	Moneyball Nation: Data in American Life	9
79-200	Introduction to Historical Research & Writing	9
79-234	Technology and Society	9
80-180	Introduction to Linguistics	9
80-280	Linguistic Analysis	9
80-381	Meaning in Language	9
80-383	Language in Use	9
82-282	Interpreting Global Texts & Cultures	9
82-283	Language Diversity & Cultural Identity	9

82-383	Second Language Acquisition: Theories and Research	9
82-480	Translation Technologies	9

Note: Additional courses not on List A or List B may also be approved as electives; new courses are added every semester so please speak with Humanities Analytics advisor.

Information Systems Concentration

(107 units minimum)

Did you enjoy computer science or more technical courses in high school, but are mostly interested in the practical and social applications of technology? Do you have a passion for business and want to use advanced technology to change how companies work? Do you want to learn how data and technology can be harnessed for social good?

The BHA concentration in Information Systems combines aspects of computer science, information technology, and business management to provide you with an uncommonly well-rounded portfolio. You will be uniquely positioned for an impactful career in an increasingly digitized and connected world and able to adapt to rapid evolution across industries.

In addition to building a solid foundation in computing, communications, and software development, you will also study social sciences and organizational theory to develop "big picture" critical thinking and understand the human impacts of technological change. This blend prepares you to take a leading role in our digital future.

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

Technical Core (3 courses, 31 units minimum)

Information Systems requires completion of prerequisite courses in mathematics and computer science. All prerequisites must be successfully completed prior to the start of fall semester, junior year. Two Technical Core courses may double-count in the BHA General Education Math, Science, and Computation category.

15-112	Fundamentals of Programming and Computer Science	12
15-121	Introduction to Data Structures	10
or 15-122	Principles of Imperative Computation	

Choose one:

21-112	Integral Calculus	10
21-120	Differential and Integral Calculus (prerequisite: 21-090)	10
21-127	Concepts of Mathematics	12
21-240	Matrix Algebra with Applications	10
80-210	Logic and Proofs	9

Information Systems Professional Core (8 courses, 76 units)

67-200	Information Systems Research Colloquium -Fall	1
67-250	The Information Systems Milieux -Spring	9
67-262	Database Design and Development -Fall	9
67-272	Application Design and Development -Spring	12
67-373	Information Systems Consulting Project -Spring	12
05-391	Designing Human Centered Software	12
or 05-410	User-Centered Research and Evaluation	
or 05-452	Service Design	
17-313	Foundations of Software Engineering	12
95-422	Managing Digital Transformation	9

International Relations & Political Science Concentration

(81 units minimum)

Offered through the Carnegie Mellon Institute for Strategy and Technology (CMIST), the International Relations and Political Science (IRPS) BHA concentration is for students who want to learn how to think systematically and develop foundational knowledge about international and domestic politics. It is an interdisciplinary concentration that is rooted firmly in political science and draws on strengths and insights from decision science, economics, history, modern languages, and other fields. IRPS students wrestle with a wide range of issues including the future of democracy, the relationship between technology and politics, the drivers of war and peace, domestic politics across countries, and the formulation of effective foreign policies. IRPS graduates embark on a variety of careers in government, law, public policy, intelligence, national defense, consulting, international development, and more.

Core disciplinary courses for the IRPS major establish a strong foundation in the study of political science and enable students to better understand the workings of political institutions, political behavior across countries, the decision-making of political leaders, the making national and international policy, and prevailing challenges to the international system, among other topics.

Core methodology courses train IRPS students in the social science tools and communications skills needed to analyze and write persuasively about international relations and politics. Students pursuing an IRPS major learn to use a wide range of analytic tools including statistics and data science, qualitative analysis, game theory, and behavioral decision-making models as they study politics and strategy. Students also learn how to effectively communicate their analyses to affect public policy.

A rich set of electives allows students to investigate issues in security and technology, grand strategy and national security, cybersecurity and international conflict, military strategy and doctrine, the politics of key regions of the world, international political economy and economic policy, representation and voting rights, climate change and development, repression and human rights, international law and diplomacy, political psychology and public opinion, and social change and revolution.

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.

Political Science Core (5 courses, 45 units)

Students must complete the following courses:

84-101	Introduction to Political Science	9
84-110	The Economics of Politics and Technology	9
or 73-102	Principles of Microeconomics	
or 73-103	Principles of Macroeconomics	
84-250	Writing for Political Science and Policy	9

In addition, students must complete two of the following three courses. If all three are taken, the third may count as an elective.

84-104	Decision Processes in American Political Institutions	9
84-226	International Relations	9
84-275	Comparative Politics	9

Methodology Core (1 course, 9 units)

Students must complete one of the following courses:

84-266	Research Design for Political Science	9
36-202	Methods for Statistics & Data Science	9

Language Requirement

BHA IRPS students are required to complete the intermediate II level or the equivalent in a modern language other than English. The language requirement may be satisfied through the BHA General Education requirements if the 200-level is reached. Advanced level study is strongly encouraged.

Electives (3 courses, 27 units minimum)

International Relations and Political Science BHA students must complete 27 units (three courses) from the elective lists below. Two courses (18 units) must be taken from the Carnegie Mellon Institute for Strategy and Technology (CMIST) and have an 84-number.

CMIST Electives		
84-120	Introduction to US Constitutional Law	9
84-200	Security War Game Simulation	6
84-252	Briefing in the Policy World	6
84-274	An Introduction to Technology and War	9
84-280	Popcorn and Politics: American Foreign Policy at the Movies	12
84-303	International Human Rights	6
84-304	Analysis of Current US National Security Priorities	6
84-306	Latin American Politics	9
84-309	American Political Divides and Great Debates	9
84-310	Policy in a Global Economy 1: International Trade and Trade Policy	6
84-311	Policy in a Global Economy 2: International Macroeconomics and Finance	6
84-312	Terrorism in Sub-Saharan Africa	6

84-314	Politics, Technological Change, and Economic Growth	9
84-317	Defense PPBE in the Age of Emerging Technologies	6
84-318	Politics of Developing Nations	9
84-319	Civil-Military Relations	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	9
84-325	Contemporary American Foreign Policy	9
84-327	Who Really Runs America?: Subnational Governance and Policymaking	9
84-328	Military Strategy and Doctrine	9
84-329	Asian Strategies	6
84-331	Technology, Law, and Democracy	6
84-333	Law of US Democracy	9
84-341	Transnational Criminal Networks & International Security	6
84-349	Digital Diplomacy: Cybersecurity Challenges and Global Governance	9
84-350	A Strategist's Introduction to Artificial Intelligence	9
84-352	Representation and Voting Rights	9
84-355	Democracy's Data: Analytics and Insights into American Elections	9
85-356	Expertise: The cognitive (neuro)science of mastering almost any skill	9
84-358	Money, Connections, and Power: Interests and Influence in the US	9
84-362	Diplomacy and Statecraft	9
84-363	Click. Hack. Rule: Understanding the Power & Peril of Cyber Conflict	9
84-365	The Politics of Fake News and Misinformation	9
84-366	The 21st-Century Presidency: Expanding Powers, New Challenges	9
84-367	The Politics of Antisemitism	9
84-368	Technology Ethics	9
84-369	Decision Science for International Relations	9
84-370	Nuclear Security & Arms Control	9
84-371	International Governance of Artificial Intelligence	9
84-372	Space and National Security	9
84-373	International Law	9
84-375	Geopolitics of Innovation	9
84-380	US Grand Strategy	9
84-383	National Cyber Policy & Strategy	6
84-386	The Privatization of Force	9
84-387	Remote Systems and the Cyber Domain in Conflict	9
84-389	Terrorism and Insurgency	9
84-390	Social Media, Technology, and Conflict	9
84-393	The US Congress: Legislative Progress or Paralysis?	9
84-405	The Future of Warfare	9

Additional Electives

19-452	EPP Projects II	12
70-342	Managing Across Cultures	9
70-365	International Trade and International Law	9
70-430	International Management	9
73-332	Political Economy	9
76-318	Communicating in the Global Marketplace	9
79-203	The Other Europe: The Habsburgs, Communism, & Central/Eastern Europe, 1740-1990	9
79-205	20th Century Europe	9
79-223	Mexico: From the Aztec Empire to the Drug War	9
79-227	Modern Africa: The Slave Trade to the End of Apartheid	9
79-229	The Origins of the Palestinian-Israeli Conflict, 1880-1948	9
79-230	The Arab-Israeli Conflict and Peace Process Through 1948 to Present	9
79-257	Germany and the Second World War	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: Game of Thrones	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
79-301	History of Surveillance: From the Plantation to Data Capitalism	6
79-302	Killer Robots? The Ethics, Law, and Politics of Drones and A.I. in War	9
79-313	"Unwanted": Refugees, Asylum Seekers, and Patterns of Global Migration	6
79-314	How Do We Remember? The Politics and Cultures of Memory	9
79-318	Sustainable Social Change: History and Practice	9
79-320	Women, Politics, and Protest	9
79-343	Education, Democracy, and Civil Rights	9
79-377	Food, Culture, and Power: A History of Eating	9
79-385	Out of Africa: The Making of the African Diaspora	9
80-135	Introduction to Political Philosophy	9
80-136	Social Structure, Public Policy & Ethics	9
80-249	AI, Society, and Humanity	9
80-335	Social and Political Philosophy	9
80-348	Health, Human Rights, and International Development	9
80-447	Global Justice	9
82-3xx	or 4xx Advanced Level Modern Language Course	
88-281	Topics in Law: 1st Amendment	9
88-284	Topics of Law: The Bill of Rights	9
88-411	Rise of the Asian Economies	9

Japanese Studies Concentration

(96 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 may be demonstrated through CMU internal placement test scores.

Core Courses in Languages, Cultures and Applied Linguistics (LCAL) (1 course, 9 units)

Complete one course.

82-282	Interpreting Global Texts & Cultures	9
82-283	Language Diversity & Cultural Identity	9
82-482	Introduction to Translation	9

Foundational Courses in Japanese Studies (5 courses, 51 units)

82-272	Intermediate Japanese II	12
82-272	Intermediate Japanese II	12
82-273	Introduction to Japanese Language and Culture	9
82-371	Advanced Japanese I: An Exploration of Critical Global Topics	9
82-372	Advanced Japanese 2: An Exploration of Critical Global Topics -Changes in Japan II: Lifestyle/ Religion and Gender	9

Japanese Studies Electives (4 courses, 36 units)

In consultation with the concentration advisor, choose three courses taught in Japanese and one course taught in English.

Linguistics Concentration

(81 units minimum)

The BHA concentration in Linguistics combines courses from the departments of English, Languages, Cultures, and Applied Linguistics, 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	Introduction to Linguistics	9

Linguistics Core (2 courses, 18 units)

Take one course each in two of the following three areas.

Sounds:

80-282	Phonetics and Phonology I	9

Structure:

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

Meaning:

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.

36-468	Special Topics: Text Analysis	9
76-389	Rhetorical Grammar	9
80-283	It Matters How You Say It	9
80-286	Words and Word Formation: Introduction to Morphology	9
80-287	Language Variation and Change	9
80-288	Intonation: The Meaning of Linguistic Tunes	9
80-382	Laboratory Phonology	9
80-384	Linguistics of Turkic Languages	9
80-385	Linguistics of Germanic Languages	9
80-388	Linguistic Typology: Diversity and Universals	9
80-484	Language and Thought	9
80-488	Acoustics of Human Speech: Theory, Data, and Analysis	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 concentration advisor 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 concentration advisor 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:

80-484	Language and Thought	9

English:

76-318	Communicating in the Global Marketplace	9
76-325	Intertextuality	9
76-386	Language & Culture	9
76-388	Coding for Humanists	9
76-389	Rhetorical Grammar	9

Languages, Cultures, and Applied Linguistics:

82-239	Crazy Linguistically Rich Asian Languages	9
82-334	Structure of Chinese	9
82-373	Structure of the Japanese Language	9
82-383	Second Language Acquisition: Theories and Research	9
82-387	Introduction to Linguistic Data Analysis Using R	9

Psychology:

85-421	Language and Thought	9
85-430	Infant Language Development	9

Language Technologies Institute:

11-411	Natural Language Processing	12
11-423	ConLanging: Lrng Ling & Lang Tech via Constru Artif. Lang	12
11-492	Speech Technology for Conversational AI	12

Statistics and Data Science:

36-468	Special Topics: Text Analysis	9

Literature & Culture Concentration

(81 units minimum)

The BHA concentration in Literature & Culture teaches students how to read, interpret and write persuasively about novels, poems, plays and other imaginative works across a variety of genres and media forms. Along with teaching students the analytical skills and methodological tools to interpret these works, this major teaches the importance of understanding imaginative works within their cultural and historical contexts. In addition, the concentration is designed to train students in strong professional and academic skills like critical thinking, inductive reasoning and persuasive argumentation that are applicable to other fields of study and a variety of career paths.

Prerequisite Course

Choose one course:

76-260	Introduction to Writing Fiction	9
76-261	Intro to Writing Creative Nonfiction	9
76-265	Introduction to Writing Poetry	9
76-269	Introduction to Screenwriting	9

Required Introductory Courses (2 courses, 18 units)

76-245	Shakespeare: Tragedies & Histories	9
or 76-247	Shakespeare: Comedies and Romances	
76-275	Introduction to Critical Writing	9

200-Level Literature & Culture Course (1 course, 9 units)

Course options include but are not limited to the following:

76-203	Literature & Culture in the 18th Century	9
76-207	Special Topics in Literature & Culture	9
76-210	Banned Books	9
76-220	Mystery! From Detective Fiction to True Crime	9
76-221	Books You Should Have Read By Now	9
76-230	Literature & Culture in the 19th Century	9
76-233	Literature and Culture in the Renaissance	9
76-241	Introduction to Gender Studies	9
76-244	Immigrant Fictions	9
76-245	Shakespeare: Tragedies & Histories (if not taken as Required Introductory Course)	9
76-247	Shakespeare: Comedies and Romances (if not taken as Required Introductory Course)	9
76-268	Comic Books & Pop Culture	9

300-Level Course (1 course, 9 units)

Course options include but are not limited to the following:

76-310	Advanced Studies in Film and Media	9
76-314	Data Stories	9
76-317	Contemporary American Fiction	9
76-326	Contemporary Global Fiction	9
76-329	Performing Race in Early Modern Drama	9
76-337	Intersectional Feminism (if not taken as a Theory Course)	9
76-339	Topics in Film and Media	9
76-341	The Age of Jane Austen	9
76-342	Love: A Cultural History	9
76-367	Fact Into Film: Translating History into Cinema	9
76-376	Crafting Race in 19th-Century Britain	9
76-392	Special Topics in Literature & Culture	9

400-Level Course (1 course, 9 units)

Course options include but are not limited to the following:

76-407	Topics in Literary & Cultural Studies	9
76-410	The Long Eighteenth Century	9
76-423	Transnational Feminisms	9
76-429	Introduction to Digital Humanities	9
76-439	Seminar in Film and Media Studies	9
76-440	Postcolonial Theory: Diaspora and Transnationalism	9
76-442	Black Lives in Pre-1900 Britain	9
76-446	Revenge Tragedy	9
76-467	Crime Fiction and Film	9
76-468	Space and Mobilities	9
76-495	Other People's Words: The History, Theory, and Practice of Interviews	9

Theory Course (1 course, 9 units)

Please consult with the Literature & Culture concentration advisor regarding this requirement.

Rhetoric Course (1 course, 9 units)

Course options include but are not limited to the following:

76-318	Communicating in the Global Marketplace	9
76-373	Argument	9
76-384	Race, Nation, and the Enemy	9
76-388	Coding for Humanists	9
76-389	Rhetorical Grammar	9
76-415	Mediated Power and Propaganda	9
76-475	Law, Performance, and Identity	9
76-476	Rhetoric of Science	9
76-492	Rhetoric of Public Policy	9

English Elective Courses (2 courses, 18 units)

Complete two additional courses from the English Department's offerings. One course must be at the 300-level, and one must be at the 400-level. Electives may include any courses offered by the English Department from any specialization area, with the exception of creative writing workshops.

Logic & Computation Concentration

(81 units minimum)

Students in the program take a common core of courses in logic, methodology, and computer science, together with an associated seminar in their senior year. The individual focus is achieved by selecting a sequence of four advanced and closely related courses. It is in this area of focus (or specialization) that students write their senior thesis under the supervision of a faculty member.

The resulting education in logic, analytic philosophy, mathematics, statistics and computer science enables students to pursue professional careers or graduate study. The analytic and communication skills developed in the major support a wide range of career choices, including those among the fields of technology, business and law. Fields of graduate study for which students are well prepared include, for example, computer science, cognitive science, philosophy, logic and linguistics.

Prerequisites

80-211	Logic and Mathematical Inquiry (Recommended prior to 21-127)	9
or 80-210	Logic and Proofs	
15-112	Fundamentals of Programming and Computer Science	12
21-127	Concepts of Mathematics	12

Introduction to Formal Systems (1 course, 9 units)

80-150	Nature of Reason	9

Logic Core (2 courses, 18 units)

80-310	Formal Logic	9
80-311	Undecidability and Incompleteness	9

Computer Science Core (2 courses, 24 units)

15-122	Principles of Imperative Computation	12
15-150	Principles of Functional Programming	12

Logic & Computation Electives (3-4 courses, 30 units minimum)

Bearing in mind prerequisites, Logic & Computation students must complete at least three advanced courses in areas that use logical and computational tools, such as philosophy, computer science, linguistics, mathematical logic, psychology or statistics. The sequence of courses, mostly at the 300-level, must be selected in consultation with the concentration advisor.

Philosophy Concentration

(81 units minimum)

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

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

Introduction to Philosophy (1 course, 9 units)

80-100	Introduction to Philosophy	9

Area 1: Values and Normative Theory (1 course, 9 units)

80-130	Introduction to Ethics	9
80-234	Race, Gender, and Justice	9
80-135	Introduction to Political Philosophy	9
80-136	Social Structure, Public Policy & Ethics	9
80-244	Environmental Ethics	9
80-245	Medical Ethics	9
80-246	Moral Psychology	9
80-249	AI, Society, and Humanity	9
80-330	Ethical Theory	9
80-335	Social and Political Philosophy	9
80-336	Philosophy of Law	9
80-348	Health, Human Rights, and International Development	9
80-447	Global Justice	9

Area 2: Philosophy of Mind/Language/Metaphysics (1 course, 9 units)

80-180	Introduction to Linguistics	9
80-270	Problems of Mind and Body: Meaning and Doing	9
80-271	Mind and Body: The Objective and the Subjective	9
80-276	Philosophy of Religion	9
80-280	Linguistic Analysis	9
80-283	It Matters How You Say It	9
80-285	Natural Language Syntax	9
80-381	Meaning in Language	9
80-383	Language in Use	9

Area 3: Logic/Philosophy of Mathematics (1 course, 9 units)

80-210	Logic and Proofs	9
80-211	Logic and Mathematical Inquiry	9
80-212	Arguments and Logical Analysis	9
80-310	Formal Logic	9
80-311	Undecidability and Incompleteness	9
80-312	Mathematical Revolutions	9
80-315	Logics for Knowledge and Belief	9
80-411	Proof Theory	9
80-413	Category Theory	9
80-419	Interactive Theorem Proving	9
80-514	Categorical Logic	9

Area 4: Epistemology/Methodology (1 course, 9 units)

80-150	Nature of Reason	9
80-201	Knowledge and Justified Belief	9
80-208	Critical Thinking	9
80-220	Philosophy of Science	9
80-221	Philosophy of Social Science	9
80-226	The Nature of Scientific Revolutions	9
80-261	Experience, Reason, and Truth	9

80-305	Game Theory	9
80-306	Decision Theory	9
80-324	Philosophy of Economics	9
80-516	Causality and Machine Learning	9
80-521	Seminar on Formal Epistemology: Belief and Evidence	9
80-325	Foundations of Causation and Machine Learning	9

Area 5: History of Philosophy (1 course, 9 units)

80-150	Nature of Reason	9
80-226	The Nature of Scientific Revolutions	9
80-250	Ancient Philosophy	9
80-251	Modern Philosophy	9
80-252	Kant	9
80-253	Continental Philosophy	9
80-254	The History of Analytic Philosophy and Its Influence	9
80-255	Pragmatism: Clear Ideas for a Better Life	9
80-261	Experience, Reason, and Truth	9
80-350	Adam Smith	9
80-551	Seminar on History of Philosophy: Smith and Hume	9

Area 6: Electives (3 courses, 27 units)

Three other philosophy courses, or appropriate courses from other departments, with the permission of the concentration advisor.

Policy & Management **Concentration**

(87 units minimum)

The Policy & Management concentration prepares students for key decision-making and management roles in government, non-profit organizations and business. The concentration emphasizes analytical approaches to decision making, practical management skills and empirical techniques necessary for graduates to excel in the public and private sectors. The multidisciplinary curriculum merges frontier knowledge on the ideals of decision making, policy and data analysis, as well as the realities of individual behavior within various institutional settings that must be confronted if high-quality outcomes are to be attained.

The Policy & Management concentration provides an excellent combination of theoretical and practical skills for students who intend to seek managerial positions. Because of its strong analytic orientation, it is also an excellent concentration for those who intend to go on to professional school programs in law, business or public policy. It is also an appropriate choice for students pursuing graduate degrees in economics, political science or decision science.

Policy Core (2 courses, 18 units)

The Policy Core gives students applied economic training and policy analysis experience. Students will gain an analytical understanding of some of the biggest domestic and global economic policy challenges, and gain an appreciation of the economic analysis of complex decisions, as well as the trade-off between economic and political-based decision making.

73-102	Principles of Microeconomics	9
88-221	Markets, Democracy, and Public Policy	9

Management Core (3 courses, 30 units)

The Management Core focuses on real-world applications of decision making. Students will develop an understanding of effective negotiation strategies and tactics, and identify the barriers and the psychological factors that may prevent decision-makers from reaching wise agreements. The courses provide systematic methods for dealing with the complexities that make decisions difficult, ranging from incorporating issues of risk and uncertainty in decision making to dealing with choices that have mutually conflicting objectives. For example, a business or government agency may need to decide on a policy for mitigating the uncertain impacts of air pollution while simultaneously trying to minimize the costs of such a policy on manufacturing. A firm might want to consider the uncertain reductions in security dangers from alternative policies to protect against terrorism.

88-150	Managing Decisions	9
or 88-255	Strategic Decision Making	
88-223	Decision Analysis	12
88-235	Negotiation: Strategies and Behavioral Insights	9
or 88-234	Negotiation: International Focus	

Empirical Core (3 courses, 27 units)

The Empirical Core focuses on key methods for collecting and analyzing data that are needed to make informed decisions. Students learn to use interviews, surveys, experiments and econometric methods to enhance their ability to test existing, and design new policies. Students will create statistical models to address questions asked in conceptual, computational and data-driven investigations.

36-202	Methods for Statistics & Data Science	9
88-251	Empirical Research Methods	9
88-252	Causal Inference: from Data to Decisions	9
or 88-275	Bubbles: Data Science for Human Minds	

Senior Project (1 course, 12 units)

The required Senior Project course gives students hands-on experience in a policy-related area. Students work in multi-disciplinary teams to apply the research and analytical methods learned in their other courses to a real-world problem.

88-451/452	Policy Analysis Senior Project	12

Politics & Public Policy **Concentration**

(81 units minimum)

Rooted in the discipline of political science, the concentration in Politics and Public Policy investigates US public policy issues and matters of American politics and law while providing students hands-on and practical learning experiences. Students pursuing the Politics and Public Policy concentration must participate in the Carnegie Mellon University Washington Semester Program (CMU/WSP) (https://www.cmu.edu/ips/washington-dc-semester-program/) for one semester during their undergraduate years.

The CMU/WSP, sponsored by the Carnegie Mellon Institute for Strategy and Technology (CMIST), is a semester-long program in which students live, intern, and take CMU classes in Washington, DC. Students earn 48 units for the Carnegie Mellon University Washington Semester Program, interning about twenty-four hours per week in any sector or field of interest within Washington, DC, while taking classes on American politics, public policy, and law taught by Carnegie Mellon faculty.

From embassies to nongovernmental organizations, think tanks to advocacy organizations, government agencies to congressional offices, and consulting firms to media outlets, Washington, DC, is the center of US political, international, and public policy activities. Students in the program come into direct contact with policymakers, Congressmen, think tank leaders, and business leaders, and through hands-on experience learn about the most pressing policy issues of the day.

Through this experiential learning program, CMU/WSP participants develop professional and networking skills, explore how coursework connects to the real world, learn to give and receive constructive feedback in the workplace and classroom, and intentionally reflect on their learning and growth. Every CMU/WSP student is paired with a Washington, DC-based alumni mentor to share career advice and tips about life in DC. CMIST also sponsors events and policy-oriented opportunities in Washington for students participating in the program to further enrich their experience and enhance their understanding of how Washington functions as a hub of international and domestic policy decision making.

Foundational Course (1 course, 9 units)

Students must complete the following course:

84-104	Decision Processes in American Political Institutions	9

Economics or Data Science Course (1 course, 9 units)

Students must complete one of the following courses:

84-110	The Economics of Politics and Technology	9
or 73-102	Principles of Microeconomics	
or 73-103	Principles of Macroeconomics	
or 36-202	Methods for Statistics & Data Science	

CMU/WSP Seminars in Washington, DC (4 courses, 48 units)

Students must complete the following courses while participating in the CMU/WSP:

84-360	CMU/WSP: Internship Seminar	24
84-336	Implementing Public Policy: From Good Idea To Reality	12
or 84-339	Seminar in Public Policy Research	
84-332	Contemporary US Constitutional Law Issues	6
84-338	Analysis of US Presidential Powers	6

American Politics Courses in Pittsburgh (2 courses, 15 units minimum)

Students must complete two courses (15 units minimum) from the below list of electives taught in Pittsburgh.

84-120	Introduction to US Constitutional Law	9
84-250	Writing for Political Science and Policy	9
84-252	Briefing in the Policy World	6
84-280	Popcorn and Politics: American Foreign Policy at the Movies	12
84-304	Analysis of Current US National Security Priorities	6
84-309	American Political Divides and Great Debates	9
84-319	Civil-Military Relations	9
84-325	Contemporary American Foreign Policy	9
84-327	Who Really Runs America?: Subnational Governance and Policymaking	9
84-331	Technology, Law, and Democracy	6
84-333	Law of US Democracy	9
84-352	Representation and Voting Rights	9
84-355	Democracy's Data: Analytics and Insights into American Elections	9
84-358	Money, Connections, and Power: Interests and Influence in the US	9
84-362	Diplomacy and Statecraft	9
84-365	The Politics of Fake News and Misinformation	9
84-366	The 21st-Century Presidency: Expanding Powers, New Challenges	9
84-367	The Politics of Antisemitism	9
84-373	International Law	9
84-380	US Grand Strategy	9
84-393	The US Congress: Legislative Progress or Paralysis?	9

Professional Writing Concentration

(84 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 perquisite 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, 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" list.

Foundation Courses (5 courses, 39 units)

76-26x	Introductory Genre Writing Course (Nonfiction, Fiction, Poetry or Screenwriting)	9
76-271	Introduction to Professional and Technical Writing	9
76-300	Professional Seminar	3
76-373	Argument	9
76-390	Style	9

Rhetoric 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.

76-325	Intertextuality	9
76-384	Race, Nation, and the Enemy	9
76-388	Coding for Humanists	9
76-389	Rhetorical Grammar	9
76-395	Science Writing	9
76-415	Mediated Power and Propaganda	9
76-473	Rhetoric & the Construction of Race	9
76-476	Rhetoric of Science	9

Advanced Writing/Rhetoric Courses (3 courses, 27 units minimum)

Students with a concentration in Professional Writing complete three Advanced Writing/Rhetoric courses at the 300- or 400-level at a minimum of 27 units, as some courses are only six units, while others are variable units. Options for these courses include all of the Rhetoric/Language Studies courses listed above plus the writing-focused courses listed below. Additional courses that fulfill these requirements are advertised on a semester-by-semester basis. For help in choosing which of the possible options are most appropriate for various professional goals – journalism, writing for new media, editing and publishing, public relations/corporate communications, or science and technical writing – consult your English Department advisor. All students with a concentration in PW, regardless of their career focus, are encouraged to take 76-391 Document & Information Design and 76-487 Information Architecture & Content Strategy (formerly titled Web Design) to extend their skills in writing for print to include information design for digital media. Both courses focus on the role of the writer in these specializations and provide lab instruction in the relevant software and related computer skills.

Courses include but are not limited to:

76-301	Internship	Var.
76-302	Communication Support Tutoring Practicum	6
76-314	Data Stories	9
76-354	Watchdog Journalism	9
76-372	News Writing	9
76-380	Methods in Humanities Analytics	9
76-391	Document & Information Design	9
76-425	Rhetoric, Science, and the Public Sphere	9
76-464	Creative Nonfiction Workshop	9
76-474	Software Documentation	9
76-475	Law, Performance, and Identity	9
76-481	Introduction to Multimedia Design	12
76-483	Research Methods in Technical & Professional Communication	9
76-487	Information Architecture & Content Strategy (co-requisite with 76-488)	9
76-488	Information Architecture & Content Strategy Lab (co-requisite with 76-487)	3
76-492	Rhetoric of Public Policy	9
76-494	Healthcare Communications	9

English Elective (1 course, 9 units minimum)

Students with a concentration in Professional Writing complete one additional course from the English Department's offerings. This course should be one that focuses on the relationships between texts and their cultural and historical contexts. Courses in literature, cultural studies, rhetoric and media studies that meet this requirement are advertised on a semester-by-semester basis. The English Elective may be any course offered by the Department with the exception of 76-270 Writing for the

Professions, which is designed for non-majors and overlaps with 76-271 Introduction to Professional and Technical Writing.

Psychology Concentration

(81 units minimum)

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

Breadth Courses (4 courses, 36 units)

To gain familiarity with the breadth of the field of Psychology, students take 85-100 Introduction to Psychology and three survey courses.

Required Intro Course:

85-100	Introduction to Psychology	9

Survey Courses:

85-110	Cognitive Psychology	9
or 85-213	Human Information Processing and Artificial Intelligence	
85-130	Developmental Psychology	9
85-150	Social Psychology	9
85-151	Personality	9
85-170	Foundations of Brain and Behavior	9
85-190	Psychopathology	9

Research Methods and Statistics (3 courses, 27 units)

Students complete two courses in Research Methods (18 units) with 85-300 Introduction to Research Methods being required along with the corresponding survey course.

Required Intro Research Methods Course:

85-300	Introduction to Research Methods	9

One Advanced Research Methods Course:

85-303	Analytic Research Methods	9
85-310	Research Methods in Cognitive Psychology	9
85-330	Analytic Research Methods	9
85-350	Research Methods in Social Psychology	9
85-370	Cognitive Neuroscience Research Methods	9

Statistics Course:

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	9
or 85-309	Statistical Concepts and Methods for Behavioral and Social Science	

Advanced Courses (2 courses, 18 units)

Complete any two advanced courses in Psychology numbered 85-400 to 85-499.

Russian Studies Concentration

(93 units minimum)

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

There are no language prerequisites for the Russian major. Students with native or near-native proficiency in Russian or with prior study at the elementary or intermediate level may begin language study at a higher level, based on consultation with the concentration advisor and placement through CMU placement tests.

Core Courses in Russian Language (4 courses, 39 units minimum)

Complete at least four semesters of Russian language study. Students who take Intensive Elementary Russian and those who place into higher level courses will still need to complete four semesters of language study.

82-191	Elementary Russian I	12
82-292	Intermediate Russian II	12
82-291	Intermediate Russian I	12
82-292	Intermediate Russian II	12
82-194	Intensive Russian (I & II)	15

Core Courses in Languages, Cultures and Applied Linguistics (LCAL) (1 course, 9 units)

82-282	Interpreting Global Texts & Cultures	9

Foundational Courses in Russian Studies (3 course, 27 units)

82-294	19th Century Russian Masterpieces	Var.
82-295	20th Century Russian Masterpieces	Var.
79-269	Russian History: From Socialism to Capitalism *	9

** Other courses with a historical focus are available in the Department of History or LCAL. Please consult the concentration advisor for more options.*

Russian Studies Electives (2 courses, 18 units)

In consultation with the concentration advisor, choose two additional courses focusing on Russia, Eastern Europe, or Eurasia. Students may substitute one relevant and related course from outside the program (i.e., another LCAL course) or from another department (e.g., History, CMIST, Philosophy, English).

Social & Political History Concentration

(84 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, Historical Research Seminar, provides training and experience in conducting original research and in interpretive, analytical writing—skills that prepare graduates for professional careers as well as for graduate or law school.

Required History Courses (2 courses, 21 units)

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

79-200	Introduction to Historical Research & Writing - Sophomore or Junior year	9
79-420	Advanced Seminar in History	12

Required Survey Courses (2 courses, 18 units)

79-110	Introduction to the Medieval Mediterranean World	9
79-120	Introduction to African American History: Black Americans and the World	9
79-160	Introduction to the History of Science	9
79-170	Introduction to Science, Technology, and Society	9
79-202	Flesh and Spirit: Early Modern Europe, 1400-1750	9
79-203	The Other Europe: The Habsburgs, Communism, & Central/Eastern Europe, 1740-1990	9
79-204	American Environmental History	9
79-205	20th Century Europe	9
79-206	Crime and Punishment in Early Modern Europe	9
79-211	Modern Southeast Asia: Colonialism, Capitalism, and Cultural Exchange	9
79-212	Jim Crow America	9

79-223	Mexico: From the Aztec Empire to the Drug War	9
79-225	West African History in Film	9
79-226	African History: Earliest Times to 1780	9
79-227	Modern Africa: The Slave Trade to the End of Apartheid	9
79-229	The Origins of the Palestinian-Israeli Conflict, 1880-1948	9
79-230	The Arab-Israeli Conflict and Peace Process Through 1948 to Present	9
79-240	Development of American Culture	9
79-242	African American History: Reconstruction to the Present	9
79-245	Capitalism and Individualism in American Culture	9
79-248	U.S. Constitution & the Presidency	9
79-249	20th Century U.S. History	9
79-250	Voting Rights: An Introduction	9
79-260	Nazi Germany: A Practical History	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: Game of Thrones	9
79-266	Russian History and Revolutionary Socialism	9
79-269	Russian History: From Socialism to Capitalism	9
79-272	Coexistence and Conflict: Muslims, Christians and Jews in Spain and Portugal	9
79-288	Bananas, Baseball, and Borders: Latin America and the United States	9
79-320	Women, Politics, and Protest	9

Social & Political History Elective Courses (5 courses, 45 units minimum)

A minimum of 45 additional History units must be approved with the History advisor. Any History courses not fulfilling another major requirement may be chosen as an elective. Any History (79-xxx) class can count as an SPH elective except for 79-198, 79-200, 79-400, 79-420, 79-449, 79-491). See the History Department website (www.cmu.edu/dietrich/history (https://www.cmu.edu/dietrich/history/)) or contact the History advisor for the most current elective offerings.

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	9
76-239	Introduction to Film Studies	9
76-295	Russian Cinema: From the Bolshevik Revolution to Putin's Russia	9
80-135	Introduction to Political Philosophy	9
80-226	The Nature of Scientific Revolutions	9
80-335	Social and Political Philosophy	9
82-245	New Directions in Hispanic Studies	9
82-247	US Latinos Literature	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
84-322	Nonviolent Conflict and Revolution	9
84-324	The Future of Democracy	9
84-325	Contemporary American Foreign Policy	9
84-362	Diplomacy and Statecraft	9
84-380	US Grand Strategy	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
88-234	Negotiation: International Focus	9
88-281	Topics in Law: 1st Amendment	9
88-284	Topics of 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.

Prerequisites

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 (prerequisite: 21-090)	10
21-256	Multivariate Analysis	9
or 21-259	Calculus in Three Dimensions	
21-240	Matrix Algebra with Applications	10
or 21-241	Matrices and Linear Transformations	
or 21-242	Matrix Theory	
15-110	Principles of Computing	10
or 15-112	Fundamentals of Programming and Computer Science	

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 (6 courses, 54 units)

36-202	Methods for Statistics & Data Science	9
or 36-290	Introduction to Statistical Research Methodology	
or 36-309	Experimental Design for Behavioral & Social Sciences	
36-235	Probability and Statistical Inference I - (recommended)	9
or 36-225	Introduction to Probability Theory	
36-236	Probability and Statistical Inference II - (recommended)	9
or 36-226	Introduction to Statistical Inference	
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 concentration 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
36-313	Statistics of Inequality and Discrimination	9
36-315	Statistical Graphics and Visualization	9
36-318	Introduction to Causal Inference	9
36-46x–47x Special Topics (topics and offerings vary)		9
36-490	Undergraduate Research	9
36-493	Sports Analytics Capstone	9
36-497	Corporate Capstone Project	9

Statistics & Machine Learning Concentration

(87 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.

Prerequisites

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 (prerequisite: 21-090)	10
21-127	Concepts of Mathematics	12
21-256	Multivariate Analysis	9
or 21-259	Calculus in Three Dimensions	
21-240	Matrix Algebra with Applications	10

or 21-241	Matrices and Linear Transformations	
or 21-242	Matrix Theory	
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)

36-235	Probability and Statistical Inference I - (recommended)	9
or 36-225	Introduction to Probability Theory	
36-236	Probability and Statistical Inference II - (recommended)	9
or 36-226	Introduction to Statistical Inference	
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 Special Topics (numbered 36-46x–47x) and Statistics Electives listed below. Students will consult with the concentration 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
36-313	Statistics of Inequality and Discrimination	9
36-315	Statistical Graphics and Visualization	9
36-318	Introduction to Causal Inference	9
36-46x–47x Special Topics (topics and offerings vary)		9
36-490	Undergraduate Research	9
36-493	Sports Analytics Capstone	9
36-497	Corporate Capstone Project	9

Machine Learning Core (2 courses, 24 units)

15-122	Principles of Imperative Computation -(C or higher)	12
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 the concentration advisor about this.

02-510/710	Computational Genomics	12
05-317	Design of Artificial Intelligence Products	12
05-434/11-344	Machine Learning in Practice	12
10-335	Art and Machine Learning	12
10-403/703	Deep Reinforcement Learning & Control	12
10-405/605	Machine Learning with Large Datasets (Undergraduate)	12
10-414	Deep Learning Systems: Algorithms and Implementation	12
10-417	Intermediate Deep Learning	12
10-418/618	Machine Learning for Structured Data	12
10-422	Foundations of Learning, Game Theory, and Their Connections	12
10-423	Generative AI	12
10-613	Machine Learning Ethics and Society	12
10-707	Advanced Deep Learning	12
10-708	Probabilistic Graphical Models	12
11-324/624	Human Language for Artificial Intelligence	12
11-411	Natural Language Processing	12
11-441	Machine Learning with Graphs	9
11-485	Introduction to Deep Learning	9
11-661/761	Language and Statistics	12
15-386	Neural Computation	9
15-387	Computational Perception	9
15-482	Autonomous Agents	12
16-311	Introduction to Robotics	12
16-385/720	Computer Vision	12
17-445	Machine Learning in Production	12
85-419	Introduction to Parallel Distributed Processing	9

Technical Writing Concentration

(87 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 Technical Writing concentration take two Theory/Specialization courses specific to either the Technical Communication (TC) or the Scientific and Medical Communication (SMC) 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 (21-120's prerequisite: 21-090)	10
or 21-112	Integral Calculus	
or 21-120	Differential and Integral Calculus	
or 21-127	Concepts of Mathematics	
15-110	Principles of Computing (required for SMC-track students)	10
or 15-112	Fundamentals of Programming and Computer Science	

(required for TC-track students)

Technical Writing Core Courses (7 courses, 51 units)

76-26x	Introductory Genre Writing Course (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	9
76-487	Information Architecture & Content Strategy (co-requisite with 76-488)	9
76-488	Information Architecture & Content Strategy Lab (co-requisite with 76-487)	3

Theory/Specialization Courses (3 courses, 27 units minimum)

Complete three courses to deepen your area of specialty in Technical Communication or Scientific and Medical Communication. At least one course must be chosen from among those designated as Recommended Options.

Recommended Options:

76-314	Data Stories	9
76-327	Equity & Communication: Strategies for Institutional Change	9
76-380	Methods in Humanities Analytics	9
76-395	Science Writing	9
76-425	Rhetoric, Science, and the Public Sphere	9
76-474	Software Documentation	9
76-476	Rhetoric of Science	9
76-481	Introduction to Multimedia Design	12
76-494	Healthcare Communications	9

Additional Options i nclude but are not limited to the following:

76-301	Internship	Var.
76-302	Communication Support Tutoring Practicum	6
76-318	Communicating in the Global Marketplace	9
76-325	Intertextuality	9
76-354	Watchdog Journalism	9
76-372	News Writing	9
76-384	Race, Nation, and the Enemy	9

76-389	Rhetorical Grammar	9
76-391	Document & Information Design	9
76-475	Law, Performance, and Identity	9
76-487	Information Architecture & Content Strategy (co-requisite with 76-488)	9
76-488	Information Architecture & Content Strategy Lab (co-requisite with 76-487)	3
39-605	Engineering Design Projects	12

Electives (1 course, 9 units)

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

COLLEGE OF FINE ARTS CONCENTRATION

(number of courses vary, 108-144 units minimum)

BCSA students choose one of the following concentrations:

- Architecture (p. 30) (108 units)
- Art (p. 30) (144 units)
- Design (p. 30) (108 units)
- Drama (p. 31) (130 units)
- Music (p. 31) (108 units)

Architecture Concentration

(108 units minimum)

Architecture Required Courses (9 courses, 57 units minimum)

48-100	Architecture Design Studio: POIESIS STUDIO 1 - Fall, First-year or Sophomore year	10-15
or 48-095	Spatial Concepts for Non-Architecture Majors	
48-104	Shop Skills -Fall, First-year	2
48-119	Design Ethics & Social Justice in Architecture - Fall, First-year or Sophomore year	3
48-120	Digital Media I -Fall, First-year	6
48-121	Drawing I -Fall, First-year	6
48-125	Digital Media II -Spring, First-year	6
48-126	Drawing II -Spring, First-year	6
48-240	History of World Architecture, I -Spring, First-year	9
48-241	Modern Architecture: History & Theory -Fall, Sophomore year	9

Architecture Electives (51 units minimum)

A minimum of **51** additional Architecture units must be approved by the Architecture advisor. A list of these selected courses must be filed in the BXA office. 48-025 First Year Seminar: Architecture Edition (3 units) is recommended in fall of the first year.

Art Concentration

(144 units minimum)

First-Year Seminar (1 course, 6 units)

60-104	Foundations: Art First-Year Seminar	6

Foundation Studios (3 courses, 30 units)

Complete three courses:

60-110	Foundations: Time-Based Media	10
60-120	Foundations: Digital Media	10
60-131	Foundations: Sculpture	10
60-135	Foundations: Sculpture II	10
60-150	Foundations: Drawing	10
60-170	Foundations: Paint/Print	10

Intermediate Studios (3 courses, 30 units)

Complete three courses:

60-2xx	Intermediate Studio Elective	10
60-2xx	Intermediate Studio Elective	10
60-2xx	Intermediate Studio Elective	10

Advanced Studios (6 courses, 60 units)

Students may take courses in any media area (ETB, SIS, SP or DP3). They may take all courses in one media area if a focus is desired. With approval from the concentration advisor, BXA students can take an additional intermediate studio in lieu of an advanced studio to increase breadth.

Complete six courses:

60-402	Senior Studio	10
60-403	Advanced 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 Social Practice (SP) (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 the concentration advisor to determine course availability.*

Critical Studies (2 courses, 18 units)

60-107	Foundations: Critical Studies -Spring	9
60-3xx	Critical Studies Elective	9

Review Requirement (1 required review, 0 units)

Complete required review:

60-200	Sophomore Review -Spring (pass/no pass)	0

Design Concentration

(108 units minimum)

Note: BXA design only considers internal transfer applicants currently enrolled in Design.

Design Required Courses (16 courses, 98 units)

51-101	Studio: Survey of Design -Fall, First-year	10
51-121	Visualizing -Fall, First-year	10
51-175	Design Studies: Place -Fall, First-year (mini-1)	5
51-177	Design Studies: Histories -Fall, First-year (mini-2)	5
51-102	Design Lab -Spring, First-year	10
51-122	Collaborative Visualizing -Spring, First-year	10
51-176	Design Studies: Futures -Spring, First-year (mini-3)	5
51-178	Design Studies: Experience -Spring, First-year (mini-4)	5
51-277	Design Studies: Systems -Fall, Sophomore year (mini-1)	5
51-279	Design Studies: Cultures -Fall, Sophomore year (mini-2)	5
51-282	Design Studies: Persuasion -Spring, Sophomore year (mini-3)	5
51-284	Design Studies: Power -Spring, Sophomore year (mini-4)	5
Choose One Studio -Fall, Sophomore year:		9
51-201	Communications Studio I: Understanding Form & Context	9
or 51-211	Products Studio I: Understanding Form & Context	
or 51-265	Environments Studio I: Understanding Form & Context	
Choose One Corresponding Lab -Fall, Sophomore year:		9
51-203	Prototyping Lab I: Communications	9
or 51-247	Prototyping Lab I: Products	
or 51-267	Prototyping Lab I: Environments	

Design Electives (10 units)

A minimum of **10** 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

(130 units minimum)

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

Note: BXA design only considers internal transfer applicants currently enrolled in Drama design. BXA dramaturgy only considers internal transfer applicants in the fall semester for spring enrollment, unless currently enrolled in Drama dramaturgy. BXA PTM only considers internal transfer applicants currently enrolled in Drama PTM.

Design/PTM Required Courses (10 courses, 79 units)

54-169	Studiocraft 1 -Fall, First-year	13
54-151	Stagecraft -Fall, First-year	10
54-159	Production Practicum -Fall, First-year	6
54-171	Basic Design 1 -Fall, First-year	6
54-170	Studiocraft 2 -Spring, First-year	8
54-152	Stagecraft -Spring, First-year	12
54-158	Production Planning -Spring, First-year	6
54-177	Foundations of Drama I -Spring, First-year or later if needed	6
54-281	Foundations of Drama II	6
54-381	Special Topics in Drama	6

Design/PTM Electives (51 units minimum)

A minimum of **51** additional Design/PTM units taken in the sophomore year or later must be approved by the Design/PTM faculty area chair. A list of these selected courses must be filed in the BXA office.

Dramaturgy Required Courses (13 courses, 80 units)

54-177	Foundations of Drama I -Fall, First-year	6
54-109	Dramaturgy 1: Approaches to Text -Fall, First-year	9
54-284	Fundamentals of Directing -Fall, First-year	6
54-200	Dramaturgy Forum -Fall, First-year	1
54-159	Production Practicum -Fall or Spring, First-year	6
54-281	Foundations of Drama II -Spring, First-year	6
54-184	Dramaturgy 2: Introduction to Production Dramaturgy -Spring, First-year	9
54-200	Dramaturgy Forum -Spring, First-year	1
54-117	Design Collaboration Project -Spring, First-year	3
54-241	Dramaturgy 3: Dramaturgy in Translation -Fall, Sophomore year	9
54-256	Dramaturgy 4: New Play Dramaturgy -Spring, Sophomore year	9
54-247	Dramaturgy 5: In Company-Fall, Juniojr year	9
54-381	Special Topics in Drama	6

Dramaturgy Electives (50 units minimum)

A minimum of **50** additional Dramaturgy units taken in the sophomore year or later must be approved by the Dramaturgy faculty area chair. 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) Audio Recording & Production, 2) Composition, 2) Music Performance (instrumental, organ, piano, voice), 4) Sound Theory & Practice

Note: BXA music performance only considers internal transfer applicants in the spring semester for fall enrollment, unless currently enrolled in Music performance.

Audio Recording & Production Required Courses (8 courses, 49 units)

57-152	Harmony I	9
or 57-149	Basic Harmony I	
57-101	Introduction to Music Technology	6
57-181	Solfege I	3
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
57-337	Sound Recording	6
57-338	Sound Editing and Mastering	6
57-438	Multitrack Recording	9

Audio Recording & Production Electives (59 units minimum)

Choose **59** units from:

57-153	Harmony II	9
or 57-150	Basic Harmony II	
57-182	Solfege II	3
or 57-186	Advanced Solfege II	
10-301	Introduction to Machine Learning	12
15-104	Introduction to Computing for Creative Practice	10
15-213	Introduction to Computer Systems	12
15-322	Introduction to Computer Music	9
33-114	Physics of Musical Sound	9
54-166	Introduction to Sound Design for Theatre	6
54-666	Production Audio (section B)	4
57-161	Eurhythmics I	3
57-162	Eurhythmics II	3
57-344	Experimental Sound Synthesis	9
57-347	Electronic and Computer Music	6
57-358	Introduction to Electronic Music (with instructor permission as space allows)	9
57-421	Exploded Ensemble	6
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	Foundations: Sculpture	10
85-415	Auditory Perception: Sense of Sound	9

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

Composition Required Courses (13 courses, 85 units)

57-152	Harmony I	9
or 57-149	Basic Harmony I	
57-161	Eurhythmics I (recommended co-requisite: 57-181)	3
57-181	Solfege I	3
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

Composition Electives (23 units minimum)

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 Required Courses (13 courses, 85 units)

57-152	Harmony I	9
or 57-149	Basic Harmony I	
57-161	Eurhythmics I (recommended co-requisite: 57-181)	3
57-181	Solfege I	3
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

Music Performance Electives (23 units minimum)

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.

Sound Theory & Practice Required Courses (7 courses, 44 units)

57-152	Harmony I	9
or 57-149	Basic Harmony I	
57-101	Introduction to Music Technology	6
57-181	Solfege I	3
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
57-421	Exploded Ensemble	6

Sound Theory & Practice Electives (64 units minimum)

Choose **64** units from:

57-153	Harmony II	9
or 57-150	Basic Harmony II	
57-182	Solfege II	3
or 57-186	Advanced Solfege II	
15-104	Introduction to Computing for Creative Practice	10
15-322	Introduction to Computer Music (prerequisite: 15-112)	9
33-114	Physics of Musical Sound	9
57-161	Eurhythmics I	3
57-162	Eurhythmics II	3
57-337	Sound Recording	6
57-338	Sound Editing and Mastering	6
57-344	Experimental Sound Synthesis	9
57-347	Electronic and Computer Music (prerequisite: 57-101 or 57-171)	6
57-358	Introduction to Electronic Music (with instructor permission as space allows)	9
57-438	Multitrack Recording	9
57-478	Survey of Historical Recording	6
57-616	Independent Study in Sound Studies	9

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 1-7 courses, 1-63 units)

Take any Carnegie Mellon course. Many BHA students use their electives to broaden or deepen their concentrations. A maximum of 9 units of physical education and/or military science may be counted toward this requirement.

Bachelor of Science and Arts Degree Program

The Bachelor of Science and Arts (BSA) intercollege degree program combines the strengths of the College of Fine Arts (CFA) and the Mellon College of Science (MCS). This degree is designed for students who are gifted in both the fine arts and the natural sciences or mathematics, and who have the interest and the exceptional ability to pursue both disciplines simultaneously. Students choose their arts concentration from the following schools in CFA: Architecture (p. 36), Art (p. 36), Design (p. 36), Drama (p. 36) or Music (p. 37). Students choose their science concentration from among the departments in MCS: Biological Sciences (p. 34), Chemistry (p. 34), Environmental & Sustainability Studies (p. 34), Mathematical Sciences (p. 35), Neurobiology (p. 35) or Physics (p. 35).

The BSA curriculum has three main components: general education requirements (p. 32), fine arts concentration requirements (p. 35) and natural sciences/mathematics concentration requirements (p. 34). Each student's course of study is structured so they can complete this rigorous program in four years.

Students receive extensive advising support. The academic advisors in the BXA Intercollege Degree Programs are the primary advisors and liaisons between CFA and MCS. Each student has two additional academic advisors: an advisor in the admitting school of CFA to guide their focus in the arts and an advisor in MCS to guide their focus in the sciences.

BSA Curriculum

	Units
I. BSA General Education	**129**
II. MCS Concentration	**114-145**
III. CFA Concentration	**108-144**
IV. Free Electives	**0-29**
Total BSA Degree Requirements	**380**

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 33-121 or 33-141 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, 52-190, 52-291, 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 (prerequisite: 21-090)	10
21-122	Integration and Approximation	10
or 21-124	Calculus II for Biologists and Chemists	

Science (3 courses, 31 units)

03-121	Modern Biology	9
09-105	Introduction to Modern Chemistry I	10
33-121	Physics I for Science Students	12
or 33-141	Physics I for Engineering Students	
or 33-151	Matter and Interactions I	

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 -First-year	9
or 76-102	Advanced First Year Writing: Special Topics	

or 76-106 & 76-107 & 76-108	Writing about Literature, Art and Culture and Writing about Data 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		
99-101	Core@CMU -Fall, First-year (section B; pass/no pass)	3

ENGAGE (3 courses, 3 units)

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

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

Cultural/Global Understanding (1 course, 9 units)

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

09-227	The Culture of Color: Dyes, Chemistry, and Sustainability	9
57-173	Survey of Western Music History	9
57-306	World Music	9
70-100	Global Business	9
70-342	Managing Across Cultures	9
76-221	Books You Should Have Read By Now	9
76-239	Introduction to Film Studies	9
76-241	Introduction to Gender Studies	9
76-386	Language & Culture	9
79-112	Introduction to Asian American History	9
79-145	Genocide and Weapons of Mass Destruction	9
79-160	Introduction to the History of Science	9
79-170	Introduction to Science, Technology, and Society	9
79-175	Moneyball Nation: Data in American Life	9
79-189	Democracy and History: Thinking Beyond the Self	9
79-201	Introduction to Anthropology	9
79-202	Flesh and Spirit: Early Modern Europe, 1400-1750	9
79-203	The Other Europe: The Habsburgs, Communism, & Central/Eastern Europe, 1740-1990	9
79-205	20th Century Europe	9
79-208	Witchcraft and Witch-Hunting	9
79-211	Modern Southeast Asia: Colonialism, Capitalism, and Cultural Exchange	9
79-220	Screening Mexico: Mexican Cinema, 1898 to Present	9
79-223	Mexico: From the Aztec Empire to the Drug War	9
79-227	Modern Africa: The Slave Trade to the End of Apartheid	9
79-229	The Origins of the Palestinian-Israeli Conflict, 1880-1948	9
79-230	The Arab-Israeli Conflict and Peace Process Through 1948 to Present	9
79-232	Arabian Peninsula Environmental History	9
79-234	Technology and Society	9
79-237	Comparative Slavery	9
79-240	Development of American Culture	9
79-242	African American History: Reconstruction to the Present	9
79-245	Capitalism and Individualism in American Culture	9
79-257	Germany and the Second World War	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: Game of Thrones	9
79-266	Russian History and Revolutionary Socialism	9
79-267	The Soviet Union in World War II: Military, Political, and Social History	9
79-268	World War I: The Twentieth Century's First Catastrophe	9
79-275	Introduction to Global Studies	9
79-278	How (Not) to Change the World	9
79-280	Coffee and Capitalism	9
79-281	Introduction to Religion	9
79-283	Hungry World: Food and Famine in Global Perspective	9
79-343	Education, Democracy, and Civil Rights	9
79-345	Roots of Rock & Roll	9
79-346	U.S. Political Films and Satire	9
79-350	Early Christianity	9
79-377	Food, Culture, and Power: A History of Eating	9
80-100	Introduction to Philosophy	9
80-101	Dangerous Ideas in Science and Society	9
80-130	Introduction to Ethics	9
80-180	Introduction to Linguistics	9
80-246	Moral Psychology	9
80-250	Ancient Philosophy	9
80-251	Modern Philosophy	9
80-252	Kant	9
80-253	Continental Philosophy	9
80-254	The History of Analytic Philosophy and Its Influence	9
80-255	Pragmatism: Clear Ideas for a Better Life	9
80-271	Mind and Body: The Objective and the Subjective	9
80-276	Philosophy of Religion	9
82-xxx	Any course from Languages, Cultures, and Applied Linguistics	
84-226	International Relations	9
84-275	Comparative Politics	9
84-306	Latin American Politics	9
84-319	Civil-Military Relations	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	9
84-325	Contemporary American Foreign Policy	9
84-328	Military Strategy and Doctrine	9
84-362	Diplomacy and Statecraft	9
84-365	The Politics of Fake News and Misinformation	9
84-370	Nuclear Security & Arms Control	9
84-372	Space and National Security	9
84-373	International Law	9
84-380	US Grand Strategy	9
84-387	Remote Systems and the Cyber Domain in Conflict	9
84-389	Terrorism and Insurgency	9
84-390	Social Media, Technology, and Conflict	9
84-405	The Future of Warfare	9
85-350	Research Methods in Social Psychology	9
85-352	Evolutionary Psychology	9
88-221	Markets, Democracy, and Public Policy	9
88-234	Negotiation: International Focus	9

Humanities and Social Sciences (2 courses, 18 units)

To fulfill this requirement, students must complete a minimum of two (2) nontechnical courses totaling at least 18 units in the Tepper School of Business and/or the Dietrich College of Humanities and Social Sciences.

Courses counted toward the Cultural/Global Understanding requirement, and 76-101, do not count toward this requirement.

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

BXA Required Courses (5 courses, 36 units)

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 - Spring, First-year (mini-3)	4.5
52-291	BXA Seminar II: Transferring Knowledge -Spring, Sophomore year (mini-4)	4.5
52-392	BXA Seminar III: Deconstructing Disciplines - Spring, Junior year	9
52-401	BXA Seminar IV: Capstone Project Research -Fall, Senior year	9
52-402	BXA Seminar V: Capstone Project Production - Spring, Senior year	9

Mellon College of Science Concentration

(number of courses vary, 114-145 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 spring mid-semester break of the student's first year.

- Biological Sciences (p. 34) (114 units)
- Chemistry (p. 34) (118 units)
- Environmental & Sustainability Studies (p. 34) (123 units)
- Mathematical Sciences (p. 35) (124 units)
- Neurobiology (p. 35) (114 units)
- Physics (p. 35) (145 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 MCS concentration at any time following the initial declaration must meet with the advisor of their intended concentration area to complete a new Declaration form.

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 - Fall, Sophomore year	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	9
or 03-344	Experimental Biochemistry	
or 03-345	Experimental Cell and Developmental Biology	
or 03-346	Experimental Neuroscience	
09-217	Organic Chemistry I	9
09-218	Organic Chemistry II	9
33-122	Physics II for Biological Sciences & 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 and 03-545.

Chemistry Concentration

(118 units minimum)

Chemistry Required Courses (13 courses, 100 units)

09-106	Modern Chemistry II	10
09-219	Modern Organic Chemistry	10
09-220	Modern Organic Chemistry II	10
09-331	Modern Analytical Instrumentation	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	
09-201 & 09-202 & 09-301	Undergraduate Seminar I and Undergraduate Seminar II: Safety and Environmental Issues for Chemists and Undergraduate Seminar III	3
09-402	Undergraduate Seminar VI	3
33-122	Physics II for Biological Sciences & Chemistry Students	9

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

Advanced Chemistry Electives (2 courses, 18 units)

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

Environmental & Sustainability Studies Concentration

(123 units minimum)

Additional Required Courses (2 courses, 18 units minimum)

09-217	Organic Chemistry I	9
33-122	Physics II for Biological Sciences & Chemistry Students	9
or 33-142	Physics II for Engineering and Physics Students	

Core Courses (3 courses, 30 units)

24/09-381	Environmental Systems on a Changing Planet - Spring	12
66-236	Introduction to Environmental Ideas	9
66-506	Senior Capstone -Fall (Interdisciplinary Research: Capstone in ESS)	9

Earth and Environmental Science (1 course, 9 units)

Choose one course from the list below.

03-128	Biology for Life Special Topics (Section S, Tropical Ecology)	9
03-140	Ecology and Environmental Science	9
09-225	Climate Change: Chemistry, Physics and Planetary Science *	9
09-510	Chemistry and Sustainability *	9
09-524	Environmental Chemistry *	9
09-529	Introduction to Sustainable Energy Science *	9
09-538	Exposure and Risk Assessment for Environmental Pollutants *	9
33-226	Physics of Energy *	9

** Prerequisites from the BSA general education curriculum*

Global Course (1 course, 3 units)

99-xxx	Each semester, a new course is offered on Global themes, in partnership with University of Pittsburgh's Global Studies Center.	3

Statistics and Data Science (1 course, 9 units)

36-xxx	Any Statistics Course	9

Political Economy (1 course, 9 units minimum)

Choose one course from the list below.

19-101	Introduction to Engineering and Public Policy	12
79-300	Controversial Topics in the History of American Public Policy *	9
84-110	The Economics of Politics and Technology	9
84-226	International Relations	9
84-325	Contemporary American Foreign Policy	9
88-344	Systems Analysis: Environmental Policy	9

Electives (5 courses, 45 units minimum)

Choose three MCS Electives and two DC Electives in consultation with the concentration advisor.

MCS Electives:

03-140	Ecology and Environmental Science	9
09-225	Climate Change: Chemistry, Physics and Planetary Science	9
09-510	Chemistry and Sustainability	9
09-524	Environmental Chemistry *	9
09-529	Introduction to Sustainable Energy Science	9
12-100	Exploring CEE: Infrastructure and Environment in a Changing World	12
12-201	Geology	9
19-101	Introduction to Engineering and Public Policy	12
24-292	Renewable Energy Engineering	9
27-505	Exploration of Everyday Materials	9
33-226	Physics of Energy	9

DC Electives:

76-241	Introduction to Gender Studies	9
76-354	Watchdog Journalism	9
76-395	Science Writing *	9
76-450	Law, Culture, and the Humanities	9
79-201	Introduction to Anthropology	9
79-275	Introduction to Global Studies	9
79-278	How (Not) to Change the World	9
79-288	Bananas, Baseball, and Borders: Latin America and the United States	9
79-297	Technology and Work	9
79-331	Body Politics: Women and Health in America	9
79-377	Food, Culture, and Power: A History of Eating	9
79-379	Experimental Ethnography	9
79-383	The History of Capitalism	9
80-135	Introduction to Political Philosophy	9
80-244	Environmental Ethics	9
84-110	The Economics of Politics and Technology	9
84-275	Comparative Politics	9
84-325	Contemporary American Foreign Policy	9

* *Additional prerequisites*

Mathematical Sciences Concentration

(124 units minimum)

Mathematical Sciences Required Courses (6 courses, 61 units minimum)

15-110	Principles of Computing	10
21-127	Concepts of Mathematics	12
or 21-128	Mathematical Concepts and Proofs	
21-228	Discrete Mathematics	9
21-241	Matrices and Linear Transformations	11
or 21-242	Matrix Theory	
21-259	Calculus in Three Dimensions	10
or 21-268	Multidimensional Calculus	
21-260	Differential Equations	9
or 21-261	Introduction to Ordinary Differential Equations	
or 33-231	Physical Analysis	

Mathematical Sciences Electives (4 courses, 36 units)

May be courses at the 21-300 level or above, or 21-270 or 21-292. Students with a Music concentration should take 21-469 Computational Introduction to Partial Differential Equations.

Mathematical Sciences, Computer Science, or Statistics Electives (3 courses, 27 units)

May be mathematical sciences courses at the 21-300 level or above, or 21-270 or 21-292; computer science courses at the 15-200 level or above; or statistics courses at the 36-300 level or above that have at least 36-225 as a prerequisite.

Neurobiology Concentration

(114 units minimum)

Neurobiology Required Courses (12 courses, 96 units)

03-161	Molecules to Mind	9
or 85-170	Foundations of Brain and Behavior	
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 & Chemistry Students	9
85-110	Cognitive Psychology	9

Neurobiology Electives (2 courses, 18 units)

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

Physics Concentration (145 units minimum)

Physics Required Courses (16 courses, 127 units)

21-259	Calculus in Three Dimensions	10
33-104	Experimental Physics	9
33-142	Physics II for Engineering and Physics Students	12
or 33-152	Matter and Interactions II	
33-201	Physics Sophomore Colloquium I -Fall	2
33-202	Physics Sophomore Colloquium II -Spring	2
33-211	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

Qualifying Physics Electives (2 courses, 18 units)

Two 33-xxx qualifying physics elective courses (http://coursecatalog.web.cmu.edu/schools-colleges/melloncollegeofscience/departmentofphysics/#physicselectivestextcontainer) pre-approved by the Physics Department. 33-114 Physics of Musical Sound is highly recommended for students with a Music concentration.

COLLEGE OF FINE ARTS CONCENTRATION

(number of courses vary, 108-144 units minimum)

BCSA students choose one of the following concentrations:

- Architecture (p. 36) (108 units)
- Art (p. 36) (144 units)
- Design (p. 36) (108 units)

- Drama (p. 36) (130 units)
- Music (p. 37) (108 units)

Architecture Concentration

(108 units minimum)

Architecture Required Courses (9 courses, 57 units minimum)

48-100	Architecture Design Studio: POIESIS STUDIO 1 -Fall, First-year or Sophomore year	10-15
or 48-095	Spatial Concepts for Non-Architecture Majors	
48-104	Shop Skills -Fall, First-year	2
48-119	Design Ethics & Social Justice in Architecture -Fall, First-year or Sophomore year	3
48-120	Digital Media I -Fall, First-year	6
48-121	Drawing I -Fall, First-year	6
48-125	Digital Media II -Spring, First-year	6
48-126	Drawing II -Spring, First-year	6
48-240	History of World Architecture, I -Spring, First-year	9
48-241	Modern Architecture: History & Theory -Fall, Sophomore year	9

Architecture Electives (51 units minimum)

A minimum of **51** additional Architecture units must be approved by the Architecture advisor. A list of these selected courses must be filed in the BXA office. 48-025 First Year Seminar: Architecture Edition (3 units) is recommended in fall of the first year.

Art Concentration

(144 units minimum)

First-Year Seminar (1 course, 6 units)

60-104	Foundations: Art First-Year Seminar	6

Foundation Studios (3 courses, 30 units)

Complete three courses:

60-110	Foundations: Time-Based Media	10
60-120	Foundations: Digital Media	10
60-131	Foundations: Sculpture	10
60-135	Foundations: Sculpture II	10
60-150	Foundations: Drawing	10
60-170	Foundations: Paint/Print	10

Intermediate Studios (3 courses, 30 units)

Complete three courses:

60-2xx	Intermediate Studio Elective	10
60-2xx	Intermediate Studio Elective	10
60-2xx	Intermediate Studio Elective	10

Advanced Studios (6 courses, 60 units)

Students may take courses in any media area (ETB, SIS, SP or DP3). They may take all courses in one media area if a focus is desired. With approval from the concentration advisor, BXA students can take an additional intermediate studio in lieu of an advanced studio to increase breadth.

Complete six courses:

60-402	Senior Studio	10
60-403	Advanced 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 Social Practice (SP) (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 the concentration advisor to determine course availability.*

Critical Studies (2 courses, 18 units)

60-107	Foundations: Critical Studies -Spring	9
60-3xx	Critical Studies Elective	9

Review Requirement (1 required review, 0 units)

Complete required review:

60-200	Sophomore Review -Spring (pass/no pass)	0

Design Concentration

(108 units minimum)

Note: BXA design only considers internal transfer applicants currently enrolled in Design.

Design Required Courses (16 courses, 98 units)

51-101	Studio: Survey of Design -Fall, First-year	10
51-121	Visualizing -Fall, First-year	10
51-175	Design Studies: Place -Fall, First-year (mini-1)	5
51-177	Design Studies: Histories -Fall, First-year (mini-2)	5
51-102	Design Lab -Spring, First-year	10
51-122	Collaborative Visualizing -Spring, First-year	10
51-176	Design Studies: Futures -Spring, First-year (mini-3)	5
51-178	Design Studies: Experience -Spring, First-year (mini-4)	5
51-277	Design Studies: Systems -Fall, Sophomore year (mini-1)	5
51-279	Design Studies: Cultures -Fall, Sophomore year (mini-2)	5
51-282	Design Studies: Persuasion -Spring, Sophomore year (mini-3)	5
51-284	Design Studies: Power -Spring, Sophomore year (mini-4)	5
Choose One Studio -Fall, Sophomore year:		9
51-201	Communications Studio I: Understanding Form & Context	9
or 51-211	Products Studio I: Understanding Form & Context	
or 51-265	Environments Studio I: Understanding Form & Context	
Choose One Corresponding Lab -Fall, Sophomore year:		9
51-203	Prototyping Lab I: Communications	9
or 51-247	Prototyping Lab I: Products	
or 51-267	Prototyping Lab I: Environments	

Design Electives (10 units)

A minimum of **10** 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

(130 units minimum)

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

Note: BXA design only considers internal transfer applicants currently enrolled in Drama design. BXA dramaturgy only considers internal transfer applicants in the fall semester for spring enrollment, unless currently enrolled in Drama dramaturgy. BXA PTM only considers internal transfer applicants currently enrolled in Drama PTM.

Design/PTM Required Courses (10 courses, 79 units)

54-169	Studiocraft 1 -Fall, First-year	13
54-151	Stagecraft -Fall, First-year	10
54-159	Production Practicum -Fall, First-year	6
54-171	Basic Design 1 -Fall, First-year	6
54-170	Studiocraft 2 -Spring, First-year	8
54-152	Stagecraft -Spring, First-year	12
54-158	Production Planning -Spring, First-year	6
54-177	Foundations of Drama I -Spring, First-year or later if needed	6
54-281	Foundations of Drama II	6
54-381	Special Topics in Drama	6

Design/PTM Electives (51 units minimum)

A minimum of **51** additional Design/PTM units taken in the sophomore year or later must be approved by the Design/PTM faculty area chair. A list of these selected courses must be filed in the BXA office.

Dramaturgy Required Courses (13 courses, 80 units)

54-177	Foundations of Drama I -Fall, First-year	6
54-109	Dramaturgy 1: Approaches to Text -Fall, First-year	9
54-284	Fundamentals of Directing -Fall, First-year	6
54-200	Dramaturgy Forum -Fall, First-year	1
54-159	Production Practicum -Fall or Spring, First-year	6
54-281	Foundations of Drama II -Spring, First-year	6
54-184	Dramaturgy 2: Introduction to Production Dramaturgy -Spring, First-year	9
54-200	Dramaturgy Forum -Spring, First-year	1
54-117	Design Collaboration Project -Spring, First-year	3
54-241	Dramaturgy 3: Dramaturgy in Translation -Fall, Sophomore year	9
54-256	Dramaturgy 4: New Play Dramaturgy -Spring, Sophomore year	9
54-247	Dramaturgy 5: In Company-Fall, Juniojr year	9
54-381	Special Topics in Drama	6

Dramaturgy Electives (50 units minimum)

A minimum of **50** additional Dramaturgy units taken in the sophomore year or later must be approved by the Dramaturgy faculty area chair. 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) Audio Recording & Production, 2) Composition, 2) Music Performance (instrumental, organ, piano, voice), 4) Sound Theory & Practice

Note: BXA music performance only considers internal transfer applicants in the spring semester for fall enrollment, unless currently enrolled in Music performance.

Audio Recording & Production Required Courses (8 courses, 49 units)

57-152	Harmony I	9
or 57-149	Basic Harmony I	
57-101	Introduction to Music Technology	6
57-181	Solfege I	3
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
57-337	Sound Recording	6
57-338	Sound Editing and Mastering	6
57-438	Multitrack Recording	9

Audio Recording & Production Electives (59 units minimum)

Choose **59** units from:

57-153	Harmony II	9
or 57-150	Basic Harmony II	
57-182	Solfege II	3
or 57-186	Advanced Solfege II	
10-301	Introduction to Machine Learning	12
15-104	Introduction to Computing for Creative Practice	10
15-213	Introduction to Computer Systems	12
15-322	Introduction to Computer Music	9
33-114	Physics of Musical Sound	9
54-166	Introduction to Sound Design for Theatre	6
54-666	Production Audio (section B)	4
57-161	Eurhythmics I	3
57-162	Eurhythmics II	3
57-344	Experimental Sound Synthesis	9
57-347	Electronic and Computer Music	6
57-358	Introduction to Electronic Music	9
	(with instructor permission as space allows)	
57-421	Exploded Ensemble	6
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	Foundations: Sculpture	10
85-415	Auditory Perception: Sense of Sound	9

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

Composition Required Courses (13 courses, 85 units)

57-152	Harmony I	9
or 57-149	Basic Harmony I	
57-161	Eurhythmics I (recommended co-requisite: 57-181)	3
57-181	Solfege I	3
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

Composition Electives (23 units minimum)

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 Required Courses (13 courses, 85 units)

57-152	Harmony I	9
or 57-149	Basic Harmony I	
57-161	Eurhythmics I (recommended co-requisite: 57-181)	3
57-181	Solfege I	3
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

Music Performance Electives (23 units minimum)

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.

Sound Theory & Practice Required Courses (7 courses, 44 units)

57-152	Harmony I	9
or 57-149	Basic Harmony I	
57-101	Introduction to Music Technology	6
57-181	Solfege I	3
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
57-421	Exploded Ensemble	6

Sound Theory & Practice Electives (64 units minimum)

Choose **64** units from:

57-153	Harmony II	9
or 57-150	Basic Harmony II	
57-182	Solfege II	3
or 57-186	Advanced Solfege II	
15-104	Introduction to Computing for Creative Practice	10
15-322	Introduction to Computer Music (prerequisite: 15-112)	9
33-114	Physics of Musical Sound	9
57-161	Eurhythmics I	3
57-162	Eurhythmics II	3

57-337	Sound Recording	6
57-338	Sound Editing and Mastering	6
57-344	Experimental Sound Synthesis	9
57-347	Electronic and Computer Music (prerequisite: 57-101 or 57-171)	6
57-358	Introduction to Electronic Music (with instructor permission as space allows)	9
57-438	Multitrack Recording	9
57-478	Survey of Historical Recording	6
57-616	Independent Study in Sound Studies	9

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 0-3 courses, 0-29 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

The Engineering and Arts (EA) additional major combines the strengths of the College of Fine Arts (CFA) and the College of Engineering (ENG). This additional major provides students with formal practice and training in the creative arts that is more robust than a minor, as well as the foundation of interdisciplinary research to accomplish the integration of their interests. Students who currently have a primary major in engineering, choose their arts concentration from the following schools in CFA: Architecture (p. 38), Art (p. 38), Drama (p. 39) or Music (p. 39).

The EA curriculum has two main components: BXA requirements (p. 38) and fine arts concentration requirements (p. 38). Each student's course of study is structured so it can be completed alongside their primary engineering major.

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

	Units
I. BXA Requirements	**36**
II. CFA Concentration	**108-144**
Total EA Additional Major Requirements	**144-180**

BXA Requirements

BXA Required Courses (5 courses, 36 units)

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 - Spring, First-year (mini-3)	4.5
52-291	BXA Seminar II: Transferring Knowledge -Spring, Sophomore year (mini-4)	4.5
52-392	BXA Seminar III: Deconstructing Disciplines - Spring, Junior year	9
52-401	BXA Seminar IV: Capstone Project Research -Fall, Senior year	9
52-402	BXA Seminar V: Capstone Project Production - Spring, Senior year	9

COLLEGE OF FINE ARTS CONCENTRATION

(number of courses vary, 108-144 units minimum)

EA students choose one of the following concentrations:

- Architecture (p. 38) (108 units)
- Art (p. 38) (144 units)
- Drama (p. 39) (130 units)
- Music (p. 39) (108 units)

Architecture Concentration

(108 units minimum)

Architecture Required Courses (9 courses, 57 units minimum)

48-100	Architecture Design Studio: POIESIS STUDIO 1 - Fall, First-year or Sophomore year	10-15
or 48-095	Spatial Concepts for Non-Architecture Majors	
48-104	Shop Skills -Fall, First-year	2
48-119	Design Ethics & Social Justice in Architecture - Fall, First-year or Sophomore year	3
48-120	Digital Media I -Fall, First-year	6
48-121	Drawing I -Fall, First-year	6
48-125	Digital Media II -Spring, First-year	6
48-126	Drawing II -Spring, First-year	6
48-240	History of World Architecture, I -Spring, First-year	9
48-241	Modern Architecture: History & Theory -Fall, Sophomore year	9

Architecture Electives (51 units minimum)

A minimum of **51** additional Architecture units must be approved by the Architecture advisor. A list of these selected courses must be filed in the BXA office. 48-025 First Year Seminar: Architecture Edition (3 units) is recommended in fall of the first year.

Art Concentration

(144 units minimum)

First-Year Seminar (1 course, 6 units)

60-104	Foundations: Art First-Year Seminar	6

Foundation Studios (3 courses, 30 units)

Complete three courses:

60-110	Foundations: Time-Based Media	10
60-120	Foundations: Digital Media	10
60-131	Foundations: Sculpture	10
60-135	Foundations: Sculpture II	10
60-150	Foundations: Drawing	10
60-170	Foundations: Paint/Print	10

Intermediate Studios (3 courses, 30 units)

Complete three courses:

60-2xx	Intermediate Studio Elective	10
60-2xx	Intermediate Studio Elective	10
60-2xx	Intermediate Studio Elective	10

Advanced Studios (6 courses, 60 units)

Students may take courses in any media area (ETB, SIS, SP or DP3). They may take all courses in one media area if a focus is desired. With approval from the concentration advisor, BXA students can take an additional intermediate studio in lieu of an advanced studio to increase breadth.

Complete six courses:

60-402	Senior Studio	10
60-403	Advanced 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 Social Practice (SP) (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 the concentration advisor to determine course availability.*

Critical Studies (2 courses, 18 units)

60-107	Foundations: Critical Studies -Spring	9
60-3xx	Critical Studies Elective	9

Review Requirement (1 required review, 0 units)

Complete required review:

60-200	Sophomore Review -Spring (pass/no pass)	0

Drama Concentration

(130 units minimum)

Option available in the following area: 1) Dramaturgy

Note: EA dramaturgy only considers applicants in the fall semester for spring enrollment.

Dramaturgy Required Courses (13 courses, 80 units minimum)

54-177	Foundations of Drama I -Fall, First-year	6
54-109	Dramaturgy 1: Approaches to Text -Fall, First-year	9
54-284	Fundamentals of Directing -Fall, First-year	6
54-200	Dramaturgy Forum -Fall, First-year	1
54-159	Production Practicum -Fall or Spring, First-year	6
54-281	Foundations of Drama II -Spring, First-year	6
54-184	Dramaturgy 2: Introduction to Production Dramaturgy -Spring, First-year	9
54-200	Dramaturgy Forum -Spring, First-year	1
54-117	Design Collaboration Project -Spring, First-year	3
54-241	Dramaturgy 3: Dramaturgy in Translation -Fall, Sophomore year	9
54-256	Dramaturgy 4: New Play Dramaturgy -Spring, Sophomore year	9
54-363	Dramaturgy 5 -Fall, Junior year	9
54-381	Special Topics in Drama	6

Dramaturgy Required Courses (50 units minimum)

A minimum of **50** additional Dramaturgy units taken in the sophomore year or later must be approved by the Dramaturgy faculty area chair. 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) Audio Recording & Production, 2) Composition, 2) Music Performance (instrumental, organ, piano, voice), 4) Sound Theory & Practice

Note: BXA music performance only considers internal transfer applicants in the spring semester for fall enrollment, unless currently enrolled in Music performance.

Audio Recording & Production Required Courses (8 courses, 49 units)

57-152	Harmony I	9
or 57-149	Basic Harmony I	
57-101	Introduction to Music Technology	6
57-181	Solfege I	3
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
57-337	Sound Recording	6
57-338	Sound Editing and Mastering	6
57-438	Multitrack Recording	9

Audio Recording & Production Electives (59 units minimum)

Choose **59** units from:

57-153	Harmony II	9
or 57-150	Basic Harmony II	
57-182	Solfege II	3
or 57-186	Advanced Solfege II	
10-301	Introduction to Machine Learning	12
15-104	Introduction to Computing for Creative Practice	10
15-213	Introduction to Computer Systems	12
15-322	Introduction to Computer Music	9
33-114	Physics of Musical Sound	9
54-166	Introduction to Sound Design for Theatre	6
54-666	Production Audio (section B)	4
57-161	Eurhythmics I	3
57-162	Eurhythmics II	3
57-344	Experimental Sound Synthesis	9
57-347	Electronic and Computer Music	6
57-358	Introduction to Electronic Music (with instructor permission as space allows)	9
57-421	Exploded Ensemble	6
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	Foundations: Sculpture	10
85-415	Auditory Perception: Sense of Sound	9

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

Composition Required Courses (13 courses, 85 units)

57-152	Harmony I	9
or 57-149	Basic Harmony I	
57-161	Eurhythmics I (recommended co-requisite: 57-181)	3
57-181	Solfege I	3
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

Composition Electives (23 units minimum)

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 Required Courses (13 courses, 85 units)

57-152	Harmony I	9
or 57-149	Basic Harmony I	
57-161	Eurhythmics I (recommended co-requisite: 57-181)	3
57-181	Solfege I	3
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

Music Performance Electives (23 units minimum)

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.

Sound Theory & Practice Required Courses (7 courses, 44 units)

57-152	Harmony I	9
or 57-149	Basic Harmony I	
57-101	Introduction to Music Technology	6
57-181	Solfege I	3
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
57-421	Exploded Ensemble	6

Sound Theory & Practice Electives (64 units minimum)

Choose **64** units from:

57-153	Harmony II	9
or 57-150	Basic Harmony II	
57-182	Solfege II	3
or 57-186	Advanced Solfege II	
15-104	Introduction to Computing for Creative Practice	10
15-322	Introduction to Computer Music (prerequisite: 15-112)	9
33-114	Physics of Musical Sound	9
57-161	Eurhythmics I	3
57-162	Eurhythmics II	3
57-337	Sound Recording	6
57-338	Sound Editing and Mastering	6
57-344	Experimental Sound Synthesis	9
57-347	Electronic and Computer Music (prerequisite: 57-101 or 57-171)	6
57-358	Introduction to Electronic Music (with instructor permission as space allows)	9
57-438	Multitrack Recording	9
57-478	Survey of Historical Recording	6
57-616	Independent Study in Sound Studies	9

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

Academic Policies

Academic Standards

The College of Fine Arts seeks to support each of our students on their pathway towards graduation. Thus, we review each student's academic performance and progress towards degree at the close of each semester. Academic actions are designed to notify a student of specific academic and graduation requirements, outline goals for completion, and identify avenues of support. Academic actions are opportunities for students to reflect, grow, and get connected with appropriate campus resources to help them succeed.

To stay on track for graduation, each student is expected to complete a minimum of 38* units each semester, have both a semester and cumulative QPA of at least 2.0, pass at least 80% of their attempted units for the semester, as well as to make adequate academic progress towards their declared degree. Adequate progress requires that a student registers for and passes all of their degree's critical coursework as defined in each program's curriculum.

To remain in good academic standing a student must achieve the following criteria:

1. Pass at least 80% of attempted units in the current semester.
2. Achieve a minimum QPA of 2.0 both in the current semester and cumulatively.
3. Make adequate academic progress towards their declared degree as defined by their degree track.

In order to make adequate academic progress, BXA students must complete the required courses determined by their CFA concentration. If a student does NOT make progress towards their designated degree path they will receive an academic notification. See CFA Handbook (http://coursecatalog.web.cmu.edu/schools-colleges/collegeoffinearts/#academicstandardstextcontainer) for specifics concerning academic standards, academic policies, and the academic action sequence.

Incomplete grades will be conditionally actioned by the default grades until the student completes the missing coursework. If the student does not complete their missing coursework by the faculty deadline agreed upon, their default grade and action will become permanent.

**Students approved for Part Time Status through the Office of Disability Resources will work with their Program's administration to determine the minimum number of units needed to remain in Good Standing.*

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 BCSA, BESA, 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 BCSA, BESA, 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;
- publicly present research results.

As a citizen of two colleges, a BXA student also has the opportunity to graduate with CFA College Honors, DC College Honors, ENG College Honors, MCS College Honors and SCS College Honors. These particular honors are defined by each college. BXA students will receive honors color cords during Commencement Weekend.

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 Commencement Weekend.

Internal Transfer/Additional Major Process

For current Carnegie Mellon students who wish to apply to a BXA program, an internal transfer (https://www.cmu.edu/interdisciplinary/apply/internal-transfer.html) and additional major (https://www.cmu.edu/interdisciplinary/apply/additional-major.html) (EA) application process takes place in both the fall and spring semester. Applications are available online and are reviewed by a committee of BCSA, BESA, BHA, BSA and EA associate deans and advisors in October and in March. However, certain concentrations consider applications only once a year or certain concentrations only consider applicants currently enrolled in the same major as the intended concentration; 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 and complete their first semester 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. Additionally, a cumulative QPA of 3.0 is required for all BXA programs and students must complete their first semester at Carnegie Mellon before applying for internal transfer.

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 BESA, 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) or delineated options within their academic college concentration (e.g. BESA chemical engineering to BESA mechanical engineering) after declaring must submit a new BESA ENG/BHA DC/BSA MCS Concentration Declaration form for approval of that change. Current BXA students seeking internal transfer out of BXA into another college program must apply and meet entry requirements to that program. Students who do not remain in BCSA can only return to their original major.

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 (https://www.cmu.edu/studyabroad/) (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 QPA.

Students who are on academic action may have restrictions from participating in some school, college, and university activities, including eligibility for study abroad.

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 (https://www.cmu.edu/hub/registrar/registration/transfer-transcripts.html) 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 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 (76-101 Interpretation and Argument, 76-102 Advanced First Year Writing: Special Topics, 76-106 Writing about Literature, Art and Culture, 76-107 Writing about Data, 76-108 Writing about Public Problems)
- Humanities (79-104 Global Histories 79-145 Genocide and Weapons of Mass Destruction, 79-189 Democracy and History: Thinking Beyond the Self)
- 36-200 Reasoning with Data (AP credit only)
- 99-101 Core@CMU

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 (https://www.cmu.edu/hub/registrar/leaves-and-returns/) 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.