

2009–2010 Addendum

This addendum to the 2008–2010 Carnegie Mellon Undergraduate Catalog presents new academic programs as well as changes in existing programs and policies for the 2009–2010 academic year.

For updated course descriptions, please refer to the on-line **Schedule of Classes** (SOC), located at <https://acis.as.cmu.edu/gale2/open/Schedule/SOCServlet>.

Note: Where only one phrase or sentence in a section has been changed, the surrounding context has been reprinted and the changes marked in **bold** text.

The complete 2008–2010 Undergraduate Catalog can be accessed online at www.cmu.edu/esg-cat. New programs are approved and existing programs are changed at various times throughout the year. The 2010–2012 Undergraduate Catalog will be published during the summer of 2010. All changes and suggestions for improvement will be considered. Please direct your comments to:

Jon Samuels
Coordinator for Records
University Registrar's Office

Cost of Attendance for 2009–2010

Freshmen — Fall 2009

| | Resident | Commuter |
|---------------------------------|-----------------|-----------------|
| Tuition | \$40,300 | \$40,300 |
| Orientation Fee | 192 | 192 |
| Activity Fee | 184 | 184 |
| Port Authority Fee | 84 | 84 |
| Technology Fee | 150 | 150 |
| Media Fee | 10 | 10 |
| Room & Fees ¹ | 6,060 | 0 |
| Dining ² | 4,280 | 1,670 |
| Books & Supplies ^{3,4} | 1,000 | 1,000 |
| Personal/Misc. ⁴ | 1,400 | 1,400 |
| Transportation ⁴ | 0 | 640 |
| TOTAL | \$53,660 | \$45,630 |

Undergraduates Who Entered Fall 2008

| | Resident | Commuter | Off Campus |
|---------------------------------|-----------------|-----------------|-----------------|
| Tuition | \$40,300 | \$40,300 | \$40,300 |
| Activity Fee | 184 | 184 | 184 |
| Port Authority Fee | 84 | 84 | 84 |
| Technology Fee | 150 | 150 | 150 |
| Media Fee | 10 | 10 | 10 |
| Room & Fees ¹ | 6,060 | 0 | 5,560 |
| Dining ² | 3,970 | 1,670 | 3,970 |
| Books & Supplies ^{3,4} | 1,000 | 1,000 | 1,000 |
| Personal/Misc. ⁴ | 1,400 | 1,400 | 1,400 |
| Transportation ⁴ | 0 | 640 | 0 |
| TOTAL | \$53,158 | \$45,438 | \$52,658 |

Undergraduates Who Entered Fall 2007

| | Resident | Commuter | Off Campus |
|---------------------------------|-----------------|-----------------|-----------------|
| Tuition | \$39,560 | \$39,560 | \$39,560 |
| Activity Fee | 184 | 184 | 184 |
| Port Authority Fee | 84 | 84 | 84 |
| Technology Fee | 150 | 150 | 150 |
| Media Fee | 10 | 10 | 10 |
| Room & Fees ¹ | 6,060 | 0 | 5,560 |
| Dining ² | 3,970 | 1,670 | 3,970 |
| Books & Supplies ^{3,4} | 1,000 | 1,000 | 1,000 |
| Personal/Misc. ⁴ | 1,400 | 1,400 | 1,400 |
| Transportation ⁴ | 0 | 640 | 0 |
| TOTAL | \$52,418 | \$44,698 | \$51,918 |

Undergraduates Who Entered Fall 2006

| | Resident | Commuter | Off Campus |
|---------------------------------|-----------------|-----------------|-----------------|
| Tuition | \$38,088 | \$38,088 | \$38,088 |
| Activity Fee | 184 | 184 | 184 |
| Port Authority Fee | 84 | 84 | 84 |
| Technology Fee | 150 | 150 | 150 |
| Media Fee | 10 | 10 | 10 |
| Room & Fees ¹ | 6,060 | 0 | 5,560 |
| Dining ² | 3,970 | 1,670 | 3,970 |
| Books & Supplies ^{3,4} | 1,000 | 1,000 | 1,000 |
| Personal/Misc. ⁴ | 1,400 | 1,400 | 1,400 |
| Transportation ⁴ | 0 | 640 | 0 |
| TOTAL | \$50,946 | \$43,226 | \$50,446 |

Undergraduates Who Entered Prior to Fall 2006

| | Resident | Commuter | Off Campus |
|---------------------------------|-----------------|-----------------|-----------------|
| Tuition | \$36,832 | \$36,832 | 36,832 |
| Activity Fee | 184 | 184 | 184 |
| Port Authority Fee | 84 | 84 | 84 |
| Technology Fee | 150 | 150 | 150 |
| Media Fee | 10 | 10 | 10 |
| Room & Fees ¹ | 6,060 | 0 | 5,560 |
| Dining ² | 3,970 | 1,670 | 3,970 |
| Books & Supplies ^{3,4} | 1,000 | 1,000 | 1,000 |
| Personal/Misc. ⁴ | 1,400 | 1,400 | 1,400 |
| Transportation ⁴ | 0 | 640 | 0 |
| TOTAL | \$49,690 | \$41,970 | \$49,190 |

NOTES:

¹ Based upon cost of a standard double room. Actual cost may differ.

² The commuter dining account is based upon 12 meals plus \$8 DineXtra per two weeks.

³ Design and Architecture students add an additional \$600 for books/supplies.

⁴ These expenses will not appear on your Student Account Invoice. Transportation for resident and off-campus students varies based on home state.

In addition, minimal health insurance coverage is required at an estimated cost of \$928+/year, unless a waiver is granted because you are covered under your family's health plan. Premium health insurance coverage is suggested for international students at an estimated cost of \$2,000+/year.

Undergraduate Options

Physical Education

Faculty

Additions:

SUZANNE BOWSER, Assistant Women's Basketball Coach/Instructor—M.S., Southern Utah University; Carnegie Mellon, 2008–.

BRENT KINTZER, Assistant Swimming Coach/Instructor—M.S., Virginia Commonwealth University; Carnegie Mellon, 2008–.

KEVIN SCHULTZ, Strength & Conditioning Coach/Instructor—M.S., University of Wisconsin—LaCrosse; Carnegie Mellon, 2008–.

Changes/Corrections:

SARA GAUNTNER, Director of Aquatics/Assistant Swimming Coach/Instructor—M.S., Gannon University; Carnegie Mellon, 2005–.

Intercollege Programs

- The Bachelor of Humanities and Arts, Bachelor of Science and Arts, and Bachelor of Computer Science and Arts programs have been collectively named the BXA Interdisciplinary Degree Programs.
- The BXA Capstone Project** is required for freshmen beginning Fall 2009 and internal transfer students applying Fall 2009, beginning Spring 2010.

Bachelor of Humanities and Arts

BHA Curriculum

| | |
|--------------------------|------------------|
| I. BHA General Education | 84 units |
| II. H&SS Concentration | 72 units |
| III. CFA Concentration | 108 units |
| IV. Free Electives | 105 units |
| BHA Degree Requirements | 369 units |

Bachelor of Computer Science and Arts

Drama Concentration

- The Directing option is now available to BCSA candidates in addition to PTM.

Carnegie Institute of Technology

CIT General

- 15-110 (Introduction to Programming) and 15-121 (Introduction to Data Structures) replace 15-100 and 15-111.
- Audio Engineering is now available as a CIT Designated Minor for Engineering Students.

Breadth Requirement 27 Units

Humanistic Studies (Cultural Analysis)* 9 Units

79-104 Introduction to World History

Cognitions and Institutions* 9 Units

73-100 Principles of Economics -or-
85-100 Introduction to Intelligence
88-104 Decision Process in American Political Institutions

* The above courses have seats reserved for first-year CIT students.

Writing/Expression 9 Units

76-101 Interpretation and Argument

Additional Majors and Dual Degrees in CIT

The minimum requirements for a Carnegie Institute of Technology additional major are that all degree requirements of the CIT major must be completed.

- The information on "Requirements for CIT students wishing to complete Additional Majors" (p. 107) apply to all students.

Academic Standards

Transfer into CIT Departments

- First-year students **will** be considered for transfer after mid-semester grades for the spring semester have been posted.
- CIT undergraduate students beyond the first year wishing to transfer into another CIT department may **apply** if they are not on academic probation and if there is room in the department of their choice.

Suspension

Steps for Petitioning to Return After Suspension

The normal period of suspension is one academic year (two semesters). At the end of that period, a student may petition to return to school (on probation) by completing the following steps:

- Writing a formal petition requesting to return and receiving permission in writing from the assistant dean for undergraduate studies;
- Completing a Return from Leave of Absence form from Enrollment Services; and
- Providing transcripts and clearance forms if the student has been in a degree program at another college or university, even though academic credit earned will not transfer back to Carnegie Mellon **unless prior approval from the Assistant Dean is given.**

CIT Designated Minors (for Engineering Students)

Audio Engineering (*new*)

Tom Sullivan, Director

Website: http://www.cit.cmu.edu/current_students/services/majors_minors/engineering_minors/audio.html

This sequence is for candidates who are engineering majors with interest in and/or have background in music, recording, sound-editing and/or other music technology areas; or majors from any discipline in the university who have the above interests and who can meet the pre-requisite requirements for the engineering courses in the minor.

Note: Students who do not have the requisite engineering/science/math background should investigate the Minor in Music Technology offered by the School of Music.

Course Requirements

The student must have taken the appropriate pre-requisite courses for the listed courses.

Prerequisite Courses, 0/3 units

Beginning Piano is required of students who do not pass a piano proficiency test.

57-103 Beginning Piano, 3 units

Music Courses, 40/43 units

Basic Harmony I is required of students who do not qualify for entrance into Harmony I, based on their scores on the theory placement test.

57-149 Basic Harmony I

or

57-152 Harmony I, 6 units

57-173 Survey of Western Music History (co-req 57-188), 9 units

57-188 Repertoire and Listening for Musicians, 1 unit

57-101 Introduction to Music Technology, 6 units

57-337 Sound Recording I, 6 units

(choose two of the courses below)

| | |
|--------|--|
| 57-347 | Electronic and Computer Music, 6 units |
| 57-338 | Sound Editing and Production, 6 units |
| 57-438 | MultiTrack Recording, 9 units |

Technical Courses, 33 units

Other courses may be taken with the approval of the advisor for engineering minors.

| | |
|--------|--|
| 33-114 | Physics of Musical Sound, 9 units |
| 18-493 | Electro-Acoustics (pre-reqs 18-220 and 18-290), 12 units |

(choose one of the courses below)

| | |
|--------|---|
| 18-491 | Digital Signal Processing (pre-req 18-290), 12 units |
| 18-551 | Sig. Proc. System Design (pre-req 18-290), 12 units |
| 18-321 | Anal. Design of Analog Ckts. (pre-req 18-220), 12 units |

Units required for minor: 73/79

Note:

| | |
|--------|--|
| 18-220 | Electronic Devices and Analog Circuits |
| 18-290 | Signal and Information Processing |

Automation and Control Engineering Designated Minor

Faculty Advisors

Chemical Engineering — Larry Biegler

Electrical and Computer Engineering — Bruce Krogh

Other CIT departments see Bruce Krogh for advising.

Biomedical Engineering Designated Minor

Jeffrey O. Hollinger, Director
www.bme.cmu.edu

Campus Office for Student Affairs: Doherty Hall 2100

The Department of Biomedical Engineering (BME) offers a minor program for those students who desire coordinated training in BME but may not have the time to pursue the BME additional major. The Biomedical Engineering Minor is designed to train students to apply engineering techniques to problems in medicine and biology. Emphasis is placed on describing biological organisms as engineering systems and on applying engineering technology to clinical and laboratory situations.

Upon completing the Biomedical Engineering Minor, the student may elect to continue graduate studies in Bioengineering or basic biomedical sciences at either the master's or Ph.D. levels. In addition, many of the courses in the BME minor will assist students in preparing for medical school. Students who remain in the field of biomedical engineering are involved in developing and improving medical instruments and devices, automating medical procedures using computers, characterizing the operation of physiological systems, designing artificial organs, and altering microbes and mammalian cells for the production of useful drugs and chemicals.

BME minor accepts undergraduate students from both within and outside CIT. Students in the minor program can choose from a wide range of electives in the track system to build marketable skills in a particular area of BME.

Requirements for CIT students: five courses, minimum of 48 units

| | |
|--------|---|
| 03-121 | Modern Biology |
| 42-101 | Introduction to Biomedical Engineering (co-req. or pre-req. 03-121) |
| 42-202 | Physiology (pre-req. 03-121 or permission of instructor) |
| xx-xxx | BME track course*, # |
| xx-xxx | BME track course* |

*Any track gateway, elective or capstone course from any of the four BME tracks may be counted. Please refer to the BME website (www.bme.cmu.edu) or to the BME listing in the course catalog for course descriptions.

Requirements for non-CIT students: six courses, minimum of 60 units

| | |
|--------|---|
| 03-121 | Modern Biology |
| 42-101 | Introduction to Biomedical Engineering (co-req. or pre-req. 03-121) |
| xx-xxx | A second Introductory Engineering Course |
| 42-202 | Physiology (pre-req. 03-121 or permission of instructor) |
| xx-xxx | BME track course *, +, # |
| xx-xxx | BME track course ** |

* Any track gateway, elective or capstone course from any of the four BME tracks may be counted. Please refer to the BME website (www.bme.cmu.edu) or to the BME listing in the course catalog for course descriptions.

+ This course cannot be a required course in the student's major.

** This course must be a track gateway, elective or capstone that is offered by one of the CIT Departments (06-xxx, 12-xxx, 18-xxx, 19-xxx, 24-xxx, 27-xxx or 42-xxx)

Both CIT and non-CIT students may replace one BME track course with a research project, 42-200 Sophomore BME Research, 42-300 Junior BME Research, 42-400 Senior BME Research or 39-500 CIT Honors Thesis, as long as the research project is supervised by a regular or courtesy BME faculty member and the project is conducted for 9 or more units of credit.

Data Storage Systems Technology Designated Minor

Required Courses:

| | |
|--------|--|
| 18-416 | Data Storage Systems |
| 18-517 | Data Storage Systems Design Project (<i>new requirement</i>) |
| 33-448 | Introduction to Solid State Physics |

Electronic Materials Designated Minor

Elective Courses

Group A

| | |
|---------------|--|
| 27-202 | Defects in Materials (ECE students only) |
| 06-619 | Semiconductor Processing Technology |
| 27-542 | Processing and Properties of Thin Films |
| 27-217 | Phase Relations (ECE students only) |
| 27-533 | Principles of Growth and Processing of Semiconductors |
| 27-432 | Electronic and Thermal Properties of Metals, Semiconductors and Related Devices |
| 27-433 | Dielectric, Magnetic, Superconducting Properties of Materials and Related Devices |
| 27-551 | Properties of Ceramics and Glasses |
| 27-216 | Transport in Materials (ECE students only) |
| 33-225 | Quantum Physics and Structure of Matter (ECE students only) |

Group B

| | |
|---------------|--|
| 18-310 | Fundamentals of Semiconductor Devices |
| 33-225 | Quantum Physics and Structure of Matter (MSE students only) |
| 18-412 | Field Effect Devices and Technology |
| 18-419 | Semiconductor Device Applications |
| 18-410 | Physical Sensors, Transducers and Instrumentation |
| 18-610 | Fundamentals of Modern CMOS Devices |
| 18-615 | Micro and Nano Systems Fabrication |
| 18-617 | Memory Devices and Systems |
| 18-712 | Elements of Photonics for Communication Systems |
| 18-715 | Physics of Applied Magnetism |
| 18-716 | Advanced Applied Magnetism |
| 18-8xx | Appropriate 800-level course |

Note: Other appropriate courses may be substituted with the approval of the coordinators in the event that limited course offerings make it impossible to satisfy the requirements as described above.

Department of Biomedical Engineering

General

- 42-203 Biomedical Engineering Laboratory is also known as 03-206 for pre-med students.
- 42-506 Surgery for Engineers is now listed as 42-660.
- Sample schedules for BME additional major combinations may be found on the BME website (www.bme.cmu.edu)
- The Self-Designed Biomedical Engineering (SBME) track is now available.

Bioimaging (BIMG) Track

The following courses may now be used as one of the three BIMG track electives.

| | |
|--------|--|
| 18-792 | Advanced Digital Signal Processing (Intermittent) |
| 24-700 | Special Topics in Mechanical Engineering: Computational Bio-modeling and Visualization (Spring) |

Courses that count **both** as BIMG and Electrical & Computer Engineering Electives:

| | |
|---------|--|
| 18-491 | Digital Signal Processing |
| 18-792 | Advanced Digital Signal Processing |
| 18-798 | Image, Video, and Multimedia |
| 18-799A | Special Topics in Signal Processing: Bioimage Registration |

Biomaterials and Tissue Engineering (BMTE) Track

The following course may now be used as one of the three BMTE track electives.

| | |
|--------|--------------------------------|
| 42-509 | Stem Cell Engineering (Spring) |
|--------|--------------------------------|

Biomechanics (BMEC) Track

The following courses may now be used as one of the three BMEC track electives.

| | |
|-------------------|--|
| 24-700* | Special Topics in Mechanical Engineering: Computational Bio-modeling and Visualization (Spring) |
| 24-779A* | Special Topics in Controls and Robotics: Bio-Inspired Robotics (Fall) |
| 42-445/ 24-415 | Special Topics: Microfluidics (Intermittent) |

* Counts as both BMEC and Mechanical Engineering elective.

Courses that count **both** as BMEC and Materials Science & Engineering Electives:

| | |
|---------------|--|
| 42-312/25-511 | Metallic and Ceramic Biomaterials (Spring) |
|---------------|--|

Note: 42-502 (Cellular Biomechanics) is now listed as 42-645 (cross-listed with 24-655)

Cellular and Molecular Biotechnology (CMBT) Track

Courses that count as **both** CMBT and Chemical Engineering Electives:

| | |
|--------|-----------------------|
| 03-232 | Biochemistry (Spring) |
|--------|-----------------------|

Self-Designed Biomedical Engineering (SBME) Track

The **Self-Designed Biomedical Engineering (SBME) track** is now available, in addition to the other elective tracks. The SBME track is aimed at helping highly motivated students who have a strong sense of career direction that falls beyond the scopes of regular BME tracks. Students taking SBME track must fulfill all the core BME requirements, but are allowed to design the "track" portion of the curriculum. Example areas include biomedical robotics, neural engineering, and computational biomedical engineering.

The SBME track is fundamentally different from the GBME track. Whereas the GBME track increases breadth and may include only courses that are already associated with the four other defined tracks, the SBME track provides depth while allowing students to choose courses from across the university.

Requirements

1. Students wishing to pursue a self-designed track should first consult the Chair of the BME Undergraduate Affairs Committee (UAC) for initial feedback and guidance. A SBME track proposal must be submitted to the UAC at least three weeks prior to Pre-Registration during the spring of the student's sophomore year. The proposal must include the following:

- The four courses to be included in the track, including information on when these courses are expected to be offered.
- Catalog descriptions of the four courses.
- A justification of how these courses represent a coherent, BME-relevant theme.

2. All four courses in the SBME track must represent a coherent theme that is relevant to Biomedical Engineering (e.g. neuroengineering, medical robotics, computational biomedical engineering, etc.).

3. At least one course in the track must be judged by the Biomedical Engineering Undergraduate Affairs Committee (UAC) to have significant biological or medical content.

4. Students may count **either** 42-660 Surgery for Engineers (9 units) or Biomedical Engineering Research Project (at least 9 units), but not both, as fulfilling one track elective. The research project (42-200/300/400 Sophomore/Junior/Senior Biomedical Engineering Research Project **or** 39-500 CIT Honors Thesis) must be on a BME topic supervised or co-supervised by a BME faculty member and conducted for 9 or more units of credit.

5. Once approved, the UAC Chair and the student will sign a contract listing the theme and the four courses comprising the SBME. The contract will be placed in the student's BME curriculum progress file.

6. In the event that course scheduling issues beyond the student's control prevent that student from completing an approved self-designed track, the student may:

- petition the UAC to substitute a different course that fits the track theme, or
- petition the UAC to be credited for the GBME track if he/she completes one of the regular track gateway courses plus either three of the originally proposed SBME track courses, or two of the originally proposed SBME courses plus Surgery for Engineers (9 units) or Biomedical Engineering Research (at least 9 units)

Faculty

This section was regrettably omitted from the 2008-2010 Undergraduate Catalog.

JAMES F. ANTAKI, Professor of Biomedical Engineering — Ph.D. 1991, University of Pittsburgh

BRUCE A. ARMITAGE, Professor of Chemistry, Biological Sciences and Biomedical Engineering — Ph.D. 1993, University of Arizona

MARCEL P. BRUCHEZ, Associate Research Professor of Chemistry and Biomedical Engineering — Ph.D. 1998, University of California, Berkeley

PHIL G.M CAMPBELL, Research Professor, Institute of Complex Engineering Systems, Biomedical Engineering, Biological Sciences, and Materials Science & Engineering — Ph.D. 1985, Pennsylvania State University

HOWIE CHOSET, Associate Professor, Robotics Institute, Biomedical Engineering, and Electrical & Computer Engineering — Ph.D. 1996, California Institute of Technology

JUSTIN C. CROWLEY, Assistant Professor of Biological Sciences and Biomedical Engineering — Ph.D. 2000, Duke University

KRIS N. DAHL, Assistant Professor of Biomedical Engineering, Chemical Engineering, and Materials Science & Engineering — Ph.D. 2004, University of Pennsylvania

MICHAEL M. DOMACH, Professor of Chemical Engineering and Biomedical Engineering — Ph.D. 1983, Cornell University

ENDER FINOL, Associate Research Professor, Institute for Complex Engineering Systems, Biomedical Engineering and Mechanical Engineering — Ph.D. 2002, Carnegie Mellon University

CHIEN HO, Professor of Biological Sciences and Biomedical Engineering — Ph.D. 1961, Yale University

JEFFREY O. HOLLINGER, Professor of Biomedical Engineering and Biological Sciences — D.D.S. 1973, University of Maryland; Ph.D. 1981, University of Maryland

BRANISLAV JARAMAZ, Associate Research Professor, Robotics Institute and Biomedical Engineering — Ph.D. 1992, Carnegie Mellon University

TAKEO KANADE, U.A. and Helen Whitaker University Professor, Robotics Institute and Biomedical Engineering — Ph.D. 1974, Kyoto University

JELENA KOVACEVIC, Professor of Biomedical Engineering and Electrical & Computer Engineering — Ph.D. 1991, Columbia University

PHILIP R. LEDUC, Associate Professor of Mechanical Engineering, Biomedical Engineering, and Biological Sciences — Ph.D. 1999, Johns Hopkins University

MATHIAS LOESCHE, Professor of Physics and Biomedical Engineering — Ph.D. 1986, Technical University of Munich

MICHAEL E. MCHENRY, Professor of Materials Science & Engineering and Biomedical Engineering — Ph.D. 1988, Massachusetts Institute of Technology

JOSE M. F. MOURA, Professor of Electrical & Computer Engineering and Biomedical Engineering — Ph.D. 1975, Massachusetts Institute of Technology

ROBERT F. MURPHY, Ray and Stephanie Lane Professor of Computational Biology and Professor of Biological Sciences, Biomedical Engineering, and Machine Learning — Ph.D. 1980, California Institute of Technology

KEREM PEKKAN, Assistant Professor of Biomedical Engineering and Mechanical Engineering — Ph.D. 2000, Middle East Technical University

TODD M. PRZYBYCIEN, Professor of Biomedical Engineering and Chemical Engineering — Ph.D. 1989, California Institute of Technology

CAMERON N. RIVIERE, Associate Research Professor, Robotics Institute and Biomedical Engineering — Ph. D. 1995, Johns Hopkins University

GUSTAVO K. ROHDE, Assistant Professor of Biomedical Engineering — Ph.D. 2005, University of Maryland

JAMES W. SCHNEIDER, Professor of Chemical Engineering and Biomedical Engineering — Ph.D. 1998, University of Minnesota

KENJI SHIMADA, Professor, Mechanical Engineering, Biomedical Engineering, Robotics Institute, and Institute of Complex Engineering Systems — Ph.D. 1993, Massachusetts Institute of Technology

METIN SITTI, Associate Professor, Mechanical Engineering, Biomedical Engineering, Electrical & Computer Engineering, Institute of Complex Engineering Systems, and Robotics Institute — Ph.D. 1999, Tokyo University

GEORGE D. STETTEN, Research Professor, Robotics Institute and Biomedical Engineering — M.D. 1991, State University of New York Syracuse Health Center; Ph.D. 2000, University of North Carolina, Chapel Hill

ROBERT D. TILTON, Professor of Biomedical Engineering and Chemical Engineering — Ph.D. 1991, Stanford University

JEANNE M. VANBRIESEN, Professor of Civil & Environmental Engineering and Biomedical Engineering — Ph.D. 1998, Northwestern University

ALAN S. WAGGONER, Professor of Biological Sciences and Biomedical Engineering — Ph.D. 1969, University of Oregon

YU-LI WANG, Professor and Head of Biomedical Engineering — Ph.D. 1980, Harvard University

NEWELL R. WASHBURN, Assistant Professor of Biomedical Engineering, Chemistry, and Materials Science & Engineering — Ph.D. 1998, University of California, Berkeley

LEE E. WEISS, Research Professor, Robotics Institute, Biomedical Engineering, and Materials Science & Engineering — Ph.D. 1984, Carnegie Mellon University

GE YANG, Assistant Professor, Biomedical Engineering and Lane Center for Computational Biology — Ph.D. 2004, University of Minnesota

CONRAD M. ZAPANTA, Associate Teaching Professor and Associate Head of Biomedical Engineering — Ph.D. 1997, Pennsylvania State University

STEFAN ZAPPE, Assistant Professor of Biomedical Engineering — Ph.D. 2002, Technical University of Berlin

Chemical Engineering

Curriculum

- Computer Science/Physics II: Students should complete 15-110 (Introduction to Programming) or 15-121 (Introduction to Data Structures) as well as 33-107 (Physics for Engineering Students II) by the end of the Sophomore year. The recommended sequence is 33-106/107 for engineering students, however 33-111/112 or 33-131/132 will also meet the CIT Physics requirement.
- Either 09-217 (Organic Chemistry I, 9 units) or 09-219 (Modern Organic Chemistry, 10 units) may be taken in the Junior year.

Chemical Engineering/Engineering and Public Policy Double Major

- 06-462 (Senior year, Spring semester) is now called "Optimization Modeling and Algorithms."
- 06-461 has been replaced by 06-463 Chemical Product Design (6 units)

Materials Science and Engineering

- 27-325 Polymer Physics and Morphology is now listed as 27-588.

Engineering and Public Policy

Mechanical Engineering
Single Major**Sophomore Year**

| | Fall | Units |
|--------|--------------------------------|--------------|
| 21-259 | Calculus in Three Dimensions | 9 |
| 24-221 | Thermodynamics I | 10 |
| 24-261 | Statics | 10 |
| xx-xxx | Restricted Technical Elective* | 10-13 |
| xx-xxx | General Education Course | 9 |
| | | <hr/> |
| | | 48-51 |

| | Spring | Units |
|--------|-------------------------------|--------------|
| 21-260 | Differential Equations | 9 |
| 24-231 | Fluid Mechanics | 10 |
| 24-262 | Stress Analysis | 12 |
| xx-xxx | Restricted Technical Elective | 10-13 |
| xx-xxx | General Education Course | 9 |
| | | <hr/> |
| | | 50-53 |

Junior Year

| | Fall | Units |
|--------|--|--------------|
| 24-302 | Mechanical Engineering Seminar (if taken in spring)(2) | 2 |
| 24-311 | Numerical Methods | 12 |
| 24-322 | Heat Transfer | 10 |
| 24-351 | Dynamics | 10 |
| 36-220 | Engineering Statistics and Quality Control | 9 |
| xx-xxx | General Education Course | 9 |
| | | <hr/> |
| | | 50(52) |

| | Spring | Units |
|--------|--|--------------|
| 24-370 | Design I: Methods and Skills | 12 |
| 24-302 | Mechanical Engineering Seminar (If not taken in fall)(2) | 2 |
| 24-321 | Thermal-Fluids Experimentation and Design | 12 |
| 24-352 | Dynamic Systems and Control | 12 |
| xx-xxx | General Education Course | 9 |
| | | <hr/> |
| | | 45(47) |

Senior Year

| | Fall | Units |
|--------|------------------------------------|--------------|
| 24-452 | Mechanical Systems Experimentation | 9 |
| xx-xxx | Elective | 9 |
| xx-xxx | Elective | 9 |
| xx-xxx | Elective | 9 |
| xx-xxx | General Education Course | 9 |
| | | <hr/> |
| | | 45 |

| | Spring | Units |
|--------|--|--------------|
| 24-441 | Design II: Conceptualization and Realization | 12 |
| 24-xxx | Mechanical Engineering Technical Elective | 9-12 |
| xx-xxx | Elective | 9 |
| xx-xxx | Elective | 9 |
| xx-xxx | General Education Course | 9 |
| | | <hr/> |
| | | 48-51 |

Minimum number of units required for degree: 380Mechanical Engineering with an Additional Major in
Engineering and Public Policy**Sophomore Year**

| | Fall | Units |
|--------|-------------------------|--------------|
| 21-259 | Same | 9 |
| 24-221 | Same | 10 |
| 24-261 | Same | 10 |
| xx-xxx | Same | 10-13 |
| 73-100 | Principles of Economics | 9 |
| 19-102 | EPP Sophomore Seminar | 3 |
| | | <hr/> |
| | | 51-54 |

| | Spring | Units |
|--------|------------------------------|--------------|
| 21-260 | Same | 9 |
| 24-231 | Same | 10 |
| 24-262 | Same | 12 |
| xx-xxx | Same | 10-13 |
| xx-xxx | EPP Social Analysis Elective | 9 |
| | | <hr/> |
| | | 50-53 |

Junior Year

| | Fall | Units |
|--------|--|--------------|
| | (Seminar requirement is met by 19-102) | |
| 24-311 | Same | 12 |
| 24-322 | Same | 10 |
| 24-351 | Same | 10 |
| 36-220 | Same | 9 |
| xx-xxx | EPP Social Analysis Elective* | 9 |
| | | <hr/> |
| | | 50 |

| | Spring | Units |
|--------|--|--------------|
| 24-370 | Same | 12 |
| | (Seminar requirement is met by 19-102) | |
| 24-321 | Same | 12 |
| 24-352 | Same | 12 |
| 19-451 | EPP Project I | 12 |
| | | <hr/> |
| | | 48 |

Senior Year

| | Fall | Units |
|--------|-------------------------------|--------------|
| 24-452 | Same | 9 |
| xx-xxx | EPP Technical Elective | 9 |
| 19-452 | EPP Project | 12 |
| xx-xxx | EPP Technical Elective | 9 |
| xx-xxx | EPP Social Analysis Elective* | 9 |
| | | <hr/> |
| | | 48 |

| | Spring | Units |
|--------|--|--------------|
| 24-441 | Same (Counts as 4th EPP Tech Elective) | 12 |
| 36-310 | Fundamentals of Statistical Modeling | 9 |
| xx-xxx | EPP Technical Elective | 9 |
| xx-xxx | EPP Social Analysis Elective* | 9 |
| xx-xxx | EPP Social Analysis Elective | 9 |
| | | <hr/> |
| | | 48 |

Minimum number of units required for degree: 387

* One of these must be taken from the following list:
 88-302 Behavioral Decision Making
 88-223 Decision Analysis and Decision Support Systems

College of Fine Arts

Architecture

- Stephen R. Lee is now the Head of the School of Architecture (previously Interim Head)
- A minimum of 495 units is required for graduation in the undergraduate program (**501 with thesis**).
- The National Architectural Accrediting Board (NAAB), which is the sole agency authorized to accredit US professional degree programs in architecture, recognizes **three** types of degrees: the Bachelor of Architecture, the Master of Architecture, and the Doctor of Architecture.

Curriculum

First Year

| | Fall | Units |
|--------|---|-------|
| 48-100 | Architecture Design Studio: Foundation I | 12 |
| 48-120 | Introduction to Digital Media I | 9 |
| 48-130 | Architectural Drawing I: A Tactile Foundation | 6 |
| 48-240 | Architectural History I: Historical Survey of World Architecture and Urbanism | 9 |
| 62-175 | Descriptive Geometry | 6 |
| 99-10x | Computing @ Carnegie Mellon | 3 |
| | | 45 |
| | Spring | Units |
| 48-105 | Architecture Design Studio: Foundation II | 12 |
| 48-115 | Physics for Architecture | 9 |
| 48-125 | Introduction to Digital Media II | 6 |
| 48-135 | Architectural Drawing II: Appearance | 9 |
| 76-101 | Interpretation and Argument | 9 |
| | | 45 |

Second Year

| | Fall | Units |
|--------|---|-------|
| 48-200 | Architecture Design Studio: Composition | 18 |
| 48-210 | Statics | 9 |
| 64-100 | Critical Histories of the Arts | 9 |
| xx-xxx | University Elective | 9 |
| | | 54 |
| | Spring | Units |
| 48-205 | Architecture Design Studio: Materials | 18 |
| 48-215 | Materials and Assemblies | 9 |
| 48-217 | Structures | 9 |
| 48-xxx | School Elective | 9 |
| xx-xxx | University Elective | 9 |
| | | 54 |

Third Year

| | Fall | Units |
|--------|---|-------|
| 48-300 | Architecture Design Studio: Site | 18 |
| 48-312 | Site Engineering and Foundations | 6 |
| 48-315 | Environment I: Climate and Energy | 9 |
| 48-xxx | Architectural History | 9 |
| | -or- | |
| 48-xxx | School Elective | 9 |
| xx-xxx | University Elective | 9 |
| | | 51 |
| | Spring | Units |
| 48-305 | Architecture Design Studio: Advanced Construction | 18 |
| 48-351 | Human Factors in Architecture | 9 |
| 48-xxx | Architectural History | 9 |
| | -or- | |
| 48-xxx | School Elective | 9 |
| xx-xxx | University Elective | 9 |
| | | 54 |

Fourth Year

| | Fall | Units |
|--------|---|-------|
| 48-400 | Architecture Design Studio: Occupancy | 18 |
| 48-410 | Environment II: Light | 6 |
| 48-412 | Environment III: Mechanical Systems | 9 |
| 48-xxx | School Elective | 9 |
| xx-xxx | University Elective | 9 |
| | | 51 |
| | Spring | Units |
| 48-405 | Architecture Design Studio: Systems Integration | 18 |
| 48-415 | Advanced Building Systems | 6 |
| 48-452 | Real Estate Design and Development | 9 |
| 48-xxx | School Elective | 9 |
| xx-xxx | University Elective | 9 |
| | | 51 |

Fifth Year

| | Fall | Units |
|--------|--|-------|
| 48-500 | Architecture Design Studio: The Urban Lab | 18 |
| 48-497 | Thesis Preparation (optional) | 6 |
| 48-550 | Issues of Practice | 9 |
| 48-453 | Urban Design Methods | 9 |
| 48-xxx | School Elective | 9 |
| | | 51 |
| | Spring | Units |
| 48-505 | Studio X | 18 |
| 48-551 | Ethics and Decision Making in Architecture | 9 |
| 48-xxx | School Elective | 9 |
| xx-xxx | University Elective | 9 |
| | | 45 |

Total number of units required: 495 (501)

Fundamental Courses

- 62-175 Descriptive Geometry replaces 21-114 Calculus for Architecture.

History (3 courses)

Three core courses in architectural history are required for the Bachelor of Architecture degree. All **first-year** students must complete the Historical Survey of World Architecture and Urbanism, which focuses on the major monuments of western civilization, as well as highlighting non-western and vernacular traditions. Two additional core courses on the history of architecture are required. These two courses must be taken within the School of Architecture and must have been designated as satisfying the core requirements. It is highly recommended that the two additional core history requirements be completed prior to the fifth year.

In addition to the three core architectural history electives, elective courses on additional topics of architectural history may also be taken. With approval of the specific electives, students completing four additional nine-unit architectural history and theory courses beyond the three required may graduate with a minor in Architectural History.

Drawing and Media (4 courses)

- 48-230 Architectural Drawing III: Perspective is no longer required.

Drawing, media representation, and model making are primary topics of both first-year studios and are associated with **four** other specific courses—Introduction to Digital Media I and II and Architectural Drawing I and II—taken during the first year. Thereafter, students may elect to take further drawing and media courses in fulfillment of the school elective requirements.

School Electives (7 courses)

A minimum of **seven** school electives is required for the Bachelor of Architecture degree.

Architecture Minors

Minor in Architecture

Elective Courses

- 48-130 Architectural Drawing I is **9 units** (was 6).
- 48-230 Architectural Drawing III has been removed from the list of Electives.

Minor in Architectural History

Elective Courses

- The following courses are **no longer** on the list of Electives: 48-441 Frank Lloyd Wright, 48-445 The City in History.

Minor in Architectural Representation and Visualization

- The minimum number of units required for this minor is now **54 units**.

Required Courses **33 units (was 30)**

- 48-130 Architectural Drawing I is **9 units** (was 6).
- 48-230 Architectural Drawing III has been removed from the list of Electives.
- 48-xxx Drawing Elective (9 units) has been added to the list of Required Courses

Elective Courses **21 units**

- 48-355 should be listed as "Drawing Elective."

Minor in Architectural Technology

Prerequisite Courses **15-23 units (was 14-22)**

- 21-114 Calculus for Architecture has been replaced by **62-175 Descriptive Geometry** (6 units)

Elective Courses **32-40 units**

- 48-410 is now known as **Environment II: Light**.

Art

Curriculum

Fourth Year

| Fall | | Units |
|-------------|--------------------------|--------------|
| 60-401 | Senior Studio | 20 |
| 60-4xx | Advanced Studio Elective | 10 |
| 60-3xx | Academic Elective | 9 |
| xx-xxx | Academic Elective | 9 |
| | | 48 |

| Spring | | Units |
|---------------|--------------------------|--------------|
| 60-402 | Senior Studio | 20 |
| 60-4xx | Advanced Studio Elective | 10 |
| xx-xxx | Academic Elective | 9 |
| xx-xxx | Academic Elective | 9 |
| | | 48 |

Design

- Terry Irwin is now the Head of the School of Design.

Drama

Acting Option Curriculum

Freshman Year

| | Fall | Units |
|--------|--------------------------------|--------------|
| 54-011 | Warmup | 1 |
| 54-101 | Acting I | 10 |
| 54-103 | Speech I | 6 |
| 54-105 | Voice/Alexander I | 5 |
| 54-107 | Movement I | 4 |
| 54-159 | Production Symposium I | 6 |
| 54-175 | Conservatory Hour | 1 |
| 54-177 | Foundations of Drama I* | 6 |
| 64-100 | Critical Histories of the Arts | 9 |
| 99-10x | Computing @ Carnegie Mellon | 3 |
| | | 45-51 |

| | Spring | Units |
|--------|-----------------------------|--------------|
| 54-012 | Warmup | 1 |
| 54-102 | Acting I | 10 |
| 54-104 | Speech I | 6 |
| 54-106 | Voice/Alexander I | 5 |
| 54-108 | Movement I | 4 |
| 54-160 | Production Symposium I | 6 |
| 54-176 | Conservatory Hour | 1 |
| 54-177 | Foundations of Drama I* | 6 |
| 76-101 | Interpretation and Argument | 9 |
| xx-xxx | Non-Drama Elective | 6-9 |
| | | 51-57 |

Sophomore Year

| | Fall | Units |
|--------|----------------------------------|--------------|
| 54-201 | Acting II | 12 |
| 54-203 | Voice & Speech II | 5 |
| 54-207 | Movement II | 5 |
| 54-211 | Actor Dance II | 3 |
| 54-221 | Directing II | 6 |
| 54-281 | Foundations of Drama II** | 6 |
| -or- | | |
| xx-xxx | HSS Approved Course | 9 |
| xx-xxx | Non-Drama Elective | 6-9 |
| 54-213 | Singing for Actors II (Optional) | 3 |
| | | 46-49 |

| | Spring | Units |
|--------|----------------------------------|--------------|
| 54-202 | Acting II | 12 |
| 54-204 | Voice & Speech II | 6 |
| 54-208 | Movement II | 3 |
| 54-212 | Actor Dance II | 3 |
| 54-242 | Improvisation | 2 |
| 54-322 | Directing III — Forms/Formats | 4 |
| 54-282 | Foundations of Drama II** | 6 |
| -or- | | |
| xx-xxx | HSS Approved Course | 9 |
| 54-294 | Make-Up for Performers | 3 |
| xx-xxx | Non-Drama Elective | 6-9 |
| 54-214 | Singing for Actors II (Optional) | 3 |
| | | 48-51 |

Junior Year

| | Fall | Units |
|--------|-----------------------------------|--------------|
| 54-301 | Acting III | 10 |
| 54-303 | Speech III (accents) | 6 |
| 54-305 | Voice/Alexander III | 5 |
| 54-307 | Movement III | 5 |
| 54-311 | Acting Symposium III | 16 |
| 54-325 | Actor Dance III | 3 |
| 54-381 | History of Drama*** | 3 |
| xx-xxx | Non-Drama Elective | 6-9 |
| 54-317 | Singing for Actors III (Optional) | 2 |
| 54-xxx | Junior Auditioning (Optional) | 2 |
| | | 54-57 |

| | Spring | Units |
|--------|-----------------------------------|--------------|
| 54-302 | Acting III | 10 |
| 54-304 | Speech III (dialects) | 6 |
| 54-306 | Voice/Alexander III | 5 |
| 54-308 | Movement III | 5 |
| 54-312 | Acting Symposium III | 16 |
| 54-325 | Actor Dance III | 3 |
| 54-382 | History of Drama*** | 3 |
| xx-xxx | Non-Drama Elective | 6-9 |
| 54-318 | Singing for Actors III (Optional) | 2 |
| 54-xxx | Junior Auditioning (Optional) | 2 |
| | | 54-57 |

Senior Year

| | Fall | Units |
|--------|-----------------------------------|--------------|
| 54-401 | Camera Lab | 3 |
| 54-405 | Grad Directing Future Stages | 5 |
| 54-409 | Theatre Lab | 4 |
| 54-411 | Acting Symposium IV | 20 |
| 54-413 | Showcase | 4 |
| 54-437 | Acting IV | 5 |
| 54-494 | Business of Acting | 4 |
| xx-xxx | Non-Drama Elective | 6-9 |
| 54-407 | Movement IV | 3 |
| | -or- | |
| xx xxx | Non-Drama Physical Content Course | 3-9 |
| | | 57-60 |
| | Spring | |
| 54-438 | Acting for the Camera | 3 |
| 54-406 | Grad Directing Future Stages | 5 |
| 54-410 | Theatre Lab | 4 |
| 54-412 | Acting Symposium IV | 20 |
| 54-414 | Showcase | 9 |
| 54-464 | Acting IV | 5 |
| xx-xxx | Non-Drama Elective | 6-9 |
| | | 55 |

Important:

* Foundations of Drama I will be taken Only one semester

** Foundations of Drama II will be taken Only one semester.

Sophomore Actors will be required to take an approved HSS Course during the semester they are not taking the Foundations of Drama II course.

*** All Actors will be required to complete two History of Drama minis during the Junior year.

Music Theatre Curriculum**Freshman Year**

| | Fall | Units |
|--------|---------------------------------------|--------------|
| 54-101 | Acting I | 10 |
| 54-103 | Speech I | 6 |
| 54-105 | Voice/Alexander I | 5 |
| 54-107 | Movement I | 4 |
| 54-123 | Ballet I | 5 |
| 54-125 | Music Skills I | 2 |
| 54-159 | Production Symposium I | 6 |
| 54-175 | Conservatory Hour | 1 |
| 54-177 | Foundations of Drama I* | 6 |
| 54-500 | Voice Lab | 5 |
| 64-100 | Critical Histories of the Arts | 9 |
| 99-10x | Computing @ Carnegie Mellon | 3 |
| | | 56-62 |
| | Spring | |
| 54-102 | Acting I | 10 |
| 54-104 | Speech I | 6 |
| 54-106 | Voice/Alexander I | 5 |
| 54-108 | Movement I | 4 |
| 54-124 | Ballet I | 5 |
| 54-126 | Music Skills II | 2 |
| 54-160 | Production Symposium I | 6 |
| 54-176 | Conservatory Hour | 1 |
| 54-177 | Foundations of Drama I* | 6 |
| 54-500 | Voice Lab | 5 |
| 76-101 | Interpretation and Argument (English) | 9 |
| | | 53-59 |

Sophomore Year

| | Fall | Units |
|--------|---------------------------|--------------|
| 54-201 | Acting II | 12 |
| 54-203 | Voice & Speech II | 5 |
| 54-205 | Ballet II | 3 |
| 54-207 | Movement II | 3 |
| 54-217 | Jazz II | 2 |
| 54-219 | MT Lit and Rep | 4 |
| 54-223 | Tap II | 2 |
| 54-261 | Production Symposium II+ | 6 |
| 54-281 | Foundations of Drama II** | 6 |
| | -or- | |
| xx-xxx | HSS Approved Course | 9 |
| 54-500 | Voice Lab | 5 |
| | | 42-45 |

Spring

| | | |
|--------|---------------------------|-------|
| 54-202 | Acting II | 12 |
| 54-204 | Voice & Speech II | 6 |
| 54-206 | Ballet II | 3 |
| 54-208 | Movement II | 3 |
| 54-218 | Jazz II | 2 |
| 54-224 | Tap II | 2 |
| 54-226 | Acting a Song | 4 |
| 54-262 | Production Symposium II+ | 6 |
| 54-281 | Foundations of Drama II** | 6 |
| | -or- | |
| xx-xxx | HSS Approved Course | 9 |
| 54-294 | Make-Up for Performers | 3 |
| 54-500 | Voice Lab | 5 |
| | | 46-49 |

Junior Year

| | Fall | Units |
|--------|-----------------------|--------------|
| 54-301 | Acting III | 10 |
| 54-303 | Speech III (dialects) | 6 |
| 54-305 | Voice/Alexander III | 5 |
| 54-311 | Acting Symposium III | 16 |
| 54-313 | Ballet III | 3 |
| 54-315 | Jazz III | 2 |
| 54-319 | Cabaret | 6 |
| 54-323 | Tap III | 2 |
| 54-500 | Voice Lab | 5 |
| 54-xxx | History of Drama*** | 3 |
| | | 58 |

Spring

| | | |
|--------|------------------------|-------|
| 54-302 | Acting III | 10 |
| 54-304 | Speech III (accents) | 6 |
| 54-306 | Voice/Alexander III | 5 |
| 54-312 | Acting Symposium III | 16 |
| 54-314 | Ballet III | 3 |
| 54-316 | Jazz III | 2 |
| 54-500 | Voice Lab | 5 |
| 54-324 | Tap III | 2 |
| 54-xxx | History of Drama*** | 3 |
| xx xxx | Non-Drama Elective**** | 6-9 |
| | | 58-61 |

Senior Year

| | Fall | Units |
|--------|------------------------|--------------|
| 54-401 | Camera Lab | 3 |
| 54-409 | Theatre Lab | 4 |
| 54-411 | Acting Symposium IV | 20 |
| 54-413 | Showcase | 4 |
| 54-415 | Broadway Styles | 4 |
| 54-423 | Tap IV | 2 |
| 54-437 | Acting IV | 5 |
| 54-494 | Business of Acting | 4 |
| 54-500 | Voice Lab | 5 |
| 54-407 | Movement IV (Optional) | 6 |
| | | 51 |
| | Spring | |
| 54-410 | Theatre Lab | 4 |
| 54-412 | Acting Symposium IV | 20 |
| 54-414 | Showcase | 9 |
| 54-416 | Broadway Styles | 4 |
| 54-424 | Tap IV | 2 |
| 54-464 | Acting IV | 5 |
| 54-438 | Acting for the Camera | 3 |
| 54-500 | Voice Lab | 5 |
| | | 52 |

Important:

* Foundations of Drama I will be taken Only one semester

** Foundations of Drama II will be taken Only one semester. Sophomore Music Theater students will be required to take an approved HSS Course during the semester they are not taking the Foundations of Drama II course.

*** All Music Theatre students will be required to complete two History of Drama minis during the Junior year.

**** All Music Theatre students will be required to take one Non-Drama elective in the spring semester of Junior year.

+ Production Symposium II is only taken one semester of the Sophomore year.

Undergraduate Directing Curriculum

Freshman Year

| Fall | | Units |
|-------------|--------------------------------|--------------|
| 54-011 | Warmup | 1 |
| 54-121 | Directing I: Sources | 9 |
| 54-101 | Acting I | 12 |
| 54-107 | Movement I | 4 |
| 54-177 | Foundations of Drama I | 6 |
| 54-517 | Directors' Colloquium | 1 |
| 54-159 | Production Symposium I | 6 |
| 54-175 | Conservatory Hour | 1 |
| 64-100 | Critical Histories of the Arts | 9 |
| 99-10x | Computing @ Carnegie Mellon | 3 |
| xx-xxx | Non-Drama Elective | 6-9 |
| | | 57-60 |

| Spring | | Units |
|---------------|---------------------------|--------------|
| 54-012 | Warmup | 1 |
| 54-122 | Directing I: Sources | 9 |
| 54-102 | Acting I | 12 |
| 54-108 | Movement I | 4 |
| 54-177 | Foundations of Drama I | 6 |
| 54-160 | Production Symposium I | 6 |
| 54-518 | Directors' Colloquium | 1 |
| 54-176 | Conservatory Hour | 1 |
| 76-101 | Interpretation & Argument | 9 |
| xx-xxx | Non-Drama Elective | 6-9 |
| | | 56-59 |

Sophomore Year

| Fall | | Units |
|-------------|----------------------------|--------------|
| 54-201 | Acting II | 12 |
| 54-221 | Directing II: Fundamentals | 9 |
| 54-281 | Foundations of Drama II | 6 |
| 54-517 | Directors' Colloquium | 1 |
| 54-257 | Directing Production II | 12 |
| 54-xxx | Make-Up (Optional) | 2 |
| xx-xxx | Non-Drama Elective | 6-9 |
| | | 46-49 |

| Spring | | Units |
|---------------|----------------------------|--------------|
| 54-202 | Acting II | 12 |
| 54-222 | Directing II: Fundamentals | 9 |
| 54-277 | Intro to Stage Management | 6 |
| 54-281 | Foundations of Drama II | 6 |
| 54-518 | Directors' Colloquium | 1 |
| 54-258 | Directing Production II | 12 |
| xx-xxx | Non-Drama Elective | 6-9 |
| | | 52-55 |

Junior Year

| Fall | | Units |
|-------------|---------------------------------|--------------|
| 54-321 | Acting III for Directors | 9 |
| 54-231 | Design for the Stage | 6 |
| 54-239 * | History of Architecture & Décor | 4 |
| | -or- | |
| 54-245 * | History of Clothing | 4 |
| 54-517 | Directors' Colloquium | 1 |
| 54-357 | Directing Production III | 12 |
| 54-277 | Stage Management I | 6 |
| xx-xxx | Non-Drama Elective | 6-9 |
| 54-xxx | History of Drama | 3 |
| | | 51-54 |

| Spring | | Units |
|---------------------|--|--------------|
| Internship semester | | 36 |

Senior Year

| Fall | | Units |
|-------------|------------------------------|--------------|
| 54-401 | Camera Lab | 6 |
| 54-409 | Theatre Lab | 9 |
| 54-433 | Producing for TV & Film | 9 |
| 54-457 * | Directing Production IV | 12 |
| 54-517 | Directors' Colloquium | 1 |
| 54-475 | Theatre Management | 6 |
| xx-xxx | Non-Drama Elective | 6-9 |
| 54-xxx | History of Drama (If Needed) | 3 |
| | | 52-55 |

| Spring | | Units |
|---------------|---------------------------------------|--------------|
| 54-422 | Directing IV: Departures from Realism | 6 |
| 54-410 | Theatre Lab | 9 |
| 54-xxx | TV Project | 3 |
| 54-458 * | Directing Production IV | 12 |

| | | |
|--------|------------------------------|-------|
| 54-518 | Directors' Colloquium | 1 |
| 54-xxx | History of Drama (If Needed) | 3 |
| xx-xxx | Non-Drama Elective | 6-9 |
| | | 40-49 |

* One semester of Directing Production IV required – Senior Thesis Play. Second semester is optional.

All Directors will be required to take a total of two Drama History minis of varying topics over their junior and senior year.

* Foundations of Drama I and II will only be taken one semester. Students are also required to take one semester of an approved HSS course during a semester of their freshman and sophomore year in which they are not taking a Foundations course.

Undergraduate Design Curriculum

Freshman Year

| Fall | | Units |
|--------------------------------|--|--------------|
| Basic Design | | 6 |
| Basic PTM | | 6 |
| Stagecraft | | 15 |
| Studiocraft | | 13 |
| Foundations of Drama I* | | 6 |
| Critical Histories of the Arts | | 9 |
| Computing @ Carnegie Mellon | | 3 |
| Conservatory Hour | | 1 |
| | | 53 |

| Spring | | Units |
|-----------------------------|--|--------------|
| Basic Design | | 6 |
| Basic PTM | | 6 |
| Stagecraft | | 11 |
| Studiocraft | | 8 |
| Foundation of Drama I* | | 6 |
| Conservatory Hour | | 1 |
| Non-Drama Elective | | 6-9 |
| Interpretation and Argument | | 9 |
| | | 53 |

Sophomore Year

| Fall | | Units |
|---------------------------|--|--------------|
| Salt Peanuts | | 6 |
| Design for the Stage | | 5 |
| Technical Management | | 5 |
| Stagecraft II | | 14 |
| Studiocraft II | | 3 |
| Directing II | | 6 |
| Foundations of Drama II** | | 6 |
| Non-Drama Elective | | 69 |
| Script Analysis (mini 2) | | 2 |
| | | 53 |

| Spring | | Units |
|---------------------------|--|--------------|
| <i>All Design</i> | | |
| Foundations II** | | 6 |
| History of Drama Minis*** | | 3 |
| Non-Drama Elective | | 6-9 |

*** Note: HOD Minis may be taken at any time after Foundations II has been completed. Costume Designers are required to take the Minis in this semester.

| <i>Sound Design</i> | | Units |
|-------------------------------------|--|--------------|
| Introduction to Sound Design | | 21 |
| Production Audio | | 6 |
| Ear Training for the Sound Designer | | 1 |

| <i>Costume Design</i> | | Units |
|--------------------------------------|--|--------------|
| Introduction to Costume Design | | 21 |
| Introduction to Costume Construction | | 6 |
| Make-up for Designers | | 2 |
| Figure Drawing I | | 6 |

| <i>Set Design</i> | | Units |
|------------------------------|--|--------------|
| Introduction to Scene Design | | 21 |
| Set Design Forum | | n/a |
| Scene Design Skills 3D | | 6 |
| Scene Painting 1 | | 6 |

| <i>Lighting Design</i> | | Units |
|---------------------------------|--|--------------|
| Introduction to Lighting Design | | 21 |
| Photoshop/Dreamweaver | | 6 |
| Lighting Design Forum | | n/a |
| | | 53 |

Junior Year

| Fall | | Units |
|-------------------------------------|--|--------------|
| <i>All Design</i> | | |
| History of Clothing | | 6 |
| History of Architecture and Décor | | 6 |
| History of Drama | | 3 |
| Non-Drama Elective | | 6-9 |
| <i>Sound Design</i> | | |
| Sound Design I | | 21 |
| Advanced System Design | | 9 |
| Ear Training for the Sound Designer | | 1 |
| <i>Costume Design</i> | | |
| Costume Design 1 | | 21 |
| Costume Construction | | 9 |
| Drawing for the Theatrical Designer | | 6 |
| Costume Design Forum | | n/a |
| Costume Crafts | | 6 |
| Figure Drawing 1 | | 6 |
| <i>Set Design</i> | | |
| Scene Design I | | 21 |
| Set Design Forum | | n/a |
| 2-D Scene Design Skills | | 6 |
| Scene Painting I | | 6 |
| <i>Lighting Design</i> | | |
| Lighting Design I | | 21 |
| Lighting Design Skills | | 6 |
| Production Electrics | | 6 |
| Lighting Design Forum | | n/a |
| | | 53 |
| Spring | | |
| <i>All Design</i> | | |
| History of Clothing | | 6 |
| History of Architecture and Décor | | 6 |
| History of Drama | | 3 |
| Non-Drama Elective | | 6-9 |
| <i>Sound Design</i> | | |
| Sound Design I | | 21 |
| Ear Training for the Sound Designer | | 1 |
| Advanced System Design | | 9 |
| <i>Costume Design</i> | | |
| Costume Design I | | 21 |
| Costume Construction | | 6 |
| Figure Drawing II | | 6 |
| Painting for the Costume Designer | | 6 |
| Costume Crafts | | 6 |
| Costume Design Forum | | n/a |
| <i>Set Design</i> | | |
| Scene Design I | | 21 |
| Set Design Forum | | n/a |
| Scene Design Skills 3D | | 6 |
| Photoshop/Dreamweaver | | 6 |
| Scene Painting | | 6 |
| <i>Lighting Design</i> | | |
| Lighting Design I | | 21 |
| Automated Lighting | | 6 |
| Lighting Previsualization Software | | 6 |
| Lighting Design Forum | | n/a |
| | | 53 |

Senior Year

| Fall | | Units |
|-------------------------------------|--|--------------|
| <i>All Design</i> | | |
| Non- Drama Elective | | 6-9 |
| History of Drama | | 3 |
| <i>Sound Design</i> | | |
| Sound Design II | | 21 |
| Ear Training for the Sound Designer | | 1 |
| <i>Costume Design</i> | | |
| Scenography or Costume Design II | | 21 |
| Costume Construction II | | 6 |
| Costume Design Forum | | n/a |
| Figure Drawing II | | 6 |
| Drawing for the Theatrical Designer | | 6 |
| <i>Set Design</i> | | |
| Scenography | | 21 |
| Set Design Forum | | n/a |
| Drawing for the Theatrical Designer | | 6 |
| Scene Painting II | | 6 |

| | | |
|------------------------|--|-----|
| <i>Lighting Design</i> | | |
| Lighting Design II | | 21 |
| Lighting Design Forum | | n/a |
| | | 53 |

Spring

| | | |
|--------------------------------------|--|-----|
| <i>All Design</i> | | |
| Non-Drama Elective | | 6-9 |
| History of Drama | | 3 |
| <i>Sound Design</i> | | |
| Sound Design II | | 21 |
| Ear Training for the Sound Designer | | 1 |
| <i>Costume Design</i> | | |
| Costume Design II | | 21 |
| Costume Construction II | | 6 |
| Costume Design Forum | | n/a |
| Painting for the Theatrical Designer | | 6 |
| <i>Set Design</i> | | |
| Set Design Two | | 21 |
| Set Design Forum | | n/a |
| Painting for the Theatrical Designer | | 6 |
| Scene Painting II | | 6 |
| <i>Lighting Design</i> | | |
| Lighting Design II | | 21 |
| Lighting Design Forum | | n/a |
| | | 53 |

All Designers will be required to take a total of two Drama History minis of varying topics over their junior and senior year.

* Foundations of Drama I and II will only be taken one semester. Students are also required to take one semester of an approved HSS course during a semester of their freshman and sophomore year in which they are not taking a Foundations course. This HSS course is also considered an elective.

Curriculum for dual disciplines is available and customizable to individual student needs. Please meet with your advisor or option coordinator to discuss the possibilities.

Undergraduate PTM Curriculum**Freshman Year**

| Fall | | Units |
|---------------|----------------------------------|--------------|
| 54-151 | Stagecraft | 15 |
| 54-157 | Basic PTM | 6 |
| 54-169 | Studiocraft | 13 |
| 54-171 | Basic Design | 6 |
| 54-175 | Conservatory Hour | 1 |
| 54-177 | Foundations of Drama I* | 6 |
| 64-100 | Critical Histories of the Arts** | 9 |
| 99-10x | Computing @ Carnegie Mellon** | 3 |
| | | 56 |
| Spring | | |
| 54-152 | Stagecraft | 11 |
| 54-158 | Basic PTM | 6 |
| 54-170 | Studiocraft | 8 |
| 54-172 | Basic Design | 6 |
| 54-176 | Conservatory Hour | 1 |
| xx-xxx | HSS approved elective* | 6-9 |
| 76-101 | Interpretation and Argument** | 9 |
| xx-xxx | Non-Drama Elective | 9 |
| | | 56 |

Sophomore Year

| Fall | | Units |
|---------------|--------------------------------|--------------|
| 54-210 | Script Analysis | 2 |
| 54-221 | Directing II | 6 |
| 54-229 | Salt Peanuts | 6 |
| 54-250 | Stagecraft II | 14 |
| 54-266 | Technical Management | 5 |
| 54-271 | Design for the Stage | 5 |
| 54-280 | Studiocraft II | 3 |
| 54-281 | Foundations of Drama II* | 6 |
| xx-xxx | Non-Drama Elective | 6-9 |
| | | 53-56 |
| Spring | | |
| 54-272 | Scenic Fabrication and Install | 6-18 |
| 54-330 | Intro to Stage Management | 6-18 |
| 54-334 | Production Resource Mgmt | 6-18 |
| xx-xxx | Directed Elective | 3-12 |
| xx-xxx | Non-Drama Elective | 6-9 |

| | | |
|----------------------------|-----------------------|-------|
| <i>Technical Direction</i> | | |
| 54-264 | Welding | 4 |
| <i>PM/SM</i> | | |
| 54-166 | Intro to Sound Design | 6 |
| | | 42-66 |

Junior Year

| | Fall | Units |
|--------|------------------------------|--------------|
| 54-273 | Technical Direction I | 6-21 |
| 54-333 | Production Personnel Mgmt | 6-21 |
| 54-368 | Production Electrics | 4-18 |
| 54-381 | History of Drama (if needed) | 3 |
| xx-xxx | Directed Elective | 3-12 |
| xx-xxx | Non-Drama Elective | 6-9 |

Technical Direction

| | | |
|----------|----------------------------|---|
| 54-353 | Structural Design I | 9 |
| -or- *** | | |
| 54-366 | Physics of Stage Machinery | 9 |

PM/SM

| | | |
|--------|--------------------------|-------|
| 54-277 | Stage Management I | 6-21 |
| 54-339 | Stage Management Seminar | 3 |
| | | 45-67 |

| | Spring | Units |
|--------|------------------------------|--------------|
| 54-475 | Theatre Management | 6 |
| 54-382 | History of Drama (if needed) | 3 |
| xx-xxx | Directed Elective | 3-12 |
| xx-xxx | Non-Drama Elective | 6-9 |

Technical Direction

| | | |
|----------|------------------------|------|
| 54-378 | Technical Direction II | 6-21 |
| 54-376 | Entertainment Rigging | 6 |
| 54-354 | Structural Design II | 9 |
| -or- *** | | |
| 54-365 | Machine Design I | 9 |

PM/SM

| | | |
|--------|------------------------------|-------|
| 54-278 | Stage Management I | 6-21 |
| 54-340 | Stage Management Seminar | 3 |
| 54-456 | Prod Mgmt Workshop | 3-18 |
| 54-380 | Music Reading for Drama Tech | 3 |
| | | 45-69 |

Senior Year

| | Fall | Units |
|--------|------------------------------|--------------|
| 54-355 | 30 Hour OSHA | 6 |
| 54-381 | History of Drama (if needed) | 3 |
| xx-xxx | Directed Elective | 3-12 |
| xx-xxx | Non-Drama Elective | 6-9 |

Technical Direction

| | | |
|----------|-------------------------|------|
| 54-477 | Technical Direction III | 6-26 |
| 54-353 | Structural Design I | 9 |
| -or- *** | | |

| | | |
|--------|----------------------------|---|
| 54-366 | Physics of Stage Machinery | 9 |
|--------|----------------------------|---|

PM/SM

| | | |
|--------|---------------------------|-------|
| 54-359 | Stage Management II | 6-26 |
| 54-439 | Stage Management Seminar | 3 |
| 54-453 | Production Mgmt. Workshop | 3-23 |
| | | 47-68 |

| | Spring | Units |
|--------|------------------------------|--------------|
| 54-xxx | PTM Business Practices | 3 |
| 54-381 | History of Drama (if needed) | 3 |
| xx-xxx | Non-Drama Elective | 6-9 |

Technical Direction

| | | |
|----------|----------------------|------|
| 54-354 | Structural Design II | 9 |
| -or- *** | | |
| 54-466 | Machine Design II | 9 |
| 54-xxx | Tech Direction IV | 6-26 |

PM/SM

| | | |
|--------|---------------------------|-------|
| 54-440 | Stage Management Seminar | 3 |
| 54-456 | Production Mgmt. Workshop | 3-23 |
| 54-xxx | Stage Management II | 6-26 |
| 54-xxx | Management II | 6 |
| | | 47-68 |

Foundations of Drama I and II will only be taken during one semester of the Freshman and Sophomore year. Students are also required to take one semester of an approved HSS course during a semester of their freshman and sophomore year in which they are not taking a Foundations course.

** Courses may be taken in either the fall or spring semester of the freshman year.

*** Classes offered in alternating years.

Undergraduate Dramaturgy Curriculum**First Year**

| | Fall | Units |
|--------|----------------------|--------------|
| 54-177 | Foundations I | 6 |
| 54-109 | Dramaturgy I (+crew) | 9(+6) |
| 54-175 | Conservatory Hour | 1 |
| 54-200 | Ghost Light Forum | 1 |

| | Spring | Units |
|--------|-------------------|--------------|
| 54-178 | Foundations II | 6 |
| 54-174 | Dramaturgy II | 9 |
| 54-176 | Conservatory Hour | 1 |
| 54-201 | Ghost Light Forum | 1 |

The following courses may be taken in either semester:

| | | |
|--------|-----------------------------|----|
| 76-101 | Interpretation and Argument | 9 |
| 64-100 | Critical Histories/Arts | 9 |
| 99-10x | Computing @ Carnegie Mellon | 3 |
| | | 61 |

Second Year

| | Fall | Units |
|--------|-------------------|--------------|
| 54-200 | Ghost Light Forum | 1 |

| | Spring | Units |
|--------|-------------------|--------------|
| 54-xxx | Intro Design | 9 |
| 54-200 | Ghost Light Forum | 1 |

The following courses may be taken in either semester:

| | | |
|--------|------------------------|----|
| 54-299 | Dramaturgy Prod. III | 3 |
| 54-xxx | Intro Design | 9 |
| 54-239 | History of Arch/Decor | 4 |
| 54-245 | History of Clothing | 4 |
| 76-294 | Interpretive Practices | 9 |
| | | 31 |

Third Year

| | Fall | Units |
|--------|-------------------------|--------------|
| 54-381 | History of Drama Mini I | 3 |
| 54-200 | Ghost Light Forum | 1 |

| | Spring | Units |
|--------|--------------------------|--------------|
| 54-382 | History of Drama Mini II | 3 |
| 54-200 | Ghost Light Forum | 1 |

The following courses may be taken in either semester:

| | | |
|----------|----------------------------|----|
| 54-387/8 | Dramaturgy Prod. IV | 10 |
| 54-xxx | Dramaturgy Research Hrs | 6 |
| 51-327 | Introduction to Web Design | 9 |
| | | 33 |

Fourth Year

| | Fall | Units |
|--------|-----------------------|--------------|
| 54-785 | Colloquium | 9 |
| 54-381 | History of Drama Mini | 3 |
| 54-200 | Ghost Light Forum | 1 |

| | Spring | Units |
|--------|-----------------------|--------------|
| 54-786 | Colloquium | 9 |
| 54-382 | History of Drama Mini | 3 |
| 54-200 | Ghost Light Forum | 1 |

The following courses may be taken in either semester:

| | | |
|-----------|--------------------|----|
| 54-487/8 | Dramaturgy Prod. V | 12 |
| 54-489/90 | Internship | 9 |
| 54-xxx | Thesis Hours | 9 |
| | | 62 |

Other Requirements (may be taken in any year)

| Course Name | Units |
|-------------------------------------|---|
| <i>English:</i> | |
| 76-245 | Shakespeare: Histories and Tragedies |
| 76-247 | Shakespeare: Comedies and Romances |
| 76-330 | Medieval Literature |
| 76-331 | Renaissance Literary and Cultural Studies |
| 76-334 | 19 th Century Lit/Cultural Studies |
| 76-335 | 20 th Century Lit/Cultural Studies |
| <i>Plus two from the following:</i> | |
| 76-431 | British Lit/Cultural Studies |
| 76-432 | African-American Studies |
| 76-438 | American Lit/Cultural Studies |
| 76-4xx | 400-level English course |

History:

Three 9-unit 200-level History courses (79-2xx). One of these must focus on history pre-1900, and one must focus on African, Asian, Latin American, or Caribbean studies. 27

European Studies:

One 9-unit course. Cannot be an English course, but can be a History course. 9

Foreign Language:

One 12-unit Foreign Language course, 82-2xx or above 12

Drama (select two):

54-101 Acting I 9
54-121 Directing I 9
54-187 Intro to Playwriting 9

Electives:

Seven non-dramaturgy electives; 6-9 units/course. 42-54

TOTAL: 161-182

Notes:

1. Interdisciplinary Symposium requirement may be dropped if the course stops being offered.
2. Ghost Light Forum should be taken every semester unless student is abroad.
3. Dramaturgy Production III-V may be taken for variable hours.

Music

- The Jazz Performance Minor is suspended until further notice.
- The **Bachelor of Science in Music and Technology** is now available (see below.)

Composition Major**Curriculum****Freshman Year**

| | Fall | Units |
|--------|--|--------------|
| 57-100 | Convocation | 0 |
| 57-521 | Studio | 9 |
| 57-031 | Composition Seminar | 0 |
| 57-4xx | Major Ensemble: _____ | 6 |
| 57-191 | Keyboard Studies I | 3 |
| 57-152 | Harmony I | 6 |
| 57-162 | Eurhythmics I | 3 |
| 57-181 | Solfege I | 3 |
| 57-189 | Repertoire and Listening for Musicians I | 3 |
| 57-173 | Survey of Western Music History | 9 |
| 57-101 | Introduction to Music Technology | 6 |
| 99-10x | Computing @ Carnegie Mellon | 3 |
| | | 51 |

| | Spring | Units |
|--------|---|--------------|
| 57-100 | Convocation | 0 |
| 57-521 | Studio | 9 |
| 57-031 | Composition Seminar | 0 |
| 57-4xx | Major Ensemble: _____ | 6 |
| 57-192 | Keyboard Studies II | 3 |
| 57-153 | Harmony II | 6 |
| 57-162 | Eurhythmics II | 3 |
| 57-182 | Solfege II | 3 |
| 57-190 | Repertoire and Listening for Musicians II | 3 |
| 64-100 | Critical Histories of the Arts | 9 |
| 76-101 | Interpretation and Argument | 9 |
| | | 51 |

Sophomore Year

| | Fall | Units |
|--------|--|--------------|
| 57-100 | Convocation | 0 |
| 57-521 | Studio | 9 |
| 57-031 | Composition Seminar | 0 |
| 57-4xx | Major Ensemble: _____ | 6 |
| 57-291 | Keyboard Studies III | 3 |
| 57-151 | Concept and Practice of Counterpoint | 6 |
| 57-163 | Eurhythmics III | 3 |
| 57-182 | Solfege III | 3 |
| 57-289 | Repertoire and Listening for Musicians III | 3 |
| 57-283 | Music History I | 9 |

| | | |
|--------|-----------------|----|
| 57-257 | Orchestration I | 6 |
| xx-xxx | Elective | 6 |
| | | 54 |

Spring

| | | |
|--------|---|----|
| 57-100 | Convocation | 0 |
| 57-521 | Studio | 9 |
| 57-031 | Composition Seminar | 0 |
| 57-4xx | Major Ensemble: _____ | 6 |
| 57-292 | Keyboard Studies IV | 3 |
| 57-408 | Form and Analysis | 6 |
| 57-164 | Eurhythmics IV | 3 |
| 57-184 | Solfege IV | 3 |
| 57-290 | Repertoire and Listening for Musicians IV | 3 |
| 57-284 | Music History II | 9 |
| 57-271 | Orchestration II | 6 |
| 57-258 | 20 th Century Techniques | 6 |
| | | 54 |

Junior Year**Fall**

| | | Units |
|--------|-----------------------------------|--------------|
| 57-100 | Convocation | 0 |
| 57-521 | Studio | 9 |
| 57-031 | Composition Seminar | 0 |
| 57-234 | Performance for Composers | 3 |
| 57-332 | Introduction to Composing | 6 |
| 57-347 | Music Technology I | 6 |
| 57-xxx | Music Support Course ¹ | |
| | Analysis/Other: _____ | 6 |
| xx-xxx | General Studies Course | 9 |
| | | 45 |

Spring

| | | |
|--------|-----------------------------------|----|
| 57-100 | Convocation | 0 |
| 57-521 | Studio | 9 |
| 57-031 | Composition Seminar | 0 |
| 57-234 | Performance for Composers | 3 |
| 57-336 | Instrumental/Choral Conducting | 6 |
| 57-459 | Score Reading/Keyboard Harmony | 6 |
| 57-348 | Music Technology II | 6 |
| 57-xxx | Music Support Course ² | |
| | Analysis/Other: _____ | 6 |
| xx-xxx | General Studies Course | 9 |
| | | 45 |

Senior Year**Fall**

| | | Units |
|--------|-----------------------------------|--------------|
| 57-100 | Convocation | 0 |
| 57-521 | Studio | 9 |
| 57-031 | Composition Seminar | 0 |
| 57-4xx | Major Ensemble: _____ | 6 |
| 57-xxx | Music Support Course ² | |
| | Analysis/Other: _____ | 6 |
| xx-xxx | General Studies Course | 9 |
| xx-xxx | Elective | 12 |
| | | 42 |

Spring

| | | |
|--------|-----------------------------------|----|
| 57-100 | Convocation | 0 |
| 57-521 | Studio | 9 |
| 57-031 | Composition Seminar | 0 |
| 57-4xx | Major Ensemble: _____ | 6 |
| 57-349 | Supervised Theory Teaching | 6 |
| 57-xxx | Music Support Course ² | |
| | Analysis/Other: _____ | 6 |
| xx-xxx | General Studies Course | 9 |
| xx-xxx | Elective | 6 |
| | | 42 |

Notes:

- 1 One music support course is recommended to be Creative Orchestration.
- 2 One music support course must be an analysis course.

Additional Requirements

Repertoire Proficiency I
Repertoire Proficiency II
Repertoire Proficiency III
Repertoire Proficiency IV
Piano Proficiency
Senior Project

Total number of units required for degree: 384

Bachelor of Science in Music and Technology (new)

Carnegie Mellon announces a new Bachelor of Science in Music and Technology, offered jointly by the School of Music, the School of Computer Science (SCS), and the Carnegie Institute of Technology (CIT).

This program will consist of a set of courses that span both music and technology, as well as a capstone composition/design/performance project. Courses in all three areas of study are stipulated in the music and technology undergraduate curriculum and provide for students coming from any of the three areas. In other words, regardless of a student's entry point—an interest in computer science, electrical engineering, or music—the coursework prescribed will allow the student to gain the requisite knowledge and experience in all three areas. Students will work closely with advisors and will be guided in both course selection and capstone projects.

Curriculum

General Requirements

85 units

Seminar

57-570 Music and Technology Seminar (each semester) 8

University

99-10x Computing @ Carnegie Mellon 3
76-101 Interpretation and Argument 9
79-104 Introduction to World History 9

Humanities

xx-xxx Cognition, Choice and Behavior course 9
xx-xxx English, History, Modern Languages, Philosophy, or Psychology course 9

Mathematics

EITHER:

21-120 Differential and Integral Calculus 10
21-122 Integ. Diff. Equations, Approximations 10

OR:

21-115 Differential Calculus (AP) 5
21-121 Integration, Differential Equations 10
21-123 Calculus of Approximation 5

Science

33-114 Physics of Musical Sound 9
33-106 Physics for Engineering Students 9

Electives

29

Music Core

90 units

57-100 Convocation 0
57-152 Harmony I 6
57-153 Harmony II 6
57-151 Concept and Practice of Counterpoint 6
57-408 Form and Analysis 6
57-258 20th and 21st Century Techniques 6
57-257 Orchestration I 6
57-271 Orchestration II 6
57-189 Repertoire & Listening I 3
57-190 Repertoire & Listening II 3
57-289 Repertoire & Listening III 3
57-290 Repertoire & Listening IV 3
57-181 Solfege I 3
57-182 Solfege II 3
57-183 Solfege III 3
57-184 Solfege IV 3
57-161 Eurhythmics I 3
57-162 Eurhythmics II 3
57-283 Music History I 9
57-284 Music History II 9

Music and Technology Core

121 units

15-110 Introduction to Programming 10
-or-
15-121 Introduction to Data Structures 10
15-123 Effective Programming in C and Unix 9
15-322 Introduction to Computer Music 9
18-100 Introduction to ECE 12
18-202 Math Foundations of EE 12
18-290 Signal and Information Processing 12
57-101 Introduction to Music Technology 6
57-347 Music Technology I 6
57-337 Sound Recording 6
57-338 Editing and Mastering 6
57-438 Multitrack Recording 9
57-571 Project 12
57-572 Project 12

Students complete either the Music Concentration of the Technical Concentration:

Music Concentration

60 units

57-5xx Studio (4 semesters) 36
57-417/8 Major Ensemble (4 semesters) 24

Technical Concentration

57 or 55 units

21-127 Concepts of Mathematics 9
15-213/ Introduction to Computer Systems 12
18-243

And

EITHER:

18-220 Electronic Devices and Analog Circuits 12
18-240 Structure and Design of Digital Systems 12
15-2xx/ Electives in ECE or CS 12
18-3xx
or above

OR:

15-128 CS Freshman Immigration 1
15-211 Fundamental Data Structures & Algorithms 12
15-323 Computer Music Systems and Info Proc 9
15-2xx/ Electives in ECE or CS 12
18-3xx
or above

Total number of units required for major:

380

College of Humanities and Social Sciences

General

- Gloria Hill is now the Assistant Dean and Director of the H&SS Academic Advisory Center.

Majors

| Name of Major (Degree Options) | Department |
|---|-------------------------------|
| Economics (B.A./B.S.) | Economics |
| Economics and Mathematical Sciences | Economics ¹ |
| English (B.A.) | English |
| Creative Writing (B.A.) | English |
| Professional Writing (B.A.) | English |
| Technical and Professional Writing (B.A.) | English |
| Global Studies (B.A.) | History |
| History (B.A.) | History |
| Economics and Statistics (B.S.) | Interdepartmental |
| Environmental Policy (additional major only) | Interdepartmental |
| Ethics, History, and Public Policy (B.A./B.S.) | Interdepartmental |
| European Studies ² | Interdepartmental |
| Information Systems (B.S.) (by admission) | Interdepartmental |
| Linguistics (B.A.) | Interdepartmental |
| Student Defined (B.A./B.S.) | Interdepartmental |
| Chinese Studies (B.A.) | Modern Languages |
| French and Francophone Studies (B.A.) | Modern Languages |
| German (B.A.) | Modern Languages |
| Hispanic Studies (B.A.) | Modern Languages |
| Japanese (B.A.) | Modern Languages |
| Russian Studies (B.A.) | Modern Languages |
| Logic and Computation (B.S.) | Philosophy |
| Philosophy (B.A.) | Philosophy |
| Cognitive Science (B.S.) | Psychology |
| Psychology (B.A./B.S.) | Psychology |
| Psychology and Biological Sciences (B.S.) | Psychology ³ |
| Decision Science (B.S.) | Social and Decision Sciences |
| Policy and Management (B.S.) | Social and Decision Sciences |
| International Relations and Politics (B.S.) ⁴ | Social and Decision Sciences |
| Statistics (B.S.) | Statistics |

Notes:

- with the Department of Mathematical Sciences
- This major had been missing from this chart.
- with the Department of Biological Sciences
- formerly Global Politics.

Minors

- The Minor in Chinese is now the Minor in Chinese Studies.
- The Minor in Global Politics is now the Minor in International Relations and Politics.
- The Minor in Russian Studies is now under the Department of Modern Languages.
- The Minor in Multimedia Production has been discontinued.

Study Abroad Scholarships

- The Alumni Travel Scholarship has been discontinued.

Washington Semester Program

Carnegie Mellon undergraduates from any course of study are invited to apply to **Carnegie Mellon University Washington Semester Program (Carnegie Mellon/WSP)**, which is being sponsored by Carnegie Mellon's International Relations and Politics Program. Through this semester-long program, students live, work, and study in Washington DC, coming into direct contact with political, business and community leaders and the most pressing political and policy issues of the day. Furthermore, the International Relations and Politics Program will sponsor policy events and forums in Washington for students participating in Carnegie Mellon/WSP.

The core curriculum for each Carnegie Mellon/WSP student centers on three interrelated elements: an **internship** that allows students to take advantage of the diverse and rich offerings available in Washington DC; an **elective research project or course**; and a **seminar** focused on a particular theme. Seminar topics include American Politics; Contemporary Islam; Economic Policy; Foreign Policy; International Business and Trade; International Environment and Development; International Law and Organizations; Journalism; Justice; Peace and Conflict Resolution; Public Law; or Transforming Communities. Some programs include a study abroad component, and academic coursework is offered through American University.

Students with strong academic records who are accepted to Carnegie Mellon/WSP are also eligible to apply for *Friedman Fellowships*, which help defray the costs of a semester in Washington. In addition to their internships, coursework, and activities, Friedman Fellows will participate in special events and activities designed to complement their work and studies. Grants of up to \$3,000 are available.

For more information, contact Kiron Skinner at kskinner@andrew.cmu.edu.

H&SS Interdepartmental Majors

Major in Ethics, History, and Public Policy

Academic Advisor: Dr. Jay Aronson, Baker Hall 246B, 412/268-2887; aronson@andrew.cmu.edu.

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

Curriculum

Students graduating with a primary major in Ethics, History, and Public Policy may elect to receive either a Bachelor of Arts or a Bachelor of Science Degree (additional requirements apply; see below). Basic requirements include 123 units encompassing 9 units in Economics, 39 units in History, 36 units in Philosophy, 27 units of elective courses, and a 12-unit, senior capstone course. This program may also be taken as an additional (e.g., second) major.

I. Economics Requirement

9 units

Choose one of the following:

- 73-100 Principles of Economics
- 88-220 Policy Analysis I

II. History Core

39 units

Choose one 9-unit course from each category below:

Policy History (9 units)

- 79-300 History of Public Policy in the United States

U.S. History (9 units)

- 79-240 Development of American Culture
79-249 20th Century U.S.

Non-U.S. History (9 units)

- 79-207 Development of European Culture
79-220 The Caribbean: Cultures and Histories
79-222 Between Revolutions: The Development of Modern Latin America
79-226 Introduction to African History I: From the Earliest Times to the Origins of the Slave Trade
79-227 Introduction to African History II: 18th Century to Neo-Colonialism
79-307 Religion and Politics in the Middle East
79-261 Chinese Culture and Society
79-265 Russian History: From the First to the Last Tsar
79-266 Russian History: From Communism to Capitalism

Historical Methods and Approaches (12 units)

- 79-360 Historical Evidence and Interpretation

III. Philosophy Core**36 units**

Choose one 9-unit course from each category below. No more than 18 units at the 100 level may be counted toward this requirement.

Ethics (9 units)

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

Political Philosophy (9 units)

- 80-135 Introduction to Political Philosophy
80-235 Political Philosophy
80-336 Philosophy of Law

Foundations of Social Science (9 units)

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

Applied Philosophy (9 units)

- 80-136 Social Structure, Public Policy, & Ethical Dilemmas
80-244 Environmental Ethics
80-245 Medical Ethics
80-348 Health, Development, & Human Rights
80-430 Ethics and Medical Research
80-447 Global Justice

IV. Senior Capstone Project Course**12 units**

This course will be co-taught by one member of History and one of Philosophy, and be taken in the fall of the senior year by every student majoring in EHPP. The purpose of the course is to give students a serious opportunity to apply the concepts and knowledge they acquired in the major to single topic, in depth.

IV. Elective Courses**27 units**

Choose any three courses from any category or categories shown below.

Engineering and Public Policy

(some courses have prerequisites; see EPP catalog listing)

- 19-319 Law & the Engineer
19-321 Law & Technology
19-422 Radiation, Health, & Policy
19-424 Energy & the Environment
19-426 Environmental Decision Making
19-448 Science, Technology, & Ethics

Business

- 70-311 Organizational Behavior
70-332 Business & Society
70-361 Foundations of Law
70-363 Law in Modern American Society
70-413 Conflict Resolution: Negotiation & Mediation
70-430 International Management

Economics

(some courses have prerequisites; see Economics catalog listing)

- 73-330 Comparative Economic Systems
73-354 Law & Economics
73-351 Public Finance
73-356 Political Economy of Public Institutions
73-357 Regulation: Theory & Policy
73-358 Economics of the Environment & Natural Resources
73-359 Benefit-Cost Analysis 73-365 Industrial Organization
73-371 International Trade
73-372 International Money & Finance
73-380 Strategy in Economics and Politics
73-476 American Economic History

History

Courses from the EHPP History Core (above) may be taken as electives only if they are not being used to fulfill the core requirement. Double counting is not permitted.

- 79-221 Development and Democracy in Latin America
79-231 American Foreign Policy: 1945 to the Present
79-233 The United States and the Middle East Since 1945
79-242 African-American History II
79-267 The Soviet Union in World War II: Military, Political and Social History
79-288 Bananas, Baseball, and Borders: A History of Latin America-US Relations
79-289 Energy, Environment and Globalization in the Americas (formerly 79-263, From Soil to Oil: Energy and the Environment in the Americas)
79-303 Pittsburgh and the Transformation of Modern Urban America (6 units)
79-305 Juvenile Delinquency: Images, Realities, and Public Policy 1800-1967
79-306 Delinquency Crime and Juvenile Justice, 1967 to the Present
79-339 The Politics of American Military Recruitment: Historical Perspective
79-333 Biology and Society: Evolution, Animal Experimentation and Eugenics
79-334 Genes, Clones and Stem Cells: Biology and Society in the 20th Century
79-335 Drug Use and Drug Policy
79-338 Childhood, Education, and Social Reform in American History
79-342 Introduction to Science and Technology Studies
79-368 Poverty, Charity, and Welfare
79-371 African American Urban History
79-373 Perspectives on Industrial Research and Development
79-374 American Environmental History: Critical Issues
79-383 Epidemic Disease and Public Health
79-389 Stalin and Stalinism

Philosophy

Courses from the EHPP Philosophy Core (above) may be taken as electives only if they are not being used to fulfill the core requirement. Double counting is not permitted.

- 80-151 God in the West
80-222 Measurement and Methodology
80-305 Rational Choice
80-405 Game Theory
80-241 Professional Ethics
80-242 Conflict, Culture, and Dispute Resolution
80-430 Ethics and Medical Research
80-340 Management, Environment, & Ethics
80-341 Computers, Society, and Ethics
80-256 Modern Moral Philosophy
80-258 Leibniz, Locke, and Hume

Social and Decision Sciences

- 88-104 Decision Processes in American Political Institutions
88-223 Decision Analysis & Decision Support Systems
88-343 Economics of Technological Change
88-347 Complex Technological Systems: Past, Present, and Future
88-358 Policy Making Institutions
88-371 Entrepreneurship, Regulation, and Technological Change
88-387 Social Norms and Economics
88-423 Institutions, Entrepreneurship, and Innovation
88-444 Public Policy and Regulation

V. Bachelor of Science Option

Students may elect to earn a Bachelor of Science rather than a Bachelor of Arts degree by completing two courses from the list below, or by petitioning the Director of EHPP to accept equivalent courses as substitutions.

| | |
|--------|---------------------------------------|
| 21-257 | Models & Methods for Optimization |
| 36-203 | Samplings, Surveys, & Society |
| 36-207 | Probability & Statistics for Business |
| 36-208 | Regression Analysis |
| 80-316 | Probability, Causation, and AI |
| 80-222 | Measurement & Methodology |
| 80-305 | Rational Choice |
| 88-251 | Empirical Research Methods |

Additional Major

The B.A./B.S. in Ethics History and Public Policy may be scheduled as an additional major in consultation with the departments concerned.

Major in European Studies**Electives**

Courses formerly on these lists which do not appear here are no longer available as Interdisciplinary Electives in their respective sections.

History

| | |
|--------|---|
| 79-208 | Two Revolutions: Dynamics of Change in Nineteenth Century Europe (was 79-250) |
|--------|---|

H&SS Interdepartmental Minors**Minor in African and African American Studies****Requirements**

- Elective courses must include one project course.

Course Changes

The following courses have changed:

- All History courses (79-xxx) have been re-numbered, and several have new names. Please consult the online Schedule of Classes, <https://acis.as.cmu.edu/gale2/open/Schedule/SOCSErvlet>.
- 76-332 Zora Neale Hurston: In and Out of Context is no longer on the list of Elective courses.

Added Courses

- 76-273 Introduction to African Studies has been added to the list of Core Courses.

The following courses have now been added as electives

| | |
|--------|---|
| | African |
| 79-290 | States, Stateless Societies, and Nationalism in West Africa |
| | African-American |
| 54-217 | Jazz II |
| 54-303 | Hip Hop and Contemporary Art |
| 54-525 | Actor Dance III |
| 76-332 | African-American Literature: Richard Wright and Zora Neale Hurston |
| 76-332 | African-American Literature: 21 st Century African-American Literature |
| 76-332 | African-American Literature and the Popular Front (1934-1956) |
| 76-342 | Advanced Seminar in African-American Studies: Ralph Ellison |
| 79-357 | Special Topics: History of Black American Music |
| | Caribbean |
| 79-235 | Caribbean Cultures |
| 79-3xx | Special Topics: Race Relations in the Atlantic World* |

* Students must conduct one independent research project in an elective course.

Minor in Gender Studies**Course Changes**

The following courses have changed:

- All History courses (79-xxx) have been re-numbered, and several have new names. Please consult the online Schedule of Classes, <https://acis.as.cmu.edu/gale2/open/Schedule/SOCSErvlet>.
- 79-379 Women in America is now 79-320 Women, Politics and Protest.

Undergraduate Economics Program

- The website for the Undergraduate Economics program (p.227) is <http://www.tepper.cmu.edu/undergraduate-economics>.

B.S. in Economics

- 73-100 Principles of Economics, under Economic Theory Requirements, is 9 units.
- Only 27 units are required under Quantitative Analysis Requirements.

B.S. in Economics and Mathematical Sciences (new)

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

B.S. in Economics and Mathematical Sciences Curriculum

| | | |
|-------------------------------------|---------------------------------|-----------------|
| Economic Theory Requirements | | 39 units |
| 73-100 | Principles of Economics | 9 |
| 73-150 | Microeconomics | 9 |
| 73-200 | Macroeconomics | 9 |
| 73-252 | Advanced Microeconomic Analysis | 6 |
| 73-253 | Advanced Macroeconomic Analysis | 6 |

| | | |
|---|---|-----------------|
| Quantitative Analysis Requirements | | 36 units |
| 36-225 | Introduction to Probability and Statistics I | 9 |
| 36-226 | Introduction to Probability and Statistics II | 9 |
| 73-261 | Econometrics | 9 |
| 36-401 | Modern Regression | 9 |

| | | |
|--|--|-----------------|
| Mathematical Science Requirements | | 92 units |
| 21-120 | Differential and Integral Calculus | 10 |
| 21-122 | Integration, Differential Equations, and Approximation | 10 |
| 21-127 | Concepts of Mathematics | 9 |
| 21-228 | Discrete Mathematics | 9 |
| 21-241 | Matrix Algebra | 9 |
| 21-259 | Calculus in Three Dimensions | 9 |
| 21-260 | Differential Equations | 9 |
| 21-355 | Principles of Real Analysis I | 9 |
| 21-356 | Principles of Real Analysis II | 9 |
| 21-373 | Algebraic Structures | 9 |

| | | |
|--------------------------------|--|----------------|
| Programming Requirement | | 9 units |
| 15-110 | Introduction to Programming ¹ | 9 |

| | | |
|----------------------------|--|----------------|
| Writing Requirement | | 9 units |
| <i>Choose one:</i> | | |
| 73-270 | Professional Writing for Economists | 9 |
| 76-270 | Writing in the Professions | 9 |
| 76-271 | Introduction to Professional and Technical Writing | 9 |

Advanced Economics Electives² 27 units

Students must take three advanced economics elective courses. Advanced Elective courses are those courses numbered 73–300 through 73–495, as well as courses designated by the Undergraduate Economics Program which are offered by other departments/programs. Students are encouraged to work with their advisors to structure a set of courses which meet these requirements based on their particular interests, subject to course availability.

Mathematical Science Depth Electives³ 27 units

Students must take three advanced mathematics depth courses. Students are encouraged to work with their advisors to structure a set of courses which meet these requirements based on their particular interests, subject to course availability.

Notes:

- 1 Beginning in Fall 2009, either 15–110 (formerly known as 15–100) or 15–117 will fulfill the programming requirement for the B.S. in Economics and Mathematical Sciences.
- 2 Recommended Advanced Economics Electives:

| | |
|--------|---|
| 73–310 | History of Economics Ideas and Analysis |
| 73–347 | Game Theory for Economists |
| 73–392 | Financial Economics |
| 73–430 | Economics of Risk and Uncertainty |
| 73–405 | Introduction to Dynamic Economics |
- 3 Recommended Mathematical Science Depth Electives:

| | |
|--------|-----------------------------------|
| 21–229 | Set Theory |
| 21–292 | Operations Research |
| 21–357 | Sequences and Series of Functions |
| 21–365 | Project in Applied Mathematics |
| 21–366 | Topics in Applied Mathematics |
| 21–371 | Functions of Complex Variables |
| 21–374 | Field Theory |
| 21–441 | Number Theory |
| 21–460 | Topology |
| 21–484 | Graph Theory |
| 21–799 | Undergraduate Research Topics |

Note: Only one of the following three courses may count towards the required Mathematical Sciences Depth Electives: 21–365, 21–366, or 21–799.

Sample Schedule for B.S. in Economics and Mathematical Sciences**First Year**

| | Fall | Units |
|--------|---------------------------------------|--------------|
| 21-120 | Differential and Integral Calculus | 10 |
| 36-201 | Statistical Reasoning | 9 |
| 73-100 | Principles of Economics | 9 |
| 76-101 | Interpretation and Argument | 9 |
| 79-104 | World History | 9 |
| 99-xxx | Computing @ Carnegie Mellon | 3 |
| | | 49 |
| | Spring | |
| 15-110 | Introductory/Intermediate Programming | 10 |
| 21-259 | Calculus in Three Dimension | 9 |
| 73-150 | Microeconomics | 9 |
| xx-xxx | Freshman Seminar | 9 |
| xx-xxx | Elective | 9 |
| | | 46 |

Second Year

| | Fall | Units |
|--------|--|--------------|
| 21-122 | Integration, Differential Equations, & Approximation | 10 |
| 21-127 | Concepts of Mathematics | 9 |
| 36-225 | Probability and Statistics I | 9 |
| 73-200 | Macroeconomics | 9 |
| xx-xxx | Elective | 9 |
| | | 46 |
| | Spring | |
| 21-241 | Matrix Algebra | 9 |
| 36-226 | Probability and Statistics II | 9 |
| 73-252 | Advanced Microeconomic Theory ⁴ | 6 |
| 73-253 | Advanced Macroeconomic Theory ⁴ | 6 |
| xx-xxx | Economics Depth Elective | 9 |
| xx-xxx | Elective | 9 |
| | | 47 |

- 4 Advanced Economic Theory is a semester-long sequence consisting of two mini courses: 73-252 (Advanced Microeconomic Theory) and 73-253 (Advanced Macroeconomic Theory).

Third Year

| | Fall | Units |
|--------|-------------------------------|--------------|
| 21-260 | Differential Equations | 9 |
| 73-261 | Econometrics | 9 |
| 73-270 | Writing for Economists | 9 |
| xx-xxx | Economics Depth Elective | 9 |
| xx-xxx | Mathematics Depth Elective | 9 |
| | | 45 |
| | Spring | |
| 21-355 | Principles of Real Analysis I | 9 |
| 73-xxx | Economics Depth Elective | 9 |
| xx-xxx | Mathematics Depth Elective | 9 |
| xx-xxx | Elective | 9 |
| xx-xxx | Elective | 9 |
| | | 45 |

Fourth Year

| | Fall | Units |
|--------|--------------------------------|--------------|
| 21-256 | Principles of Real Analysis II | 9 |
| 21-228 | Discrete Mathematics | 9 |
| 36-401 | Modern Regression | 9 |
| 73-495 | Senior Project | 9 |
| xx-xxx | Elective | 9 |
| | | 45 |
| | Spring | |
| 21-273 | Algebraic Structures | 9 |
| xx-xxx | Mathematics Depth Elective | 9 |
| xx-xxx | Elective | 9 |
| xx-xxx | Elective | 9 |
| xx-xxx | Elective | 9 |
| | | 45 |

Department of English

- The Department Head for the Department of English is now Christine Neuwirth.

B.S. in Technical Writing & Communication**Technical Communication Track****Technical Communication Electives**

- 76–209 Theory & Practice in Anthropology is replaced with 76–276 Theory and Practice in Anthropology of Globalization.
- The following courses are no longer on the list of Technical Communication Electives: 79–212, 79–230, 79–358.

Scientific & Medical Communication Track**Theory/Specialization Courses – Additional Options**

- 79–234 Body Politics: Women and Health in America is now known as 79–331.
- 79–384 Medicine and Society is now known as 79–330.
- 79–385 History of Biomedical Research is now known as 79–333.
- The following courses are no longer on the list of Theory/Specialization Courses: 79–334 and 79–358.

Department of History

Undergraduate programs in History focus on new ways to understand the past and new ways to use what we know. Department faculty offer three different degree programs: the B.A. in History, the B.A. in Global Studies, and the interdepartmental B.A. or B.S. in Ethics, History, and Public Policy (described both here and in the catalog section on Interdepartmental Majors). All three focus on connections between past and present and on how historical knowledge facilitates understanding of social, cultural, and policy change. Our degree programs emphasize empirical methods and conceptual analysis, as well as specific research skills relevant to many types of jobs and further professional training. The Department's mission also includes courses introducing students to various societal settings and diverse types of controversial public issues, thus contributing actively to both liberal education and professional development.

Each of the three degree programs combines a structured sequence of courses, training in research methods, theoretical concepts, and analytical writing skills, plus a considerable array of electives. Each program stems from the teaching and research strengths of a department that is internationally known for its innovative historical

and anthropological approaches to the study of social, cultural, and policy change.

Our degree programs prepare students for many career options. There is, of course, a historical profession, composed largely of research scholars and teachers who have completed a Ph.D., and graduates of the CMU History Department have gone on to earn doctorates at Harvard, Northwestern, and other major universities. More often, graduates of our department pursue post-undergraduate professional school, such as law, business administration, public policy, urban planning, librarianship, journalism, the ministry, or social work. Most schools in these fields prefer students who have acquired a strong liberal education and broad perspectives on human problems, rather than students with narrowly specialized training or skills.

History is also excellent preparation for careers that may begin immediately upon graduation, including business; indeed, most graduates of history departments, at Carnegie Mellon and elsewhere, take jobs in business and management. Having been trained to analyze subtle and complex issues, to develop breadth of understanding, to dig out information and make sense of it, and to present their findings effectively, our graduates do extremely well in many types of organizations, both public and private. The U.S. Foreign Service is another traditional avenue for graduates from history departments, especially in combination with foreign language skills. Many other government and non-profit agencies actively recruit history and other liberal arts graduates. Because history courses emphasize research and writing skills plus analysis of social and policy trends, they offer good preparation for journalism and other writing careers.

All three of our degree programs combine easily and well with complementary majors in areas such as Business, Economics, Professional Writing, Statistics, Philosophy, Political Science, or Modern Languages.

An option to pursue a general minor in the Department of History is detailed below; several other minors, described throughout the Undergraduate Catalog, can be linked with any degree program in History to provide additional depth. These include H&SS minors in such fields as African and African-American Studies; Gender Studies; Film and Media Studies; Global Politics; Religious Studies; Environmental Studies; Policy and Management; Russian Studies, and Science, Technology and Society. Examples in other colleges include minors offered in the arts, engineering, science, mathematics, business, and computer science. History faculty are also integral participants in four interdepartmental majors described elsewhere in this catalog: Ethics, History, and Public Policy; European Studies; Russian Studies; and Global Politics.

Several research centers coordinate sponsored research by faculty and graduate students in the Department of History. These include the Center for History and Policy (Caroline Acker, Director); and the Center for African American Urban Studies and the Economy (CAUSE) (Joe W. Trotter, Director). The department also supports the Center for Historical Information Systems and Analysis (CHISA) (David Miller, Director).

General

- All History courses (79-xxx) have been re-numbered, and several have new names. Please consult the online Schedule of Classes, <https://acis.as.cmu.edu/gale2/open/Schedule/SOCSEvlet>.
- All History majors have changed. There are now three undergraduate major programs: B.A. in History, B.A. in Global Studies, and B.A./B.S. in Ethics, History, and Public Policy (Interdepartmental).

The B.A. in History

Academic Advisor: Dr. Naum Kats, Baker Hall 240, 412/268-2880; kats@andrew.cmu.edu.

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

Curriculum

Students graduating with a primary major in History receive a Bachelor of Arts degree; this program may also be taken as an additional (e.g., second) major. Requirements for the B.A. in History are "Introduction to World History" plus an additional 87 units that include survey courses in the United States and other parts of the World, four courses that center entirely or in part on research projects, and two courses that cover time periods before the 20th century. For students whose primary major is the B.A. in History, no course may be "double counted."

I. Required General Education Course 9 units

79-104 Introduction to World History

II. Required Survey Courses 27 units

Choose one 9-unit course from each category below.

Category 1: United States (9 units)

79-240 Development of American Culture

Category 2: Regional (9 units)

(Europe, East Asia, South Asia, Africa, Latin America, Caribbean, Middle East)

79-202 Flesh and Spirit: Early Modern Europe, 1400-1800

79-205 20th Century Europe

79-207 The Development of European Culture

79-208 Europe's Two Revolutions: Dynamics of Change in the 19th Century

79-212 China and Its Neighbors: Minorities, Conquerors and Tribute Bearers

79-213 Nationalities and the New States of the Former USSR

79-220 The Caribbean: Cultures and Histories

79-221 Development and Democracy in Latin America

79-222 Between Revolutions: The Development of Modern Latin America

79-223 North of the Border: Mexican Immigration Past and Present

79-224 Mayan America

79-225 Slavery and Emancipation in the Caribbean and Latin America

79-226 Introduction to African History I: Earliest Times to the Origins of the Slave Trade

79-227 Introduction to African History II: 18th Century to Neo-Colonialism

79-229 Origins of the Arab-Israeli Conflict, 1880-1948

79-230 Arab-Israeli Conflict and Peace Process since 1948

79-233 United States and the Middle East since 1945

Category 3: Non-U.S./National (9 units)

(Russia/USSR, Spain, Germany, France, China, etc)

79-255 Irish History

79-256 20th Century Germany

79-257 Germany and the Second World War

79-258 French History: From the Revolution to De Gaulle

79-259 French History: From World War II to the Present

79-261 Chinese Culture and Society

79-262 Modern China

79-263 China's Cultural Revolution (6 units)

79-264 China in the Age of Reform, 1978-2008 (6 units)

79-265 Russian History: From First to Last Tsar

79-266 Russian History: From Communism to Capitalism

79-267 The Soviet Union in World War II: Military, Political and Social History

III. Required Introductory Research Course 12 units

79-360 Historical Evidence and Interpretation

IV. Distribution Requirements (complete 4 courses) 36 units

In addition to the above requirements, the B.A. in History requires that students take *at least two additional* 9-unit courses numbered 79-200 to 79-359 and *at least two* 9-unit courses numbered 79-361 to 79-399. At least two of the four distribution courses must be substantially devoted to periods before 1900, not including required courses or courses used to satisfy other requirements for the B.A. in History; in other words, no double counting is permitted.

Courses on eras before 1900 (two courses are required, for a total of 18 units)

79-202 Flesh and Spirit: Early Modern Europe, 1400-1800

79-212 China and Its Neighbors: Minorities, Conquerors and Tribute Bearers

| | |
|--------|---|
| 79-220 | The Caribbean: Cultures and Histories |
| 79-222 | Between Revolutions: The Development of Modern Latin America |
| 79-224 | Mayan America |
| 79-225 | Slavery and Emancipation in the Caribbean and Latin America |
| 79-226 | Introduction to African History I: Earliest Times to the Origins of the Slave Trade |
| 79-227 | Introduction to African History II: 18th Century to Neo-Colonialism |
| 79-229 | Origins of the Arab-Israeli Conflict, 1880-1948 |
| 79-241 | African-American History I |
| 79-243 | African American Women's History |
| 79-244 | Women in American History |
| 79-246 | Industrial America |
| 79-247 | The Civil War Era, 1848-1877 |
| 79-255 | Irish History |
| 79-258 | French History: From the Revolution to DeGaulle |
| 79-261 | Chinese Culture and Society |
| 79-265 | Russian History: From First to Last Tsar |
| 79-281 | Introduction to Religion |
| 79-288 | Bananas, Baseball, and Border: A History of Latin America-U.S. Relations |
| 79-292 | China Inside Out: Going Global, 19th and 21st Centuries |
| 79-293 | Inward Odyssey |
| 79-305 | Juvenile Delinquency: Images, Realities, Public Policy, 1800-1967 |
| 79-308 | 18th Century China Through Literature |
| 79-310 | Religions of China |
| 79-319 | Protest and Dissent in American History |
| 79-321 | Making of the Modern Family |
| 79-322 | Family and Gender in Russian History |
| 79-323 | Family, Gender and Sexuality in European History, 500-1800 |
| 79-324 | Population and History |
| 79-327 | History of the American Working Class |
| 79-329 | History of Feminist Theory |
| 79-330 | Medicine and Society |
| 79-335 | Drug Use and Drug Policy |
| 79-343 | History of American Urban Life |
| 79-347 | Cross-Breeds: The History of Racial Mixing in America |
| 79-350 | Early Christianity |
| 79-352 | Christendom Divided the Protestant and Catholic Reformation, 1450-1650 |
| 79-353 | Religious Identities and Religious Conflicts in 19th Century Europe |
| 79-354 | Religion in American Society |
| 79-361 | Protest, Propaganda and the Public Sphere, 1500-1800 |
| 79-362 | Law and Disorder in Early Modern Europe, 1400-1800 |
| 79-365 | Comparative Gender History |
| 79-366 | History of Sexuality |
| 79-368 | Poverty Charity and Welfare |
| 79-369 | European Cities |
| 79-371 | African American Urban History |
| 79-372 | Cities, Technology and the Environment |
| 79-377 | Food, Power and History |
| 79-385 | The Making of the African Diaspora in the New World |
| 79-387 | Historical Memory and Historical Sources, Reconstructing Africa's Unwritten Past |
| 79-393 | Research in U.S. History I |
| 79-396 | Music and Society in 19th and 20th Century Europe and the U.S. |

| | |
|--------|--|
| 79-385 | The Making of the African Diaspora in the New World |
| 79-386 | Entrepreneurs in Africa, Past, Present and Future |
| 79-387 | Historical Memory and Historical Sources, Reconstructing Africa's Unwritten Past |
| 79-389 | Stalin and Stalinism |
| 79-390 | Nazi Germany |
| 79-391 | Comparative Postwar Societies |
| 79-392 | History of Modern Warfare |
| 79-393 | Research in U.S. History I |
| 79-394 | Research in U.S. History II |
| 79-395 | The Arts in Pittsburgh |
| 79-396 | Music and Society in 19th and 20th Century |
| 79-398 | Documenting the 1967 Arab-Israeli War |
| 79-399 | American-Arab Encounters |

V. Senior Capstone Research Seminar**12 units**

| | |
|--------|-----------------------------|
| 79-420 | Advanced Studies in History |
|--------|-----------------------------|

B.A. in History – Sample Curriculum

Pre-requisite: 79-104, Introduction to World History

| Junior Year | | Senior Year | |
|--|-------------------------------------|-------------------------------------|-------------------------------------|
| Fall | Spring | Fall | Spring |
| 79-240, Development of American Culture | Regional Survey | Non-U.S. Survey | Distribution Requirement (Pre-1900) |
| 79-360, Historical Evidence and Interpretation | Distribution Requirement (Research) | 79-420, Advanced Studies in History | Distribution Requirement (Research) |
| Elective | Distribution Requirement (Pre-1900) | Elective | Elective |
| Elective | Elective | Elective | Elective |
| Elective | Elective | Elective | Elective |

The table above represents a two-year (junior-senior) plan for completing all requirements for the B.A. in History. The purpose of this table is merely to show that the B.A. in History can be completed in as few as two years; not that it must be. Students may declare the B.A. in History and begin course requirements as early as the start of the sophomore year and in some instances in the first year. Students should consult the department's academic advisor, Dr. Naum Kats, for both short- and long-term course planning.

Additional Major

The B.A. in History may be scheduled as an additional major in consultation with the departments concerned. Details for declaring a general minor in the Department of History may be found below.

The B.A. in Global Studies

Contact: John Soluri, Chair, Global Studies Faculty Committee
Office: Baker Hall 363
E-mail: jsoluri@andrew.cmu.edu

The B.A. in Global Studies meets the interests of undergraduate students in a wide range of topics related to globalization. The anthropologists, historians, and literary and cultural studies faculty who have organized this program share interpretive approaches to the study of transnational processes that are informed by contemporary social and cultural theory and are resonant with the interdisciplinary traditions of the humanities. The primary aim of the B.A. in Global Studies is to help students appreciate the specific character of the present period of world history in relation both to the past and to newly emergent trends and tendencies. Global Studies is based in the Department of History, but it depends on participation and teaching by faculty from the Departments of English and Modern Languages, as well as History. Through coursework on global processes, regional and local cultures, and contemporary issues and problems, as well as through advanced language studies, Global Studies students develop a broad understanding of their prospects and responsibilities as "citizens of the world." Global Studies students are strongly encouraged to incorporate a semester of study abroad into their course of study in order to gain first hand experience of cultural and social diversity. They should consult frequently with program advisor John Soluri

Courses with a research component (two courses are required, for a total of 18 units)

| | |
|--------|--|
| 79-361 | Protest, Propaganda and the Public Sphere, 1500-1800 |
| 79-362 | Law and Disorder in Early Modern Europe, 1400-1800 |
| 79-363 | The Rise of Modern Golf, 1860-Present |
| 79-365 | Comparative Gender History |
| 79-366 | History of Sexuality |
| 79-368 | Poverty, Charity, and Welfare |
| 79-369 | European Cities |
| 79-371 | African American Urban History |
| 79-372 | Cities, Technology and the Environment |
| 79-373 | Perspectives on Industrial Research and Development |
| 79-374 | American Environmental History: Critical Issues |
| 79-375 | China's Environmental Crisis |
| 79-376 | Nationalism and Ethnicity |
| 79-377 | Food, Power, and History |
| 79-379 | Extreme Ethnography |
| 79-380 | Special Topics in Science and Technology Studies (subject will vary) |
| 79-382 | History of Biomedical Research |
| 79-383 | Epidemic, Disease and Public Health |

(see above) and with participating faculty, who will help students to develop a coherent course of study on specific regions and topics that will provide a basis for independent research projects. The B.A. in Global Studies is an attractive major for those who wish to pursue advanced graduate study or careers in law, teaching, government, business, and international development.

Curriculum

Students graduating with a primary major in Global Studies receive a Bachelor of Arts degree. Global Studies may also be taken as an additional (e.g., second) major. Required courses include "Introduction to World History" plus 93 additional units (including 79-275 and 79-400) and proficiency in a language other than English. Students may "double count" a maximum of two courses taken for the B.A. in Global Studies that are also being used to fulfill the requirements of other majors and programs. Students should consult with Global Studies advisor John Soluri (see above) about new courses and study abroad courses that may be approved for students pursuing the B.A. in Global Studies.

I. Required General Education Course 9 units

79-104 Introduction to World History

II. Global Studies Introductory Course 9 units

79-275 Introduction to Global Studies

III. Language Requirement

Demonstrating intermediate to advanced level proficiency in a language other than English is a crucial component of the B.A. in Global Studies. Normally this requirement can be satisfied by successfully completing a course conducted in the second language at the 300 level or above for French, German, Italian, or Spanish, or the fourth semester (Intermediate II) level or above for Arabic, Chinese, Japanese, or Russian. Comparable proficiency for other languages can be considered. Additional advanced cultural, historical, and literary study in the second language is strongly recommended. Courses in a language other than English may also be counted as GS distribution courses or GS electives as appropriate, and students may receive credit for "Language Across the University" courses and appropriate internship and service learning options.

IV. Theoretical and Topical Core Courses 18 units

To gain a solid foundation in the theories and topics underpinning the B.A. in Global Studies, students select 18 units (typically two classes) from the following core courses:

79-276 Theory and Practice in the Anthropology of Globalization
 79-277 Contemporary Cultural Politics: States, Regions, and Nations
 79-278 Rights to Representation: Indigenous People and Their Media
 79-280 Experiencing Globalization
 79-289 Energy, Environment, and Globalization in the Americas
 79-313 Objects of Value
 79-317 Art, Anthropology, and Empire
 79-376 Nationalism and Ethnicity

V. Transnational, Global, and Regional 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 one or both of the subcategories below.

Transnational and Global Courses

76-244 World English
 76-318 Communicating in the Global Marketplace
 76-326 Postcolonial Literary Studies
 76-329 Global Women's Writing
 76-449 Culture and Globalization
 79-212 China and Its Neighbors: Minorities, Conquerors and Tribute Bearers
 79-224 Mayan America
 79-233 The US and the Middle East since 1945
 79-250 Mahatma Gandhi and the Long American Civil Rights Movement
 79-282 Europe and the World
 79-288 Bananas, Baseball, and Borders: A History of Latin America-US Relations
 79-292 China Inside Out: Going Global, 19th to 21st Centuries
 79-312 Cultural Understandings/Misunderstandings: Translating Language, Culture, and Histories in Japanese, Vietnamese, and US Relations

79-380 Special Topics in Science and Technology Studies: History and Theory of Property
 79-383 Epidemic Disease and Public Health
 79-385 The Making of the African Diaspora in the New World
 80-136 Social Structure, Public Policy, and Ethics
 80-244 Environmental Ethics
 80-348 Health, Development, and Human Rights
 80-447 Global Justice
 82-304 The Francophone World
 82-345 Introduction to Hispanic Literary and Cultural Studies (various topics)
 82-431 China and the West
 88-326 Theories of International Relations
 88-359 Globalization

Regional Courses

Africa:

79-226 Introduction to African History I: Earliest Times to the Origins of the Slave Trade
 79-227 Introduction to African History II: 18th Century to Neocolonialism
 79-291 Globalization in East African History (6 units)
 79-386 Entrepreneurs in Africa: Past, Present, and Future
 82-404 Francophone Realities: Africa

The Middle East:

79-229 Origins of the Arab-Israeli Conflict, 1880-1948
 79-230 Arab-Israeli Conflict and Peace Process since 1948
 79-307 Religion and Politics in the Middle East
 79-398 Documenting the 1967 Arab-Israeli War
 79-399 American-Arab Encounters (via video w/Qatar)

Eastern and Southern Asia and the Pacific:

76-339 Advanced Studies in Film and Media (topic: Globalization in East Asia)
 76-343 South Asian Literature and Film
 76-354 South Asian Literature
 79-287 Colonization and Decolonization in Oceania
 82-333 Introduction to Chinese Language and Culture
 82-473/474 Topics in Japanese Studies
 88-411 The Rise of the Asian Economies

The Americas:

79-220 The Caribbean: Cultures and Histories
 79-221 Development and Democracy in Latin America
 79-222 Between Revolutions: The Development of Modern Latin America
 82-343 Language and Culture: Latin America
 82-451 Studies in Latin American Literature and Culture (various topics)
 82-452 The Latin American "Fin de Siglo"
 82-453 Voices from Within: The Crisis of Latin American Identity
 82-454 The Hispanic Caribbean
 82-455/456 Literature and Revolution in 20th Century Latin America

Europe:

79-205 20th Century Europe
 79-207 Development of European Culture
 79-213 Nationalities and the New States of the Former USSR
 82-323 Germany, Austria, and Switzerland in the Twentieth Century
 82-324 Contemporary Germany, Austria, and Switzerland
 82-415/416 Topics in French and Francophone Studies (various topics)
 82-441 Studies in Peninsular Literature and Culture
 82-455/456 Topics in Hispanic Studies (various topics)
 82-491 Literature, Politics, and Film in Russia and East Europe Today
 88-370 African Politics

VI. Elective Courses 27 units

Students are required to take an additional 27 units (typically 3 courses) of electives, selected from one or both of the subcategories below. Category IV and V courses listed above that are not used to fulfill those requirements may be counted as electives in addition to the courses listed below.

Those students who wish to pursue an optional Global Studies Senior Thesis (9 units) as one of their electives may do so by arrangement with Global Studies faculty; the thesis will often involve work in a language other than English. *This option is not to be confused with the two-semester Senior Honors Thesis, for graduating with college-level honors.*

Thematic Courses

| | |
|--------|---|
| 73-100 | Principles of Economics |
| 73-148 | Environmental Economics |
| 76-238 | Introduction to Media Studies |
| 76-239 | Introduction to Film Studies |
| 76-241 | Introduction to Gender Studies |
| 76-378 | Community Literacy and Intercultural Interpretation |
| 76-386 | Language and Culture |
| 76-387 | Sociolinguistics |
| 79-281 | Introduction to Religion |
| 79-293 | Inward Odyssey |
| 79-311 | Introduction to Anthropology |
| 79-314 | The Politics and Culture of Memory |
| 79-318 | Dilemmas and Controversies in Anthropology |
| 79-325 | Art and Religion |
| 79-330 | Medicine and Society |
| 79-332 | Medical Anthropology |
| 79-333 | Biology and Society: Evolution, Animal Experimentation and Eugenics |
| 79-334 | Genes, Clones, and Stem Cells: Biology and Society in the 20th Century and Beyond |
| 79-342 | Introduction to Science and Technology Studies |
| 79-368 | Poverty, Charity and Welfare |
| 79-382 | History of Biomedical Research |
| 80-340 | Environmental Ethics and Decision Processes |
| 82-384 | Language and Culture: Language in its Social Context |
| 88-205 | Comparative Politics |
| 88-330 | Political Economy of Inequality and Redistribution |
| 88-357 | Comparative Foreign Policy: China, Russia and the US |
| 88-378 | International Economics |
| 88-384 | Conflict and Conflict Resolution in International Relations |
| 88-410 | The Global Economy: A User's Guide |

Nation-based Courses

| | |
|-------------------|---|
| 79-231/ 88-329 | American Foreign Policy — 1945 to the Present |
| 79-240 | Development of American Culture |
| 79-245 | A History of Asian Americans in the United States |
| 79-249 | 20th Century US |
| 79-315 | Hawaii: America's Pacific Island State |
| 82-344 | Language and Culture: U.S. Latinos |
| 79-261 | Chinese Culture and Society |
| 79-262 | Modern China |
| 79-309 | 20th Century China Through Film |
| 79-310 | Religions of China |
| 79-375 | China's Environmental Crisis |
| 82-333 | Introduction to Chinese Language and Culture |
| 82-433 | Topics in Contemporary Culture of China |
| 82-439 | Modern China Through Literature |
| 82-440 | Studies in Chinese Literature and Culture |
| 82-455/456 | The Cuban Condition: Between Empire and a Hard Place |
| 79-258 | French History: From the Revolution to De Gaulle |
| 82-303 | French Culture |
| 82-305 | French in its Social Contexts |
| 82-325 | Introduction to German Studies |
| 82-424 | New Germany |
| 82-425 | Studies in German Literature (various topics) |
| 82-426 | Germany in the Age of Globalization |
| 82-273 | Introduction to Japanese Language and Culture |
| 82-278 | Japanese Literature in Translation |
| 82-473/474 | Topics in Japanese Studies |
| 79-265 | Russian History from the First to the Last Tsar |
| 79-266 | Russian History from Communism to Capitalism |
| 82-294 | Topics in Russian Language and Culture |
| 79-337 | Spain and the Modern World: Civil War, Dictatorship, Democracy, and Europeanization |
| 82-342 | Language and Culture: Spain |

VII. Senior Capstone Course**12 units**

| | |
|--------|------------------------------------|
| 79-400 | Advanced Seminar in Global Studies |
|--------|------------------------------------|

B.A. in Global Studies — Sample Curricula

These sample curricula represent two year plans for completing the requirements for the B.A. in Global Studies, for those students who wish to study abroad and for those who do not wish to do so. Its aim is to show that for almost all students the major can be completed in the last two years of undergraduate study, not that it must be completed according to this schedule. Students may declare the B.A. in Global Studies and take appropriate courses earlier in their academic careers, and should consult frequently with the Global Studies Advisor about their course of study in Pittsburgh and possibly abroad.

All Students — Freshman or Sophomore Year

| Fall Semester | Spring Semester |
|----------------------|-----------------------------|
| 79-104 World History | Language Course or Elective |
| Gen. Ed. or Elective | Gen. Ed. or Elective |
| Gen. Ed. or Elective | Gen. Ed. or Elective |
| Gen. Ed. or Elective | Gen. Ed. or Elective |
| Gen. Ed. or Elective | Gen. Ed. or Elective |

Students Who Plan to Study Abroad — Junior Year

| Fall Semester | Spring Semester (abroad) |
|------------------------------|-----------------------------|
| 79-275 Introduction to G. S. | Language Course or Elective |
| Language Course or Elective | Global Studies Elective |
| Global Studies Core Course | G. S. Transnational Course |
| G. S. Transnational Course | Elective |
| Elective | Elective |

Students Plan to Study Abroad — Senior Year

| Fall Semester | Spring Semester |
|-----------------------------|--------------------------------|
| Global Studies Core Course | 79-400 G.S. Advanced Seminar |
| G. S. Transnational Course | Language Course or Elective |
| Global Studies Elective | G.S. Senior Thesis or Elective |
| Language Course or Elective | Elective |
| Elective | Elective |

Students Not Planning to Study Abroad — Junior Year

| Fall Semester | Spring Semester |
|-----------------------------|-----------------------------|
| 79-275 Introduction to G.S. | Language Course or Elective |
| Language Course or Elective | Global Studies Core Course |
| G. S. Transnational Course | G. S. Transnational Course |
| Elective | Global Studies Elective |
| Elective | Elective |

Students Not Planning to Study Abroad — Senior Year

| Fall Semester | Spring Semester |
|-----------------------------|--------------------------------|
| G. S. Transnational Course | 79-400 G.S. Advanced Seminar |
| Language Course or Elective | Language Course or Elective |
| Global Studies Core Course | G.S. Senior Thesis or Elective |
| Global Studies Elective | Elective |
| Elective | Elective |

Additional Major

The B.A. in Global Studies may be scheduled as an additional major in consultation with the departments concerned.

The B.A./B.S. in Ethics, History, and Public Policy (Interdepartmental Major)

Academic Advisor: Dr. Jay Aronson, Baker Hall 246B, 412/268-2887; aronson@andrew.cmu.edu.

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

Curriculum

Students graduating with a primary major in Ethics, History, and Public Policy may elect to receive either a Bachelor of Arts or a Bachelor of Science Degree (additional requirements apply; see below). Basic requirements include 123 units encompassing 9 units in Economics, 39 units in History, 36 units in Philosophy, 27 units of elective courses, and a 12-unit, senior capstone course. This program may also be taken as an additional (e.g., second) major.

I. Economics Requirement 9 units

Choose one of the following:

- 73-100 Principles of Economics
88-220 Policy Analysis I

II. History Core 39 units

Choose one 9-unit course from each category below:

Policy History (9 units)

- 79-300 History of Public Policy in the United States
U.S. History (9 units)

- 79-240 Development of American Culture
79-249 20th Century U.S.

Non-U.S. History (9 units)

- 79-207 Development of European Culture
79-220 The Caribbean: Cultures and Histories
79-222 Between Revolutions: The Development of Modern Latin America
79-226 Introduction to African History I: From the Earliest Times to the Origins of the Slave Trade
79-227 Introduction to African History II: 18th Century to Neo-Colonialism
79-307 Religion and Politics in the Middle East
79-261 Chinese Culture and Society
79-265 Russian History: From the First to the Last Tsar
79-266 Russian History: From Communism to Capitalism

Historical Methods and Approaches (12 units)

- 79-360 Historical Evidence and Interpretation

III. Philosophy Core 36 units

Choose one 9-unit course from each category below. No more than 18 units at the 100 level may be counted toward this requirement.

Ethics (9 units)

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

Political Philosophy (9 units)

- 80-135 Introduction to Political Philosophy
80-235 Political Philosophy
80-336 Philosophy of Law

Foundations of Social Science (9 units)

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

Applied Philosophy (9 units)

- 80-136 Social Structure, Public Policy, & Ethical Dilemmas
80-244 Environmental Ethics
80-245 Medical Ethics
80-348 Health, Development, & Human Rights
80-430 Ethics and Medical Research
80-447 Global Justice

IV. Senior Capstone Project Course 12 units

This course will be co-taught by one member of History and one of Philosophy, and be taken in the fall of the senior year by every student majoring in EHPP. The purpose of the course is to give students a serious opportunity to apply the concepts and knowledge they acquired in the major to single topic, in depth.

IV. Elective Courses 27 units

Choose any three courses from any category or categories shown below.

Engineering and Public Policy

(some courses have prerequisites; see EPP catalog listing)

- 19-319 Law & the Engineer
19-321 Law & Technology
19-422 Radiation, Health, & Policy
19-424 Energy & the Environment
19-426 Environmental Decision Making
19-448 Science, Technology, & Ethics

Business

- 70-311 Organizational Behavior
70-332 Business & Society
70-361 Foundations of Law
70-363 Law in Modern American Society
70-413 Conflict Resolution: Negotiation & Mediation
70-430 International Management

Economics

(some courses have prerequisites; see Economics catalog listing)

- 73-330 Comparative Economic Systems
73-354 Law & Economics
73-351 Public Finance
73-356 Political Economy of Public Institutions
73-357 Regulation: Theory & Policy
73-358 Economics of the Environment & Natural Resources
73-359 Benefit-Cost Analysis 73-365 Industrial Organization
73-371 International Trade
73-372 International Money & Finance
73-380 Strategy in Economics and Politics
73-476 American Economic History

History

Courses from the EHPP History Core (above) may be taken as electives only if they are not being used to fulfill the core requirement. Double counting is not permitted.

- 79-221 Development and Democracy in Latin America
79-231 American Foreign Policy: 1945 to the Present
79-233 The United States and the Middle East Since 1945
79-242 African-American History II
79-267 The Soviet Union in World War II: Military, Political and Social History
79-288 Bananas, Baseball, and Borders: A History of Latin America-US Relations
79-289 Energy, Environment and Globalization in the Americas (formerly 79-263, From Soil to Oil: Energy and the Environment in the Americas)
79-303 Pittsburgh and the Transformation of Modern Urban America (6 units)
79-305 Juvenile Delinquency: Images, Realities, and Public Policy 1800-1967
79-306 Delinquency Crime and Juvenile Justice, 1967 to the Present
79-339 The Politics of American Military Recruitment: Historical Perspective
79-333 Biology and Society: Evolution, Animal Experimentation and Eugenics
79-334 Genes, Clones and Stem Cells: Biology and Society in the 20th Century
79-335 Drug Use and Drug Policy
79-338 Childhood, Education, and Social Reform in American History
79-342 Introduction to Science and Technology Studies

| | |
|--------|---|
| 79-368 | Poverty, Charity, and Welfare |
| 79-371 | African American Urban History |
| 79-373 | Perspectives on Industrial Research and Development |
| 79-374 | American Environmental History: Critical Issues |
| 79-383 | Epidemic Disease and Public Health |
| 79-389 | Stalin and Stalinism |

Philosophy

Courses from the EHPP Philosophy Core (above) may be taken as electives only if they are not being used to fulfill the core requirement. Double counting is not permitted.

| | |
|--------|---|
| 80-151 | God in the West |
| 80-222 | Measurement and Methodology |
| 80-305 | Rational Choice |
| 80-405 | Game Theory |
| 80-241 | Professional Ethics |
| 80-242 | Conflict, Culture, and Dispute Resolution |
| 80-430 | Ethics and Medical Research |
| 80-340 | Management, Environment, & Ethics |
| 80-341 | Computers, Society, and Ethics |
| 80-256 | Modern Moral Philosophy |
| 80-258 | Liebniz, Locke, and Hume |

Social and Decision Sciences

| | |
|--------|--|
| 88-104 | Decision Processes in American Political Institutions |
| 88-223 | Decision Analysis & Decision Support Systems |
| 88-343 | Economics of Technological Change |
| 88-347 | Complex Technological Systems: Past, Present, and Future |
| 88-358 | Policy Making Institutions |
| 88-371 | Entrepreneurship, Regulation, and Technological Change |
| 88-387 | Social Norms and Economics |
| 88-423 | Institutions, Entrepreneurship, and Innovation |
| 88-444 | Public Policy and Regulation |

V. Bachelor of Science Option

Students may elect to earn a Bachelor of Science rather than a Bachelor of Arts degree by completing two courses from the list below, or by petitioning the Director of EHPP to accept equivalent courses as substitutions.

| | |
|--------|---------------------------------------|
| 21-257 | Models & Methods for Optimization |
| 36-203 | Samplings, Surveys, & Society |
| 36-207 | Probability & Statistics for Business |
| 36-208 | Regression Analysis |
| 80-316 | Probability, Causation, and AI |
| 80-222 | Measurement & Methodology |
| 80-305 | Rational Choice |
| 88-251 | Empirical Research Methods |

Senior Honors Thesis

The H&SS college-level Honors Program may be undertaken by students completing the B.A. in History, the B.A. in Global Studies, or the interdepartmental B.A./B.S. in Ethics, History, and Public Policy. Eligibility requirements are set by the college, and additional departmental requirements may apply depending on which of the three majors a student is completing; please see the relevant academic advisor and/or the Director of Undergraduate Studies for details.

Additional Major

The B.A./B.S. in Ethics History and Public Policy may be scheduled as an additional major in consultation with the departments concerned.

Faculty

Additions

NICO SLATE, Assistant Professor of History—Ph.D., Harvard University; Carnegie Mellon, 2009–.

Department of Modern Languages

General

- 82-282 Community Service Learning is now available for all majors under "Core Courses for Modern Languages." This course is now an elective option for Modern Languages majors in their junior semester.
- All History courses (79-xxx) have been re-numbered, and several have new names. Please consult the online Schedule of Classes, <https://acis.as.cmu.edu/gale2/open/Schedule/SOCSErvlet>.

Chinese Studies

Core Courses in History & Society

- 79-270 Chinese Culture & Society is now 79-261.
- 79-273 20th Century China Through Films is now 79-309.

The following courses are now available as Core Courses in History & Society:

| | |
|--------|---------------------------------------|
| 79-212 | China and Its Neighbors |
| 79-310 | Religion of China |
| 79-308 | 18th Century China through Literature |
| 79-247 | East Asians in Films |

Interdisciplinary Electives

The following courses are now available as Interdisciplinary Electives:

History

| | |
|--------|---------------------------------------|
| 79-212 | China and Its Neighbors |
| 79-310 | Religion of China |
| 79-308 | 18th Century China through Literature |
| 79-247 | East Asians in Films |

Modern Languages

| | |
|--------|--|
| 82-440 | Studies in Chinese Literature & Culture: Chinese Folk Performances |
|--------|--|

Note: These changes also apply to the Minor in Chinese Studies.

French and Francophone Studies

Interdisciplinary Electives

Courses formerly on these lists which do not appear here are no longer available as Interdisciplinary Electives in their respective sections.

History

| | |
|--------|---|
| 79-205 | 20th Century Europe |
| 79-207 | Development of European Culture |
| 79-202 | Flesh and Spirit: Early Modern Europe 1400-1800 (formerly 79-251) |
| 79-220 | Caribbean: Cultures and Histories (formerly 79-253 Development of Caribbean Culture) |
| 79-227 | Introduction to African History: 18th Century Neo-Colonialism (formerly 79-258) |
| 79-253 | Religious Identities and Religious Conflicts in 19th Century Europe (formerly 79-275) |
| 79-385 | The Making of African Diaspora in the New World (formerly 79-294) |
| 79-340 | A History of Modern Warfare |
| 79-350 | Theories of International Relations |
| 79-396 | Music and Society in 19th/20th Century Europe and the U.S. (formerly 79-386) |

Note: These changes also apply to the Minor in French and Francophone Studies.

German

Core Courses in German

- 82-324 Contemporary Germany, Austria and Switzerland is now 82-320.
- 82-325 Introduction to German Studies is now 82-237 Contemporary Germany, Austria and Switzerland prior to World War I.

Interdisciplinary Electives

Courses formerly on these lists which do not appear here are no longer available as Interdisciplinary Electives in their respective sections.

History

| | |
|--------|---|
| 79-205 | 20th Century Europe |
| 79-349 | The Holocaust in Historical Perspective (was 79-219) |
| 79-208 | Two Revolutions: Dynamics of Change in Nineteenth Century Europe (was 79-250) |

Note: These changes also apply to the Minor in German.

Hispanic Studies

Interdisciplinary Electives

Courses formerly on these lists which do not appear here are no longer available as Interdisciplinary Electives in their respective sections.

History

| | |
|-------------------|--|
| 79-208 | Two Revolutions: Dynamics of Change in Nineteenth Century Europe (was 79-250) |
| 79-222 | Modern Latin America Between Revolutions: The Development of Modern Latin America (was 79-290) |
| 79-292/ 82-452 | The Latin America Fin de Siglo: Modernity, Modernismos, and Underdevelopment |
| 79-325 | Art and Religion |

Note: These changes also apply to the Minor in Hispanic Studies.

Japanese

Core Courses in History

Courses formerly on these lists which do not appear here are no longer available as Interdisciplinary Electives in their respective sections.

| | |
|--------|---|
| 79-281 | Introduction to Religion (was 79-259) |
| 79-280 | Experiencing Globalization (was 79-380) |
| 79-311 | Introduction to Anthropology (was 79-201) |
| 79-310 | Religions of China (was 79-225) |
| 79-360 | Historical Evidence and Interpretation (was 79-200) |

Interdisciplinary Electives

Courses formerly on these lists which do not appear here are no longer available as Interdisciplinary Electives in their respective sections.

History

| | |
|--------|---|
| 79-281 | Introduction to Religion (was 79-259) |
| 79-280 | Experiencing Globalization (was 79-380) |
| 79-311 | Introduction to Anthropology (was 79-201) |
| 79-310 | Religions of China (was 79-225) |
| 79-360 | Historical Evidence and Interpretation (was 79-200) |

Note: These changes also apply to the Minor in Japanese.

Major in Russian Studies

Required Electives

Courses formerly on these lists which do not appear here are no longer available as Interdisciplinary Electives in their respective sections.

History

| | |
|--------|---|
| 79-205 | 20th Century Europe |
| 79-231 | American Foreign Policy: 1945-Present |
| 79-265 | Russian History from the First to the Last Tsar (was 79-280) |
| 79-266 | Russian History (was 79-281) |
| 79-267 | Soviet Union in World War II: Military and Political History (was 79-282) |

Note: These changes also apply to the Minor in Russian Studies.

Department of Philosophy

- 80-247 Heath, Development, and Human Rights is now 80-348 Ethics and Global Development.
- 80-254 Analytic Philosophy is now 80-354.
- 80-262 Introduction to the Philosophy of Bertrand Russell is now 80-362.
- 80-306 Meaning in Language is now 80-381.
- 80-516 and 80-575, previously 9 or 12 units, are now only available as 9-unit courses.
- The B.A./B.S. in Ethics, History, and Public Policy program has changed (see below)

The B.A./B.S. in Ethics, History, and Public Policy (Interdepartmental Major)

Academic Advisor: Dr. Jay Aronson, Baker Hall 246B, 412/268-2887; aronson@andrew.cmu.edu.

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

Curriculum

Students graduating with a primary major in Ethics, History, and Public Policy may elect to receive either a Bachelor of Arts or a Bachelor of Science Degree (additional requirements apply; see below). Basic requirements include 123 units encompassing 9 units in Economics, 39 units in History, 36 units in Philosophy, 27 units of elective courses, and a 12-unit, senior capstone course. This program may also be taken as an additional (e.g., second) major.

I. Economics Requirement 9 units (choose one of the following)

| | |
|--------|-------------------------|
| 73-100 | Principles of Economics |
| 88-220 | Policy Analysis I |

II. History Core 39 units (Choose one 9-unit course from each category below)

Policy History (9 units)

| | |
|--------|---|
| 79-300 | History of Public Policy in the United States |
|--------|---|

U.S. History (9 units)

| | |
|--------|---------------------------------|
| 79-240 | Development of American Culture |
| 79-249 | 20th Century U.S. |

Non-U.S. History (9 units)

| | |
|--------|--|
| 79-207 | Development of European Culture |
| 79-220 | The Caribbean: Cultures and Histories |
| 79-222 | Between Revolutions: The Development of Modern Latin America |
| 79-226 | Introduction to African History I: From the Earliest Times to the Origins of the Slave Trade |
| 79-227 | Introduction to African History II: 18th Century to Neo-Colonialism |
| 79-307 | Religion and Politics in the Middle East |
| 79-261 | Chinese Culture and Society |
| 79-265 | Russian History: From the First to the Last Tsar |
| 79-266 | Russian History: From Communism to Capitalism |

Historical Methods and Approaches (12 units)

| | |
|--------|--|
| 79-360 | Historical Evidence and Interpretation |
|--------|--|

III. Philosophy Core**36 units**

Choose one 9-unit course from each category below. No more than 18 units at the 100 level may be counted toward this requirement.

Ethics (9 units)

80-130 Introduction to Ethics
80-230 Ethical Theory

Political Philosophy (9 units)

80-135 Introduction to Political Philosophy
80-235 Political Philosophy
80-336 Philosophy of Law

Foundations of Social Science (9 units)

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

Applied Philosophy (9 units)

80-136 Social Structure, Public Policy, & Ethical Dilemmas
80-244 Environmental Ethics
80-245 Medical Ethics
80-348 Health, Development, & Human Rights
80-430 Ethics and Medical Research
80-447 Global Justice

IV. Senior Capstone Project Course**12 units**

This course will be co-taught by one member of History and one of Philosophy, and be taken in the fall of the senior year by every student majoring in EHPP. The purpose of the course is to give students a serious opportunity to apply the concepts and knowledge they acquired in the major to single topic, in depth.

IV. Elective Courses**27 units**

See *Catalog entry under "Interdepartmental Majors"*

V. Bachelor of Science Option

Students may elect to earn a Bachelor of Science rather than a Bachelor of Arts degree by completing two courses from the list below, or by petitioning the Director of EHPP to accept equivalent courses as substitutions.

| | |
|--------|---------------------------------------|
| 21-257 | Models & Methods for Optimization |
| 36-203 | Samplings, Surveys, & Society |
| 36-207 | Probability & Statistics for Business |
| 36-208 | Regression Analysis |
| 80-316 | Probability, Causation, and AI |
| 80-222 | Measurement & Methodology |
| 80-305 | Rational Choice |
| 88-251 | Empirical Research Methods |

Additional Major

The B.A./B.S. in Ethics History and Public Policy may be scheduled as an additional major in consultation with the departments concerned.

Faculty**Additions:**

KEVIN ZOLLMAN, Assistant Professor of Philosophy — Ph.D., University of California, Irvine; Carnegie Mellon, 2009–.

Changes:

DAVID DANKS, **Associate** Professor of Philosophy — Ph.D., University of California, San Diego; Carnegie Mellon, 2003–.

Department of Psychology**Major in Psychology****Natural Science Requirement**

Note: The natural science requirements for the departmental majors (including the college's GenEd requirement) are a total of:

- Four courses for the B.S. in Psychology
- Two courses for the B.A. in Psychology
- Two courses for the B.S. in Cognitive Science.

Two of the courses should be in the same science: biology, chemistry, or physics (biology being strongly recommended).

Computer Science Requirement

| | | |
|--------|-------------------------------------|----------|
| 15-102 | Exploring Programming with Graphics | 10 units |
| | –or– | |
| 15-110 | Introduction to Programming | 10 units |

Unified Double Major in Psychology and Biological Sciences**Computational Reasoning**

| | | |
|--------|-------------------------------------|----------|
| 99-10x | Computing @ Carnegie Mellon | 3 units |
| 15-102 | Exploring Programming with Graphics | 10 units |
| | –or– | |
| 15-110 | Introduction to Programming | 10 units |

Major in Cognitive Science**Computing Prerequisite**

| | | |
|--------|---------------------------------|----------|
| 15-121 | Introduction to Data Structures | 10 units |
|--------|---------------------------------|----------|

Additional Major

The programming requirement is now 15-121 Introduction to Data Structures.

Minor in Psychology**Introductory Courses**

- 85-100 Introduction to Intelligence in Humans, Animals, and Machines is no longer an option for Introductory Courses. 85-102 Introduction to Psychology must be taken to fulfill this requirement.

Department of Social and Decision Sciences**Major/Minor in International Relations and Politics**

As of Fall 2009, the major and minor in Global Politics have been renamed to **International Relations and Politics**. This new title contains two principal, equally important elements. The inclusion of "International Relations" in the title signals that our program and curriculum are in line with IR programs at top universities, most of which continue to focus on the state as a core unit of analysis in the international system. Like other leading IR programs, Carnegie Mellon University's major also devotes a lot of attention to unpacking the state, investigating how the levels of analysis interact, and thinking through the role of transnational actors in the international system. Retaining the word "politics" reflects the fact that this program teaches and trains students to understand politics, broadly defined. This new title will make good sense to political science departments around the country, will help students when they apply to graduate school and look for jobs, and will most accurately reflect the focus of the program and major. International Relations and Politics will retain all elements of the Global Politics curriculum. **This is a change in name only; curriculum requirements remain the same.**

Department of Statistics

Major in Statistics

1. Mathematical Foundations (prerequisites) (28–38 units)

Calculus *

Sequence 1

21-111 Calculus I
21-112 Calculus II

and *one* of the following:

21-256 Multivariate Analysis and Approximations
21-259 Calculus in Three Dimensions

Sequence 2

21-120 Differential and Integral Calculus

and *one* of the following:

21-256 Multivariate Analysis and Approximations
21-259 Calculus in Three Dimensions

Note: Other sequences are possible; these require approval from the undergraduate advisor.

- * It is recommended that students complete the calculus requirement no later than the end of their sophomore year.

3. Probability and Statistical Theory (9 or 18 units)

Option 1:

Take the following course:

36-310 Fundamentals of Statistical Modeling

Option 2:*

Take the following theory sequence:

36-225** Introduction to Probability and Statistics I
36-226 Introduction to Probability and Statistics II

- * **A grade of C or better is required in order to continue from 36-225 to 36-226.**

- ** It is possible to substitute 36-217 or 21-325 for 36-225 (36-225 is the standard introduction to probability, 36-217 is tailored for engineers and computer sciences)

5. Statistical Electives (9 or 18 units) *

Statistical electives courses can be either within or outside the Statistics department. Students are required to take *two* electives, *only one of which* can be outside statistics.

- * Students who take Option 2 or 3 in the Theory requirement (unchanged since 2008-2010 Undergraduate Catalog) can use the first course in the theory sequence as an elective within statistics and therefore are required to take only one additional elective which can be either within or outside Statistics.

Courses outside Statistics

- 15-100 and 15-111 have been replaced with 15-102 Exploring Programming with Graphics and 15-110 Introduction to Programming.
- 15-200 Advanced Programming/Practicum is no longer on the list of Courses outside Statistics.
- 15-123 Effective Programming in C and Unix and 15-212 Principles of Programming have been added to this list.

Sample Programs

Note: C.A. refers to Concentration Area courses. Changes in **bold**.

Schedule 1

| | Fall | Spring |
|-----------------------|--------------------------------|------------------|
| Freshman Year | 36-201 21-111 | 36-202 21-112 |
| Sophomore Year | 21-127 21-256 | 36-303 36-315 |
| Junior Year | 36-310 C. A. | 21-241 C. A. |
| Senior Year | 36-401 36-461 C. A. | 36-402 C. A. |

Schedule 2

(Unchanged from 2008-2010 Undergraduate Catalog)

| | Fall | Spring |
|-----------------------|---------------------------|---------------------------|
| Freshman Year | 21-120 | 21-256 |
| Sophomore Year | 36-225 | 36-226 21-241 |
| Junior Year | 36-350 36-309 C. A. | 36-315 C. A. |
| Senior Year | 36-401 36-461 C. A. | 36-402 36-410 C. A. |

Minor in Statistics

1. Mathematical Foundation:

Calculus: 19-29 units via Sequence 1 or 2 (see Major in Statistics)

Sample Programs

Schedule 1

| | Fall | Spring |
|-----------------------|--------------------------------|-------------------------|
| Freshman Year | 21-111 36-201 | 21-112 36-202 |
| Sophomore Year | 21-256 36-309 | 36-303 |
| Junior Year | 36-310 | 21-141 |
| Senior Year | 36-401 | 36-402 |

Schedule 2

(Unchanged from 2008-2010 Undergraduate Catalog)

| | Fall | Spring |
|-----------------------|------------------|--------|
| Freshman Year | 21-120 21-241 | 21-256 |
| Sophomore Year | 36-225 | 36-226 |
| Junior Year | 36-309 | 36-315 |
| Senior Year | 36-401 | 36-402 |

Major in Economics and Statistics

I. Prerequisites

5. Programming Prerequisite (new) 10 units

15-110 Introduction to Programming

II. Disciplinary Core

2. Statistics Core 36 units

36-225* Introduction to Probability and Statistics I
 36-226** Introduction to Probability and Statistics II
 36-401 Modern Regression
 36-402 Advanced Data Analysis (Project Course)

* A grade of C or better is required to move on to 36-226.

** A grade of C or better is required to move on to 36-401.

Total number of units for the major: 195 units

Total number of units for the degree: 360 units

Sample Curriculum

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

| | Fall | Spring |
|-----------------------|---|--|
| Freshman Year | 21-120 36-201 73-100 ----- ** ----- | 21-256 36-202 73-150 15-110 ----- |
| Sophomore Year | 21-122 36-225 73-200 ----- ----- | 21-241 36-226 73-252/3 ----- ----- |
| Junior Year * | 36-401 73-261 Writing Requirement ----- ----- | 36-402 Statistics Elective Economics Elective ----- ----- |
| Senior Year | Statistics Elective ----- ----- ----- | Economics Elective ----- ----- ----- |

* A student could spend, for example, year 3 abroad and move year 3 courses to year 4.

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

H. John Heinz III College

- The former H. John Heinz School of Public Policy and Management is now the **H. John Heinz III College**.
- The Dean of the Heinz College is now **Ramaya Krishnan**.

Five-Year Masters Program

The Heinz College's Accelerated Masters Program allows qualified students to earn a prestigious master's degree in just five years. The Master of Science in Public Policy and Management and Master of Science in Health Care Policy and Management programs are open to students from all undergraduate degree programs at the university. The Master of Science in Biotechnology Management requires a science or engineering background. For students in the College of Fine Arts or the Bachelor of Humanities and Arts degree program who are interested in careers in arts management, Heinz offers an accelerated track in the Master of Arts Management degree. For students with a business and/or IT background, the Master of Information Systems Management degree can be completed in just one additional semester of study beyond their bachelors degrees.

Mellon College of Science

Department of Physics

Gregg Franklin, Head

General

- 15-100 Introductory/Intermediate Programming has been replaced in Curriculum lists with **15-xxx**, designating 15-101 or 15-102 or 15-110.
- The term Track Advisor should be replaced with **Assistant Head for Undergraduate Affairs** in all Track descriptions.

B.S. in Physics

- 33-232 Mathematical Methods of Physics, originally listed as 9 units, should be listed as **10 units**. Thus, for example, the B.S. in Physics, the Minimum Total Physics Units total is 164, not 163 as originally listed.

B.A. in Physics

- The Electives requirement is **81** units, not 82 units.

B.S. in Physics/Chemical Physics Track

Modifications from the requirements listed for the B.S. in Physics:

- Only **18** units of Physics Electives are required.
- No units of Technical Electives are required.
- The free elective unit requirement is adjusted so that the minimum number of units required for this degree is 360.

Faculty

Additions

ALEX EVILEVITCH, Associate Professor of Physics—Ph.D., Lund University, Sweden; Carnegie Mellon, 2009–.

HY TRAC, Assistant Professor of Physics—Ph.D., University of Toronto; Carnegie Mellon, 2010–.

MAUMITA MANDAL, Assistant Professor of Chemistry—Ph.D., Hyderabad, India; Carnegie Mellon, 2009–.

Changes/Corrections

GREGG B. FRANKLIN, Professor of Physics; **Head, Department of Physics**—Ph.D., Massachusetts Institute of Technology; Carnegie Mellon, 1984–.

STEPHEN GAROFF, Professor of Physics; **Associate Head, Department of Physics**—Ph.D., Harvard University; Carnegie Mellon, 1988–.

FREDERICK J. GILMAN, Buhl Professor of Physics; **Dean, Mellon College of Science**—Ph.D., Princeton University; Carnegie Mellon, 1964–.

STEPHANIE TRISTRAM-NAGLE, **Research Professor of Physics**—Ph.D., University of California, Berkeley; Carnegie Mellon, 1982–.

JIAN-GANG ZHU, Professor of Electrical and Computer Engineering—Ph.D., University of California San Diego; Carnegie Mellon, 1997–.

School of Computer Science

General

- Effective F09, 15-100 Introductory/Intermediate Programming, becomes **15-110 Introduction to Programming** and 15-111 Intermediate/Advanced Programming, becomes **15-121 Introduction to Data Structures**.

B.S. in Computer Science (for students entering in F09)

Constrained Electives

Effective for the freshman class entering F09, the Constrained Electives in the Computer Science major have been changed to the following:

One Algorithms & Complexity elective:

15-354 Computational Discrete Mathematics
 15-355 Modern Computer Algebra
 15-453 Formal Languages and Automata
 21-301 Combinatorics
 21-484 Graph Theory
 others as designated

One Applications elective:

15-313 Foundations of Software Engineering
 15-322/3 Computer Music
 15-381 Artificial Intelligence: Representation and Problem Solving
 15-384 Robotic Manipulation
 15-385 Computer Vision
 15-415 Database Applications
 15-462 Computer Graphics
 10-601 Machine Learning
 11-411 Natural Language Processing
 others as designated

One Logics & Languages elective:

15-312 Foundations of Programming Languages
 15-317 Constructive Logic
 15-414 Bug Catching: Automated Program Verification and Testing
 21-300 Basic Logic
 80-311 Computability and Incompleteness
 others as designated

One Software Systems elective:

15-410 Operating System Design and Implementation
 15-411 Compiler Design
 15-440 Distributed Computer Systems
 15-441 Computer Networks
 others as designated