2007-2009 Undergraduate Bulletin Supplement

Changes and Additions to
Majors, Minors, and Programs

The majors, minors and programs listed below have been added to the curriculum or have had their requirements changed in some way since the publication of the 2007-2009 Undergraduate Bulletin. (Entries are arranged alphabetically by name of program.)

When requirements change, students who have completed at least 45 credits may elect to satisfy either the previous major requirements or the new major requirements. Students with fewer than 45 credits must satisfy the new requirements, unless the major department specifies otherwise. Please consult the section "When Major Requirements Change" in the Academic Policies and Regulations chapter of the Bulletin for complete details.

This list is continually being updated. Twice during the year (roughly November 1 and April1) the entire Bulletin (including this Supplement) is archived. That is, a "snapshot" of the Bulletin is taken and saved for reference. These dated archives serve as official records of the Bulletin as it changes semester by semester.

Fall 2008
Spring 2008
Fall 2007
### Fall 2008 Updates

#### Africana Studies (AFS)

**Requirements for the Major in Africana Studies (AFS)**

The major in Africana Studies leads to the Bachelor of Arts degree. All courses for the major, except those graded S/U, must be passed with a letter grade of C or higher.

Completion of the major requires 39 credits, including at least 21 upper-division credits (from courses numbered 300 or higher). Courses taken pass/fail with an AFS or AFH designator (283, 475, 476, and 488) are considered enhancements to the major experience but do not count towards major requirements. They may fulfill university requirements.

1. **Foundation Courses**
   - AFS 101, 102  Themes in the Black Experience I, II
2. **Two courses from each of the following areas (at least two courses selected from 200-level courses, and at least five upper-division courses at the 300 or 400-level):**
   a. **Africana Studies in the Humanities**
      - AFH 206  Great Books of the Black Experience
      - AFH/EGL 249  African-American Literature and Music in the 19th and 20th Centuries
      - AFH 329/HUF 318  Pan-African Literature
      - AFH 330  Pan-African Literature II
      - AFH/EGL 368  Caribbean and American Connections in Literature
      - AFH/HUF 385  French Caribbean Literature
   b. **Africana Studies in the Social Sciences**
      - AFS/HIS 221  Introduction to Modern African History
      - AFS 239  Introduction to the Caribbean Experience
      - AFS 240  Issues in Caribbean Society
      - AFS/HIS 277  The Modern Color Line
      - AFS/SOC 365  Introduction to African Society
      - AFS 372  African American Political Thought
      - AFS/ANT 395  Religions of the Caribbean
   c. **The African American Experience**
      - AFS 300  Blacks in the City
      - AFS 310  American Attitudes Toward Race
      - AFS 319  The Politics of Race
      - AFS/HIS 325  The Civil Rights Movement
      - AFS/HIS 339  Recent African American History
      - AFS/WST 350  African American Women and Social Change
      - AFS 360  African American Social Commentary
      - AFS 363  The Media and Black America
      - AFS 370  The African American Family
      - AFS 375  Slavery
      - AFS 392  The Black Power Movement
      - AFS 394  Black Nationalism in America
   d. **The Global African Experience**
      - AFH/PHI 379  Philosophy of Race
      - AFS 345  Culture and Gender: Women in Africa and the Caribbean
      - AFS/POL 337  The Politics of Africa
      - AFS 339/ARH 329  Arts of the African Diaspora
      - AFS/HIS 346  Political and Social History of Africa
      - AFS/ANT 380  Race and Ethnicity in Latin America and the Caribbean
      - AFS/WST 381  AIDS, Race, and Gender in the Black Community
      - AFS/HIS 388  Slavery in Latin America and the Caribbean
      - AFS 393  Caribbean Immigrants in U.S.
      - AFS 400  Ancient Egypt (KMT): Historical and Contemporary Views

3. **Three credits in AFH or AFS 447 Readings in Africana Studies or AFH or AFS 487 Research in Africana Studies taken in the junior or senior year:** Seniors are required to present their research orally to the AFS faculty.

4. **Two additional AFS or AFH courses at the 300 or 400 level, or two upper-division courses outside of the department (approval of the undergraduate studies director is necessary when taking courses outside of the department for major credit).**

5. **Upper-Division Writing Requirement**

Africana Studies Majors are required to submit a writing sample completed for an upper-division course in the Africana Studies Department and must submit evaluation forms signed by a professor with grades of B or higher. Students must inform the instructor of the courses in advance of their plan to use the paper(s) in fulfillment of the writing requirement for the major. A minimum of 15 pages of material must be submitted.

**Notes:**

1. Students are recommended, but not required, to take AFS 491 Interdisciplinary Seminar.
2. Students must take at least two 200-level courses in Africana Studies prior to beginning their junior year.
3. Only six credits of directed readings or independent study courses (courses numbered 447 and 487) may be used toward the major.
4. The following courses may not be used to fulfill major requirements: AFS 283, 475, 476, 488; AFH 475, 476.
5. Transfer students must take at least 12 credits of upper-division Africana Studies courses in residence at Stony Brook to complete the AFS major.

#### Departmental Honors Program

Departmental majors with a minimum G.P.A. of 3.33 in Africana Studies courses as specified in the major requirements and an overall G.P.A. of 3.0 are eligible to enroll in the Africana Studies Honors program at the beginning of their senior year.

The student must submit a proposal to the Department indicating the merit of the proposed research after asking a faculty member to be a sponsor for the project. This should be done in the semester prior to beginning the project. The faculty sponsor must submit a statement of support for the proposal.

The resulting project is read and evaluated by a committee consisting of the faculty sponsor and two faculty members (one may be a member of a department outside of Africana Studies). If the honors project is completed successfully, honors are conferred.

#### Requirements for the Minor in Africana Studies (AFS)

The minor in Africana Studies is intended for students interested in exploring aspects of the Black experience in ways that relate to their own major field of study. The sequence of lower- and upper-
division courses gives the student a well-balanced analysis of the varied aspects of the African and African American experience. All courses offered for the minor, except those graded S/U, must be passed with a letter grade of C or higher.

Completion of the minor requires 21 credits, including 12 upper-division credits.

1. AFS 101, 102 Themes in the Black Experience I, II
2. One course from each of the following areas (see above):
   a. Africana Studies in the Humanities
   b. Africana Studies in the Social Sciences
   c. The African-American Experience
   d. The Global African Experience
3. One additional upper-division course selected from one of the areas listed in requirement 2.
4. Three credits in AFH or AFS 447 Readings in Africana Studies or AFH or AFS 487 Research in Africana Studies taken in the junior or senior year.

**Biomedical Engineering (BME)**

**Sample Course Sequence for the Major in Biomedical Engineering**

<table>
<thead>
<tr>
<th>Freshman Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Year Seminar 101</td>
<td>1</td>
</tr>
<tr>
<td>D.E.C. A</td>
<td>3</td>
</tr>
<tr>
<td>AMS 151</td>
<td>3</td>
</tr>
<tr>
<td>CHE 131</td>
<td>4</td>
</tr>
<tr>
<td>PHY 131/133</td>
<td>4</td>
</tr>
<tr>
<td>BME 100</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

**Spring Credits**

| First Year Seminar 102 | 1 |
| ESG 111 | 3 |
| AMS 161 | 3 |
| CHE 132 | 4 |
| PHY 132/134 | 4 |
| MEC 203 | 2 |
| **Total** | **17** |

**Sophomore Fall Credits**

| AMS 261 | 4 |
| MEC 260 | 3 |
| BIO 202 | 3 |
| D.E.C. or BME 212 | 3 |
| AMS 210 | 3 |
| **Total** | **16** |

**Spring Credits**

| AMS 361 | 4 |

**Requirements for the Major in Biomedical Engineering (BME)**

The curriculum begins with a focus on basic mathematics and the natural sciences followed by courses that emphasize engineering science and bridging courses that combine engineering science and design. The sequence of courses culminates with a one-year design experience that integrates the science, engineering, and communication knowledge acquired. The technical electives and additional courses are chosen in consultation with a faculty advisor, taking into consideration the particular interest of the student.

Completion of the major requires approximately 130 credits.

1. **Mathematics**
   a. AMS 151, 161 Calculus I, II
   b. AMS 261 or MAT 203 or MAT 205 Calculus III
   c. AMS 351 or MAT 303 or MAT 305 Calculus IV
   d. AMS 310 Matrix Methods and Models
   e. AMS 310 Survey of Probability and Statistics

Note: The following alternate calculus course sequences may be substituted for AMS 151, 161:

- MAT 125, 126, 127
- MAT 131, 132
- MAT 141, 142
- MAT 171

2. **Natural Sciences**
   a. BIO 202 Fundamentals of Biology: Molecular and Cellular Biology or BIO 203 Fundamentals of Biology: Cellular and Organ Physiology
   b. CHE 131, 132 General Chemistry I, II
   c. PHY 131/133, 132/134 Classical Physics I, II with labs

Note: The following alternate science sequences may be substituted:

- PHY 125, 126, 127, or PHY 141, 142 in lieu of PHY 131/133, 132/134
- CHE 141, 142, in lieu of CHE 131, 132

3. **Computers and Programming**
   a. ESG 111 C Programming for Engineers
   b. ESE 124 Computer Techniques for Electronic Design
   c. CSE 130 Introduction to Programming in C
   d. MEC 203 Technical Drawing and Computer Aided Drafting

4. **Engineering**
   a. MEC 260 Engineering Statics
   b. MEC 262 Engineering Dynamics
   c. ESE 271 Electrical Circuit Analysis I

5. **Biomedical Engineering**
   a. BME 100 Introduction to Biomedical Engineering
   b. BME 212 Laboratory Methods in Biomedical Engineering
   c. BME 301 Bioelectricity
   d. BME 304 Genetic Engineering
   e. BME 305 Biofluids
   f. BME 440 Biomedical Engineering Design

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**Chemical and Molecular Engineering (CME)**

**Sample Course Sequence for the Major in Chemical and Molecular Engineering**

**Freshman Fall**
- D.E.C. 3
- CME 101 3
- AMS 151 3
- CHE 131, 133 4, 1
- ESG 111 3
- Total 18

**Spring Credits**
- First Year Seminar 102 1
- D.E.C. 3
- AMS 161 3
- CHE 132, 134 5
- PHY 131, 133 4
- Total 16

**Sophomore Fall**
- AMS 261 4
- CHE 321 4
- CHE 383 2
- CME 304 3
- PHY 132, 134 4
- Total 17

**Spring Credits**
- AMS 361 4
- CHE 326 4
- CHE 384 3
- CME 312 3
- CME 314 3
- Total 17

**Junior Fall**
- ESG 281 4
- CHE 310, 300 2, 0
- CHE 318 3
- CME 330 3
- CME 315 3
- Specialization course 1 3
- Total 18

**Spring Credits**
- CME 322 3
- CHE 320 2
- CHE 322 3
- CME 333 3
- CME 327 or 300-level BUS course 3
- Specialization course 2 3
- Total 17

**Senior Fall**
- CME 401 3
- CME 410 2
- CME 440 3
- Specialization course 3 3
- D.E.C. 3
- D.E.C. 3
- CME 375 1
- Total 18

**Spring Credits**
- D.E.C. 3
- CME 420 2
- CME 441 3
- Specialization course 4 3
- D.E.C. 3
- D.E.C. 3
- Total 17

**Requirements for the Major in Chemical and Molecular Engineering (CME)**

The curriculum begins with a focus on mathematics, physics, and chemistry, followed by courses covering specific chemical engineering topics as well as an intensive laboratory sequence. In addition, each student chooses a four-course sequence as an area of specialization which may also qualify the students for a minor in the respective department. The program culminates in the submission and acceptance of a senior thesis or original research project completed by the student which is defended at the end of the senior year. The students are encouraged to select original research projects which can be published in peer reviewed journals.

Completion of the major requires approximately 117 credits.

1. **Mathematics**
   a. AMS 151, 161 Applied Calculus I, II
   b. AMS 261 or MAT 203 or MAT 205 Calculus III
   c. AMS 361 or MAT 303 or MAT 305 Calculus IV

   Note: The following alternate calculus course sequences may be substituted for AMS 151, 161:
   - MAT 131, MAT 132
   - PHY 125, 126, 127
   - PHY 141, 142

2. **Natural Sciences**
   a. Chemistry
      - CHE 131, 132 General Chemistry I, II or CHE 141, 142
      - CHE 133, 134 General Chemistry Laboratory I, II or CHE 143, 144
      - CHE 321 Organic Chemistry I and CHE 326 Organic Chemistry II
      - CHE 383, 384 Introductory and Intermediate Synthetic and Spectroscopic Laboratory Techniques
   b. Physics
      - PHY 131, 132 Classical Physics I, II
      - PHY 133, 134 Classical Physics Laboratory I, II
      - PHY 251 Modern Physics and PHY 252 Modern Physics Laboratory or ESG 281 Engineering Introduction to the Solid State
      - Note: The following alternate physics course sequences may be substituted for PHY 131/133, 132/134:
        - PHY 125, 126, 127 or PHY 141, 142

3. **Computer Programming**
   one of the following:
   - CSE 130 Introduction to Programming in C
   - ESG 111 C Programming for Engineers
   - ESE 124 Computer Techniques for Electronic Design

4. **Chemical Engineering**
   - CME 101 Introduction to Chemical and Molecular Engineering
   - CME 304, 314 Chemical Engineering Thermodynamics I, II
   - CME 312 Material and Energy Balance
   - CME 315 Numerical Methods for Chemical Engineering Analysis
   - CME 318 Chemical Engineering Fluid Mechanics
   - CME 322 Chemical Engineering Heat and Mass Transfer
   - CME 323 Reaction Engineering and Chemical Kinetics
   - CME 327 Molecular Modeling for Chemical Engineers or 300-level BUS course
   - CME 330 Principles of Engineering for Chemical Engineers
   - CME 333 Principles of Engineering for Engineers
   - CME 401 Separation Technologies
   - CME 310, 320, 410, 420 Chemical Engineering Laboratory I, II, III, IV
   - CME 440, 441 Process Engineering and Design I, II

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5. Specializations in Chemical and Molecular Engineering

Chemical and Molecular Engineering students must choose from one of the eight specializations offered. Each specialization requires the completion of four technical elective courses at the 300 level or higher.

6. Upper-Division Writing Requirement: CME 300 Writing in Chemical and Molecular Engineering

All degree candidates must demonstrate skill in written English at a level acceptable for engineering majors. All Chemical and Molecular Engineering students must complete the writing course CME 300 concurrently with CME 310. The quality of writing in technical reports submitted for CME 310 is evaluated, and students whose writing does not meet the required standard are referred for remedial help. Satisfactory writing warrants an S grade for CME 300, thereby satisfying the requirement.

Grading

All courses taken to satisfy requirements 1-6 above must be taken for a letter grade of C or higher, except in CME 304 which must be taken for a letter grade of B- or higher.

Specializations

Students must complete four courses in a chosen specialization. (In some cases, there is also a pre- or co-requisite course attached to one of the courses.) In consultation with a faculty advisor, students select their area of specialization before registering for the first semester of the junior year and not later than upon earning 57 credits. Students are urged to meet regularly with their advisors regarding completion of the course requirements for the chosen specialization. Other courses may be used towards this requirement with the prior permission of the undergraduate program director.

A. Pharmacology

Ensures a sound background in pharmacology coupled with a foundation in chemical process control, distillation, and molecular modeling for students interested in pursuing a career in the food, cosmetics, or pharmaceutical industries or in medical instrumentation.

BIO 203 Fundamentals of Biology: Cellular and Organ Physiology
BIO 328 Mammalian Physiology
BCP 401 Principles of Pharmacology
BCP 402 Advanced Pharmacology

B. Materials Science

Provides a foundation in properties of materials, engineering mechanics, and electronic materials for students interested in computer-related industries, nanotechnology, and electronics.

ESG 333 Materials Science II: Electronic Properties
ESM 334 Materials Engineering
ESM 335 Strength of Materials
ESM 336 Electronic Materials

C. Polymer Science

Provides a foundation in the properties of polymers, spectroscopy of organic compounds, polymer synthesis, and polymer processing for students interested in pursuing research in major laboratories or in academia.

CME 369 Polymers
CME 370 Cellular Biology for Chemical Engineers
CME 371 Biomedical Polymers
CME 470 Polymer Synthesis

Cinema and Cultural Studies (CCS)

Requirements for the Major in Cinema and Cultural Studies (CCS)

The major in Cinema and Cultural Studies leads to the Bachelor of Arts degree. All courses offered for the major must be passed with a letter grade of C or higher. Twenty-one credits for the major must be earned in courses numbered 300 or higher.

Completion of the major requires 39 credits.

A. Core Courses

CCS 101 Images and Texts: Understanding Culture
CCS 201 Writing about Culture
CCS 301 Theorizing Cinema and Culture
CCS 401 Senior Seminar in Cinema and Cultural Studies

B. Courses in Cinema

1. Required:

HUM 201 Film Genres and History
HUM 202 Film History

2. One other lower-division course from the following:

CLT 235 American Pluralism in Film and Literature
HUF 211 French Cinema
HUG 221 German Cinema Since 1945
HUI 231 Sex and Politics in Italian Cinema

3. Three upper-division courses from the following:

CCS 311 Gender and Genre in Film
CCS 312 Cinema and the Ancient World
CCS 390 Latin American Cinema
CCS 391 Contemporary African Cinema and Cultural Studies
CCS 392 American Cinema and Cultural Studies
CCS 393 European Cinema and Cultural Studies
CCS 394 Asian Cinema and Cultural Studies
CCS 487 Independent Research
CCS 488 Internship

CLT 335 Interdisciplinary Study of Film

SPN 420 Topics in Spanish and Latin American Cinema

THR 403 Media Theory and Criticism

C. Courses in Cultural Studies

1. Texts and Contexts. One course from the following:

CLT 361 Literature and Society
CLT 362 Literature and Ideas
CLT 363 Literature and the Arts
CLT 391 African Contemporary Literature

CLT 392 Multicultural Comparative Literature

CLT 393 European Comparative Literature

CLT 394 Asian Comparative Literature
2. Visual Culture. One course from the following:
   ARH 322 American Art
   Since 1947
   ARH 329/AFH 339 Arts of the African Diaspora
   ARH 331 American Art to 1890
   ARH 333 Arts for the Public
   ARH 335 History of Photography
   ARH 342 Art of the 20th Century

3. Digital Culture. One course from the following:
   ARS/MUS/THR 317 Interactive Performance, Media, and MIDI
   ARS/MUS/THR 318 Music and the Moving Image
   ARS 325 Theory and Practice of Electronic Media: Print
   ARS 326 Theory and Practice of Electronic Media: Video and Animation
   ARS 327 Web Art, Design, and Culture
   ARS 425 Advanced Digital Arts
   CCS 313 Television Studies
   CCS 395 Digital Cultural Studies
   MUS 300 Music, Technology, and Digital Culture
   MUS 340 Introduction to Music Technology
   MUS 437 Electronic Music

Comparative Literature (CLT)

Requirements for the Major in Comparative Literature (CLT)
The interdisciplinary major in Comparative Literature leads to the Bachelor of Arts degree. All courses offered for the major must be taken for a letter grade. All upper-division courses offered for the major must be passed with a grade of C or higher.

Completion of the major requires 36 credits.

A. Introduction
   Two courses that survey a literary theme historically and cross-culturally, selected from the following:
   HUM 109 Philosophy and Literature in Social Context
   HUM 121 Death and Afterlife in Literature
   HUM 122 Images of Women in Literature
   HUM 123 Sin and Sexuality in Literature

B. Background
   Three courses beyond the introductory level, chosen from the following:
   CLT 315, CLT 211, 212, 220, 266
   or one course per designator from the following: EGL 200-level, FRN 395, 396, ITL 395, 396, GER 344, HUR 341, JDH 261
   or one of the following classical language courses: LAT 112 or SKT 112

C. Literature in the Original Language
   At least one course in literature in its original language (other than English)

D. Theory
   CLT 301 Theory of Literature
   or CLT 301 Theorizing Cinema and Culture

E. Advanced Study
   Four upper-division courses, at least one from each of groups 1 and 2:
   Group 1:
   CLT 331 Literary Genres: Poetry
   CLT 332 Literary Genres: Drama
   CLT 333 Literary Genres: Novel
   CLT 334 Other Literary Genres
   CLT 391 African Contemporary Literature
   CLT 392 Multicultural Comparative Literature
   CLT 393 European Comparative Literature
   CLT 394 Asian Comparative Literature

Group 2:
   CLT 335 Interdisciplinary Study of Films
   CLT 361 Literature and Society
   CLT 362 Literature and Ideas
   CLT 363 Literature and the Arts
   CCS 311 Gender and Genre in Film
   CCS 312 Cinema and the Ancient World
   CCS 313 Television Studies
   CCS 390 Latin American Cinema
   CCS 391 Contemporary African Cinema and Cultural Studies
   CCS 392 American Cinema and Cultural Studies
   CCS 393 European Cinema and Cultural Studies
   CCS 394 Asian Cinema and Cultural Studies
   CCS 395 Digital Cultural Studies

Requirements for the Minor in Comparative Literature (CLT)
The minor in Comparative Literature is designed especially to interest students majoring in a foreign language, English, and other humanities fields. It provides a broad overview of the theory and techniques of comparative study, and an opportunity for the student to bring comparative breadth to his or her major field of study.

Completion of the minor requires 21 credits.

A. Introduction
   One course that surveys a literary theme historically and cross-culturally, selected from the following:
   HUM 109 Philosophy and Literature in Social Context
   HUM 121 Death and Afterlife in Literature
HUM 122 Images of Women in Literature
HUM 123 Sin and Sexuality in Literature

B. Background
Two courses beyond the introductory level, chosen from the following:
CLS 215, CLT 211, 212, 220, 296
or one course per designator from the following: EGL 200-level, FRN 395, 396, TTL 395, 396, GER 344, HUR 341, JDH 261
or one of the following classical language courses: LAT 112 or SKT 112

C. Literature in the Original Language
At least one course in literature in its original language (other than English)

D. Theory
CLT 301 Theory of Literature
or CCS 301 Theorizing Cinema and Culture
or EGL 365 Literary Criticism and Theory

E. Advanced Study
Two upper-division courses, one from group 1, and one from group 2:

Group 1:
CLT 331 Literary Genres: Poetry
CLT 332 Literary Genres: Drama
CLT 333 Literary Genres: Novel
CLT 334 Other Literary Genres
CCS 391 Contemporary African Cinema and Cultural Studies
CCS 392 American Cinema and Cultural Studies
CCS 393 European Cinema and Cultural Studies
CCS 394 Asian Cinema and Cultural Studies

Group 2:
CLT 335 Interdisciplinary Study of Film
CLT 361 Literature and Society
CLT 362 Literature and Ideas
CLT 363 Literature and the Arts
CCS 311 Gender and Genre in Film
CCS 312 Cinema and the Ancient World
CCS 313 Television Studies
CCS 390 Latin American Cinema
CCS 391 Contemporary African Cinema and Cultural Studies
CCS 392 American Cinema and Cultural Studies
CCS 393 European Cinema and Cultural Studies
CCS 394 Asian Cinema and Cultural Studies
CCS 395 Digital Cultural Studies

Computer Engineering (ECE)

Requirements for the Major in Computer Engineering (ECE)

7. Engineering Technical Electives
4 ESE electives chosen from:
- ESE 311 Analog Integrated Circuits
- ESE 319 Electromagnetics and Transmission Line Theory
- ESE 330 Integrated Electronics
- ESE 337 Digital Signal Processing Theory
- ESE 344 Software Techniques for Engineers
- ESE 346 Computer Communications
- ESE 347 Digital Signal Processing
- ESE 349 Introduction to Fault Diagnosis of Digital Systems
- ESE 355 VLSI System Design
- ESE 356 Digital System Specification and Modeling
- ESE 357 Digital Image Processing
- ESE 358 Computer Vision
- ESE 360 Network Security Engineering
- ESE 366 Design using Programmable Mixed-Signal Systems-on-Chip
- ESE 381 Embedded Microprocessor Systems Design II
- ESE 476 Undergraduate Instructional Laboratory Development Practicum

Computer Science (CSE)

Transfer Credits
Students wishing to transfer credits for courses equivalent to CSE 114, 214, or CSE 215 in order to use them as prerequisites for other CSE courses or toward meeting the requirements for acceptance into the major must demonstrate proficiency in the course material by passing a proficiency examination, given during the first week of each semester.

Enrolling in CSE Courses

To enroll in CSE courses, students must:
- Have completed all prerequisites with a grade of C or higher. (Pass/No Credit grades are not acceptable to meet prerequisites.) For transfer students, official transfer credit evaluations must have been completed and approved and the relevant proficiency examination for lower division courses, given during the first week of each semester, must have been taken and passed.
- Failure to satisfy the prerequisites or to attend the first class may result in deregistration. The Pass/No Credit option is not available to CSE majors for CSE courses.

Requirements for the Major in Computer Science (CSE)
The major in Computer Science leads to the Bachelor of Science degree. At least five upper-division courses from items 2 and 3 below must be completed at Stony Brook.

Completion of the major requires approximately 80 credits.

1. Required Introductory Courses
- CSE 114 Computer Science I
- CSE 214 Computer Science II
- CSE 215 Foundations of Computer Science
- CSE 219 Computer Science III
- CSE 220 Computer Organization and Systems

2. Required Advanced Courses
- CSE 302 Professional Ethics for Computer Science [Effective fall 2005]
- CSE 303 Introduction to the Theory of Computation and CSE 373 Analysis of Algorithms
- CSE 308 Software Engineering

Three software-related courses chosen from: CSE 305; 306; 304 or 307; 328 or 333

One hardware-related course chosen from: CSE 310, 320, 346, ESE 345

3. Computer Science Electives
Three upper-division CSE or ISE course electives excluding CSE 475, 488, 495, and 496.

4. AMS 151, 161 Applied Calculus I, II
Note: The following alternate calculus course sequences may be substituted for AMS 151, 161 in major requirements or prerequisites: MAT 125, 126, 127, or MAT 131, 132, or MAT 141,
The minor in Computer Science is open to all students not majoring in either Computer Science or Information Systems or minoring in Information Systems. To declare the minor in Computer Science, students must complete CSE 113 and 114 with grades of C or higher. The minor requires seven CSE or ISE courses totaling 22 to 24 credits as outlined below.

1. CSE 114 Computer Science I
2. CSE 214 Computer Science II
3. CSE 215 Foundations of Computer Science
4. CSE 219 Computer Science III or CSE 220 Computer Organization and Systems Programming
5. Three upper-division CSE or ISE courses totaling at least nine credits (excluding CSE/ISE 300, 475, 487, 488).

Note: All of these courses must be passed with a letter grade of C or higher.

Cytotechnology
The Cytotechnology major has been removed from the majors offered through the Schools of Health Sciences.

Cytotechnology
Cytotechnologists are skilled laboratory scientists who employ microscopic and other analytic methods to evaluate clinical biological cellular specimens for the presence of disease. Detecting changes in cells that may lead to early, life-saving treatment, cytotechnologists are employed as practitioners in hospital and private laboratories, and as researchers, managers and educators.

Pre-Application Requirements
1. 3 credits of English composition
2. 6 credits in the arts and/or humanities, excluding studio, skills, and techniques courses
3. 6 credits in the social and behavioral sciences
4. 12 credits of biology with lab.
(See Note 1)
5. 8 credits of chemistry with lab
6. 2 credits in college level mathematics
7. 2.50 g.p.a.

Notes:
1. Students completing the courses at Stony Brook should take BIO 202 and 203 Fundamentals of Biology and HBM 320, 321 Microbiology and Laboratory, though other biological science courses may be substituted for HBM 320, 321.
2. Courses in genetics, cell biology, anatomy, general microbiology, organic chemistry, computer literacy, sociology and human sexuality are recommended.

Dance (DAN)
The Dance minor is no longer being offered.

Digital Arts (DIA)
Digital technologies are reshaping all aspects of our culture; the arts and its related commercial and entertainment industries are no exception. The Digital Arts Minor enables students to explore digital production tools in print, web, video, animation, game, CD, DVD, performance, installation, interactive experience, information visualization, and public space. In addition to production skills, the Digital Arts Minor builds critical literacy in reading and understanding images, sound, and information as well as in interacting in mediated social networks. It encourages creative thinking and problem solving, often cited as necessary skills for the 21st century and the pace of change in technology. The minor provides the education and fosters skills now crucial to being a citizen, consumer, cultural producer, and innovator in today’s global visual and information culture.

This minor is particularly well suited for, but not limited to, students in Studio Art (ARS), Cinema and Cultural Studies (CCS), Computer Science (CSE), Multi-disciplinary Studies (MTD), Music (MUS), Theatre (THR), Journalism (JRN), and Business (BUS).

Requirements for the Minor in Digital Arts (DIA)
All letter-graded courses for the minor in Digital Arts must be passed with a letter grade of C or higher. Completion of the minor requires 21 credits.

To earn a Digital Arts Minor students must take one Core course (category A), one Foundations course (category B), and one Intermediate Production course (category C). Students must also take one additional production course chosen from categories C or D, one Theory and Culture course chosen from category E, and six
additional elective credits chosen from categories C, D, or E. Nine or more credits for the minor must be upper division.

A. Core Courses:
ARS/MUS/THR 208 Introduction to Digital Media Technology
ARS 225 Introductory Digital Art

B. Foundations in the Arts:
ARS 205 Foundations in Visual Arts: Idea and Form
CCS 101-B Images and Texts: Understanding Culture

C. Intermediate Production Courses:
ARS/MUS/THR 317 Interactive, Performance, Media, and MIDI
ARS/MUS/THR 318 Movies: Shoot, Score, and Edit
ARS 325 Intermediate Digital Art: Print
ARS 326 Intermediate Digital Arts: Video
ARS 327-H Intermediate Digital Arts: Web Art, Design, and Culture
ARS 328 Intermediate Digital Arts: Animation
ARS/MUS/THR 341 Sound Design
ARS 425 Advanced Digital Arts
MUS 340 Introduction to Music Technologies

D. Other Production Courses:
ARS 381 Photography 2
ARS 481: Photography 3
ARS 482: Photography 4
ARS 390-G/491/492 Topics (only approved topics)
ARS 487 Advanced Directed Projects in Studio
ARS/MUS/THR/CCS/CSE/ISE 488 Internship
CSE 102 Introduction to Web Design and Programming
ISE 108 Introduction to Programming
CSE 325 Computers and Sculpture
CSE 334 Introduction to Multimedia Systems (also ISE 334)
CSE 364 Advanced Multimedia (also ISE 364)
CSE 380 Computer Game Programming
CSE 381 Advanced Game Programming
MUS 437 Electronic Music

E. Theory and Culture Courses:
ARH 322-G American Art Since 1947
ARH 333-K Arts for the Public
ARH 334-G Performance Art
ARH 335-G History of Photography
ARH 336-G Digital Visual Culture
ARH 342-G Art of the 20th Century
ARH 400 Topics in Art History (only approved topics)
CCS 201 Writing About Culture
CCS 301-G Theorizing Cinema and Culture
CCS 313-H Television Studies
CCS 391-J Contemporary African Cinema and Cultural Studies
CCS 395-H Digital Cultural Studies
CCS 401 Senior Seminar in Cinema and Cultural Studies
CLT 335 Interdisciplinary Study of Film
CSE 301-H History of Computing
EST 310 Game Design
MUS 300-H Music, Technology, and Digital Culture
THR 277 The Media Industry
THR 403 Media: Theory and Criticism

Notes:
1. No more than six credits from any 488 internship may be applied to the minor.
2. No more than three credits from 487 may be applied to the minor.
3. Pre-approval for appropriate 487 projects and 488 internships is required.
4. ARS majors should be aware that many ARS courses require ARS 154 as a prerequisite, although ARS 154 is not required for DIA courses.

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**Engineering Science (ESG)**

**Sample Course Sequence for the Major in Engineering Science**

<table>
<thead>
<tr>
<th>Freshman Fall</th>
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<td>PHY 131/133#</td>
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<td>AMS 151#</td>
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<tr>
<td>PHY 132/134#</td>
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<td>ESG 188</td>
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<td>MEC 262</td>
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<td>ESG 281</td>
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<td>ESG 316</td>
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<td>ESM 336</td>
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<tr>
<td>ESG 339</td>
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<td>ESG 440#</td>
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<td>ESM 450</td>
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<td>Technical elective (design)#</td>
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<td>D.E.C.</td>
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<td>ESG 375</td>
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<td>ESG 441#</td>
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<td>Technical elective (design)#</td>
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**Areas of Specialization**

Each area of specialization requires two design-related courses and three elective courses above those used toward Requirement A, Core. Other technical electives may be substituted only with the approval of the undergraduate program director.

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Biomedical Engineering

Biomedical engineering is the application of various engineering disciplines to biomedical problems, requiring sound understanding of an engineering discipline coupled with principles of biology and medicine. Students utilize elective courses to learn the fundamentals of biology and bioengineering.

1. One of the following two-course design sequences must be completed.
   a. ESM 334 Materials Engineering
      ESM 335 Strength of Materials
   b. MEC 310 Introduction to Machine Design
      MEC 410 Design of Machine Elements
   c. MEC 305 Heat and Mass Transfer
      MEC 364 Introduction to Fluid Mechanics

2. Three technical electives chosen from the following:
   a. ESM 334 Materials Engineering
   b. GEO/MAR 318 Engineering Geology and Coastal Processes
      or GEO 309 Structural Geology
      or MEC 364 Introduction to Fluid Mechanics

Civil Engineering Track:

1. Two required courses:
   a. ESM 334 Materials Engineering
   b. GEO/MAR 318 Engineering Geology and Coastal Processes
      or GEO 309 Structural Geology
      or MEC 364 Introduction to Fluid Mechanics

2. Three technical electives chosen from the following:
   CME 314 Chemical Engineering Thermodynamics II
   GEO 315 Groundwater Hydrology
   ISE 320 Information Management
   MEC 305 Heat and Mass Transfer
   MEC 363 Mechanics of Solids
   MEC 406 Energy Management in Commercial Buildings
   MEC 455 Applied Stress Analysis
   A third course from 1. above
   ESM 488 Cooperative Industrial Practice (3 credits)
   or ESM 499 Research in Materials Science (3-4 credits)
   or other departmental independent research with permission of the program director
   ESM 440, 441 Engineering Science Design III, IV (See Note)
   ESG 320 Sensor Materials and Devices

Note: ESM 440/441 Engineering Science Design III/IV counts for one technical elective with permission of the instructor and the undergraduate program director.

Environmental Engineering Track:

1. Two required courses:
   a. ESM 212 Intro to Environmental Materials Engineering (or CME 318 Chemical Engineering Fluid Mechanics or MEC 364 Introduction to Fluid Mechanics or MEC 305 Biofluids)
   and CHE 312 Physical Chemistry Short Course (or CHE 301 Physical Chemistry I)
   CHE 312 Physical Chemistry

2. Three technical electives chosen from:
   CME 318 Chemical Engineering Fluid Mechanics or MEC 364 Introduction to Fluid Mechanics or BME 305 Biofluids may be taken as a technical elective if not taken as a required course
   CME 314 Chemical Engineering Thermodynamics II
   ESG 320 Sensor Materials and Devices
   ISE 320 Information Management
   AMS 322 Groundwater Modeling
   GEO 316 Geochemistry of Surficial Processes
   GEO/MAR 318 Engineering Geology and Coastal Processes
   MAR 301 Environmental Microbiology
   MAR 336 Marine Pollution
   MAR 394 Environmental Toxicology and Public Health
   ATM 397 Air Pollution and its Control
   CHE 361 Nuclear Chemistry
   CHE 362 Nuclear Chemistry Laboratory
   ESM 488 Cooperative Industrial Practice (3 credits)
   or ESM 499 Research in Materials Science (3-4 credits)
   or other departmental independent research with permission of the program director
   ESG 440, 441 Engineering Science Design III, IV (See Note)
   EST 392 Engineering and Managerial Economics

Note: ESG 440/441 Engineering Science Design III/IV counts for one technical elective with permission of the instructor and the undergraduate program director.

Electrical Engineering

This specialization is intended to provide a depth of understanding of electronic devices, electronic materials, and electrical and electronic system design built upon the broad engineering science curriculum.

1. One of the following two-course design sequences:
   a. ESE 218 Digital Systems Design and ESE 380 Embedded Microprocessor Systems Design I
   b. ESE 305 Deterministic Signals and Systems and ESE 315 Control Systems Design

2. ESE 372 Electronics
3. Two courses chosen from the following:
   ESE 304 Applications of Operational Amplifiers
   ESE 306 Random Signals and Systems
   ESE 307 Analog Filter Design
   ESE 310 Electrical Circuit Analysis II
   ESE 311 Analog Integrated Circuits
   ESE 316 Digital Devices and Circuits
   ESE 319 Introduction to Electromagnetic Fields and Waves
   ESE 332 Semiconductor Device Characterization
   ESE 350 Electrical Power Systems
   ESE 352 Electromechanical Energy Converters
   ESE 358 Computer Vision
   ESE 362 Optoelectronic Devices and Optical Imaging Techniques
   ESE 381 Embedded Microprocessor Systems Design II
   ESM 475 Undergraduate Teaching Practicum
   MEC 305 Heat and Mass Transfer
   MEC 310 Introduction to Machine Design and MEC 410 Design of Machine Elements
   MEC 325 Manufacturing Processes
   MEC 340/441 Engineering Science Design III/IV (See Note)
   EST 392 Engineering and Managerial Economics
   Note: Three credits of research (ESM 499 or 488) may be used as a technical elective with permission of the undergraduate program director.

Materials Science and Engineering

This specialization provides the opportunity for in-depth study of the relationship between performance-properties-processing in materials engineering and its applications.

1. One of the following two-course design sequences:
   a. ESM 334 Materials Engineering and MEC 335 Strength of Materials
   b. MEC 310 Introduction to Machine Design and MEC 410 Design of Machine Elements
   c. MEC 305 Heat and Mass Transfer and MEC 364 Introduction to Fluid Mechanics
   d. ESE 218 Digital Systems Design and ESE 380 Embedded Microprocessor Systems Design I
   e. ESE 305 Deterministic Signals and Systems and ESE 315 Control System Design

2. Three courses from the following:
   ESM 325 Diffraction Techniques and Structure of Solids
   ESM 353 Biomaterials: Manufacture, Properties, and Applications
   ESM 369 Polymers
   ESM 475 Undergraduate Teaching Practicum
   ESG 440/441 Engineering Science Design III/IV (See Note)
   EST 392 Engineering and Managerial Economics
   Note: Three credits of research (ESM 499 or 488) may be used as a technical elective with permission of the undergraduate program director.

Nanoscale Engineering

The creation of functional materials and devices which involves controllable processes and transformations at the scale of billionths of a meter promises to become a major focus of future efforts in both engineering and scientific research. With a thorough background in materials science, engineering design, and surface and molecular chemistry and devices, this specialization prepares students for graduate study, as well as professional positions in materials and process engineering and research and development.

1. Two required courses:
   a. ESM 334 Materials Engineering
   b. ESG 320 Sensor Materials and Devices

2. Three technical electives chosen from:
   ESM 369 Polymers
   ESM 375 Biomaterials
   CHE 301 Physical Chemistry I
   CHE 302 Physical Chemistry II
   CHE 321 Organic Chemistry I
   CHE 322 Organic Chemistry II
   CHE 345 Structure and Reactivity in Organic Chemistry
   BME 381 Nanofabrication in Biomedical Applications
   ESM 488 Cooperative Industrial Practice (3 credits)
   or ESM 499 Research in Materials

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Science (3-4 credits)
or other departmental independent research with permission of the program director

ESG 440, 441 Engineering Science
Design III, IV (see Note)
EST 392 Engineering and Managerial Economics

Note: ESG 440/441 Engineering Science Design III/IV counts for one technical elective with permission of the instructor and the undergraduate program director.

**Engineering Management**

Students may take a specialization in Engineering Management consisting of the following courses:

1. Two required courses, EST 392 Engineering and Managerial Economics and ESG 201 Engineering Responses to Society

2. Three technical electives which may be satisfied by the following courses:
   - BUS 210 Financial Accounting
   - BUS 330 Principles of Finance
   - BUS 340 Information Systems in Management
   - BUS 348 Principles of Marketing
   - EST 305 Applications Software for Information Management
   - EST 326 Management for Engineers
   - EST 327 Marketing for Engineers
   - EST 391 Technology Assessment
   - EST 393 Project Management
   - ISE 330 Information Management
   - Another upper level course in Business, Technology and Society, or Economics with the permission of the Undergraduate Program Director

**Environmental Engineering (ENE)**

The Minor in Environmental Engineering is composed of the following courses:

A. Two required courses:
   - ESM 212: Introduction to Environmental Materials Engineering
   - BME 305 Biofluids*
   - CME 318 Fluid Mechanics*
   - MEC 364 Fluid Mechanics*
   - One course selected from CHE 312: Physical Chemistry, short course or CHE 301: Physical Chemistry I
   - May be taken as a technical elective if not taken as a required course.

B. Technical electives (choose 4, of which at least 1 must be an ESG or ESM course):
   - ESG 301: Sustainability of the Long Island Pine Barrens
   - ESG 320: Sensor Materials and Devices
   - ESG 332: Materials Science I: Structure and Properties of Materials
   - ESM 334: Materials Engineering
   - ESM 488 Cooperative Industrial Practice or 499 Research in Materials Science or ESG 487 Cooperative Research in Technological Solutions: at least 3 credits, with permission of Director of the Minor.
   - BIO 386/ENS 311: Ecosystem Ecology and the Global Environment
   - CHE 302: Physical Chemistry II
   - GEO 315: Groundwater Hydrology
   - GEO 316: Geochemistry of Surficial Processes
   - GEO 318: Engineering Geology and Coastal Processes
   - MAR 301: Environmental Microbiology
   - MAR 336: Marine Pollution
   - MAR 392: Waste Management Issues
   - MAR 394: Environmental Toxicology and Public Health
   - ATM 397: Air Pollution and Its Control
   - CHE 310: Chemistry in Technology and the Environment

**Environmental Studies (ENS)**

C. Concentration (12 credits)

All students in the major must complete an area of concentration consisting of four courses to develop depth of knowledge in a specific field of interest.

1. Archaeology
   - ANT 104 Introduction to Archaeology
   - ANT 357 The Agricultural Revolution
   - ANT 362 Long Island Archaeology
   - One additional upper-division archaeology course

2. Atmospheric Studies
   - ATM 205 Introduction to Atmospheric Science
   - ATM 237 Global Atmospheric Change
   - ATM 397 Air Pollution and its Control
   - MAR 334 Remote Sensing in the Environment
   - Other upper-division ATM courses (ATM 345, ATM 346, or ATM 348) may be substituted with permission of the undergraduate program director.

3. Conservation/Physical Anthropology
   - ANP 321 Primate Evolution
   - ANP 350 Primate Behavior and Ecology
   - ANP 360 Primate Conservation
   - MAR 315 Conservation Biology and Marine Biodiversity

4. Ecology*
   - BIO 351 and 352 Ecology and Ecology Laboratory
   - BIO 353 Marine Ecology
   - BIO 354 Evolution or BIO 355 Plant Ecology
   - Other upper-division ecology or marine sciences courses (e.g., MAR 320 Limnology) may be substituted for BIO 353 and BIO 354/BIO 355 with permission of the undergraduate program director.

5. Environmental Economics*
   - ECO 303 Intermediate Microeconomic Theory
   - ECO 305 Intermediate Macroeconomic Theory
   - ECO 373 Economics of the Environment and Natural Resources
   - One additional upper-division economics course by permission of the undergraduate director.

6. Environmental History
   - HIS 193 American History to 1877
   - HIS 404 United States since 1877
   - HIS 353 Environmental History of North America
   - HIS 398 Environment in World History
   - Additional upper-division history course with permission of undergraduate director (for example, AAS/HIS 353 Environmental History of China)

7. Environmental Law
   - ENS/POL 333 Environmental Law

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**SUPPLEMENT: MAJORS, MINORS, AND PROGRAMS**

Fall 2008: updates since Spring 2007 are in red
POL 320 Constitutional Law and Politics
POL 329 Administrative Law
POL 366 Government Regulation of Business

Other upper-division courses (i.e., POL 351, POL 359, PHI 375) may be substituted for POL 366 with permission of the undergraduate program director.

8. Marine Environmental Studies*
   MAR 333 Coastal Oceanography
   MAR 336 Marine Pollution
   MAR 315 Conservation Biology and Marine Biodiversity
   MAR 385 Principles of Fisheries Biology and Management
   Other upper-division courses (BIO 343, 353; MAR 301, 302, 304, 307, 308, 334, 350, 351, 366, 371, 390) may be substituted for MAR 315 and/or MAR 385 with permission of the director of undergraduate studies.

9. Public Policy*
   POL 325 Civil Liberties and Civil Rights
   POL 359 Public Policy Analysis
   POL 364 Organizational Decision Making
   PHI 364 Philosophy of Technology or PHI 366 Philosophy and the Environment
   Or one additional upper-division waste reduction or environmental policy course (with permission of the director of undergraduate studies).

10. Waste Reduction and Management
    MAR 392 Waste Management Issues
    ENS/POL 333 Environmental Law
    BCP/MAR 394 Toxicology and Public Health

Humanities (HUM)

Requirements for the Major in Humanities (HUM)

D. Advanced Studies by Epoch

Twenty-one upper-division credits (seven courses numbered 300 or higher) in courses with the listed designators, to be distributed as follows:

- three courses in two of the following epochs
- two courses chosen from a third epoch

Information Systems (ISE)

Sample Course Sequence for the Major in Information Systems

<table>
<thead>
<tr>
<th>Freshman Fall</th>
<th>Credits</th>
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<td>ISE 102</td>
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<td>AMS 151</td>
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<td>Specialization Course</td>
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<tr>
<td>Spring Credits</td>
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<tr>
<td>First Year Seminar 102</td>
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</tr>
<tr>
<td>ISE 102</td>
<td>3</td>
</tr>
<tr>
<td>Specialization Course</td>
<td>3</td>
</tr>
<tr>
<td>WRIT 102 (D.E.C. A)</td>
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<tr>
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Sophomore Fall

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Junior Fall

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Senior Fall

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<tr>
<td>D.E.C.</td>
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<td>Elective</td>
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</table>

Acceptance into the Information Systems Major

Qualified freshman and transfer applicants may be accepted directly into the Information Systems major upon admission to the University. Currently enrolled students may apply for acceptance to the major after completing the following two courses with grades of C or higher and a grade point average of 2.80 or higher.

1. ISE 102 Introduction to Web Design and Programming
2. ISE 108 Introduction to Programming

Enrolling in ISE Courses

To enroll in ISE courses, students must have completed all prerequisites with a grade of C or higher (Pass/No Credit grades are not acceptable to meet prerequisites). For transfer students, official transfer credit evaluations must have been completed and approved.

Failure to satisfy the prerequisites or to attend the first class may result in deregistration. The Pass/No Credit option is not available to ISE majors for ISE courses.

Requirements for the Major in Information Systems (ISE)

The major in Information Systems leads to the Bachelor of Science degree. At least two of the courses under requirement A.2. below must be completed at Stony Brook.

Completion of the major requires approximately 70 credits.

A. Information Systems Courses

1. ISE 102 Introduction to Web Design and Programming
2. ISE 108 Introduction to Programming
3. ISE 208 Intermediate Programming
4. ISE 302 Professional Ethics for Computer Science
5. ISE 305 Database Design and Practice
6. ISE/CSE 308 Software Engineering
7. ISE 311 Systems Administration
8. ISE 320 Information Management

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3. Three additional upper-division ISE courses, excluding ISE 475.

**B. Mathematics Courses**
1. AMS 151 Applied Calculus I  
   (or MAT 131 or MAT 141 or MAT 125, 126)
2. AMS 201 Matrix Methods and Models  
   or AMS 210 Applied Linear Algebra  
   or MAT 211 Introduction to Linear Algebra
3. AMS 310 Survey of Probability and Statistics  
   or ECO 320 Mathematical Statistics

**C. Specializations**
Students must complete a specialization in one of the application areas listed below, or else design a specialization of six to eight courses in another application area in consultation with the ISE Undergraduate Director before the courses for the specialization are completed.

**D. Upper-Division Writing Requirement:** ISE 300 Writing in Information Systems
All degree candidates must demonstrate technical writing skills at a level that would be acceptable in an industrial setting. To satisfy this requirement, students must pass ISE 300 Writing in Information Systems, a course that requires various writing assignments, including at least one significant technical paper.

**EST 304 Communication for Engineers and Scientists** may be taken in lieu of ISE 300 to fulfill the ISE upper-division writing requirement.

**Grading**
All courses taken to satisfy Requirements A through D must be taken for a letter grade and completed with a grade of C or higher. A grade of C or higher is required in prerequisite courses listed for all CSE and ISE courses.

**Specialization in Business and Economics**
Students may take a specialization in Business and Economics consisting of the following courses:

1. Core Courses
   a. BUS 111 Introduction to Business for Non-Business Majors
   b. ECO 108 Introduction to Economics
   c. BUS 210 Financial Accounting
2. One of the following:
   BUS 214 Managerial Accounting
   BUS 346 Operations Management
   BUS 349 Management Science
   BUS 355 Investment Analysis
   BUS 356 Financial Engineering
   ECO 348 Analysis for Managerial Decision Making
   ECO 368 Modern Portfolio Theory
   ECO 389 Corporate Finance
   EST 392 Engineering and Managerial Economics
   EST 393 Production and Operations Analysis
3. One of the following:
   BUS 347 Business Ethics
   BUS 348 Principles of Marketing
   ECO 326 Industrial Organization
   ECO 343 Transformation in Economic Systems
   ECO 345 Law and Economic Issues
   POL 319 Business Law
   POL 359 Public Policy Analysis
   POL 364 Organizational Decision Making
   SOC 381 Sociology of Organizations
4. One of the following:
   BUS 340 Information Systems in Management
   BUS 343 Expert Systems in Business
   EST 302 Assessment of Computer-Based Technologies
   EST 305 Applications Software in Information Management
   EST 320 Communication Technology Systems
   EST 325 Technology in the Workplace

**Specialization in Psychology**
Students may take a specialization in Psychology consisting of the following courses:

1. Core Courses
   a. PSY103 Introduction to Psychology
   b. PSY 201 Statistical Methods in Psychology
   c. PSY 310 Research and Writing in Psychology
2. One of the following:
   PSY 220 Survey in Developmental Psychology
   PSY 230 Survey in Clinical Psychology
   PSY 240 Survey in Social Psychology
   PSY 250 Survey in Biopsychology
   PSY 260 Survey in Cognition and Perception
3. Two additional courses numbered 200 or higher other than PSY 273, 283, 310, 399, 447, 475, 476, 487, 488, 495, 496

**Specialization in Technological Systems Management**
Students may take a specialization in Technological Systems Management consisting of the following courses:

1. Four required courses:
   a. EST 202 Introduction to Science, Technology, and Society Studies
   b. EST 391 Technology Assessment
   c. EST 392 Engineering and Managerial Economics
   d. EST 393 Project Management
2. Two elective courses from the following:
   EST 310/ISE 340 Design of Computer Games
   EST 320 Communication Technology Systems
   EST/ISE 323 Human-Computer Interaction
   EST 326 Management for Engineers
   EST 327 Marketing for Engineers
   EST 421 Starting the High-Technology Venture

Note: Courses cross-listed between ISE and EST may be taken either as ISE electives (Item A.3) or as TSM specialization electives (Item C).

**Specialization in Other Application Areas**
A student may design a specialization in another application area of information systems in consultation with the ISE Undergraduate Director before the cours-
es for the specialization are completed.

Requirements for the Minor in Information Systems (ISE)
The minor in Information Systems is open to all students not majoring in either Computer Science or Information Systems or minoring in Computer Science. To declare the minor in Information Systems, students must complete ISE 102 with a grade of C or higher. The minor requires seven courses totaling 21 credits as outlined below:

1. ISE 102 Professional Ethics for Computer Science
2. ISE 108 Introduction to Programming
3. ISE 208 Intermediate Programming
4. Four electives totaling at least twelve credits. Electives must include nine credits of upper-division courses and at least nine credits of ISE courses. Approved electives include most ISE courses, as well as other courses relevant to Information Systems; for details contact the Department of Computer Science Undergraduate Office.

Latin American and Caribbean Studies (LAC)
The minor in Latin American and Caribbean Studies allows students to pursue an interdisciplinary course of study that provides a broad overview of Latin America and the Caribbean. Students are introduced to the principal historical, social, and cultural themes in the region, and through their electives, they are also able to develop more detailed knowledge of specific subjects in the region, such as the history of a particular country or the literature of a particular period.

Courses in Latin American and Caribbean Studies (LAC)
See the Course Descriptions listing in this Bulletin for complete information.

LAC 200-J Introduction to Latin American and Caribbean Societies
LAC 380 Topics in Latin American Studies
LAC 487 Independent Research in Latin American and Caribbean Studies
LAC 488 Internship

LAC 490 Senior Seminar in Latin American and Caribbean Studies

Requirements for the Minor in Latin American and Caribbean Studies (LAC)
All courses offered for the minor must be passed with a letter grade of C or higher.
Completion of the minor requires 24 credits.
1. LAC 200 Introduction to Latin American and Caribbean Societies
2. SPN 211 Intermediate Spanish I (Latin America) or SPN 210 Intermediate Spanish (Spain)
3. One history or social science course, to be chosen from those listed in Group A
4. Two additional upper-division courses to be chosen from those listed in Group B
5. LAC 488 Internship (or LAC 487 Research with permission of director)
6. One four-credit upper-division independent study course in any department, approved by the director

Mechanical Engineering (MEC)

Sample Course Sequence for the Major in Mechanical Engineering

Freshman Fall Credits
First Year Seminar 101 1
MAT 131 4
MEC 101 2
PHY 131/133 4
WRT 101 3
D.E.C. 3
Total 17

Spring Credits
First Year Seminar 102 1
D.E.C. 3
MAT 132 4
MEC 102 2
PHY 132/134 4
WRT 102 3
Total 17

Sophomore Fall Credits
MEC 125* 1
MEC 200 1
MEC 202 1
MEC 260** 3
AMS 261 or MAT 203 4
ESG 281 or PHY 251/252 4
D.E.C. 3
Total 17

Spring Credits
MEC 203 2
MEC 262*** 3
MEC 363*** 3
AMS 361 or MAT 203 4
ESG 188 or CHE 131 4
MEC 214 1
Total 17

Junior Fall Credits
MEC 301 3
ESG 332 4
MEC 316 3
MEC 364 3
EST 382 or ECO 108 (D.E.C. F) 3
Total 16

Spring Credits
MEC 300 1
MEC 305 3
MEC 310 3
MEC 317 3
MEC 320 3
MEC 325 3
Total 15

Senior Fall Credits
MEC 410 3
MEC 411 4
MEC 422 3
MEC 440 3
Technical elective 3
Total 16

Spring Credits
MEC 441 3
Technical Elective 3
Technical Elective 3
D.E.C. 3
D.E.C. 3
Total 15

*MEC 125 may be taken in any semester prior to or including MEC 325.
**A grade of “C” or higher is required in this course to graduate with the Mechanical Engineering major.
***A grade of “C” or higher is required in MEC 260 to register for this course.
Note: MEC 265, 202, 203, 260, and 262 are offered both fall and spring; all other courses are offered in their respective semesters. MEC 262 and 363 are also generally offered in the summer.

Nanotechnology Studies (NTS)
The minor in Nanotechnology Studies (NTS) is an interdisciplinary, research-intensive program intended for students in majors from the College of Engineering and Applied Sciences or the College of Arts and Sciences who wish to learn about the emerging field of nanotechnology. The coursework in the minor will provide a broad background in the science, design, manufacture, and societal, health and environmental impacts of nanomaterials and nanoscale structures and their applications in engineering and health related...
areas. The inclusion of a minimum of two semesters of research in the students’ own major areas, as well as choice of technical electives, will allow for integration into current interests and disciplines, and will provide knowledge and skills valuable to students planning to seek employment or graduate studies in fields related to the engineering, business, policy or the broader impact of nanotechnology.

Admittance to the minor requires the approval of the NTS faculty committee, following review of student performance in the 213 class and other relevant coursework.

Requirements for the Minor in Nanotechnology Studies (NTS)

All courses for the minor must be passed with an average grade of B or higher.

Completion of the minor requires 18-22 credits and consists of the following requirements:

1. BME 213 or ESM 213 or EST 213 or MEC 213
2. Two semesters (at least 6 credits) of independent research (499 or 488), co-advised by a faculty member from the student’s major program and a second faculty advisor from the NTS faculty committee. Research topics must be approved by both faculty advisors for courses to be accepted to the NTS minor.
3. Two technical electives, chosen from among the following courses:
   a. BME 381 Nanofabrication in Biomedical Applications
   b. ESG 339 Thin Film Processing of Advanced Materials
   c. ESG 320 Sensor Materials and Devices
   d. MEC 470 Introduction to Tribology
   e. EST 391 Technology Assessment
   f. Another upper division technical course with permission of the NTS faculty committee
4. BME 400 or ESM 400 or EST 400 or MEC 400

Comparative Politics and International Relations

POL 214, 216, 302, 305, 307, 309, 310, 311, 313, 336, 337, 345, 350, 357, 372, 382, 405, 411, 412, 413. Also 287, 401, 402, 403, 404, 447, 487, and 495 when the topic is applicable.

American Government, Law, and Public Policy


Political Behavior and Political Psychology


South Asian Studies (SOA)

Requirements for the Minor in South Asian Studies (SOA)

All courses offered for the minor must be passed with a letter grade of C or higher. At least nine credits toward the minor must be upper-division.

Completion of the minor requires seven courses or 21 credits.

1. AAS 201 Introduction to the Civilization of the Indian Subcontinent
2. AAS/HIS 348 History of British India
3. One of the following:
   a. AAS/RLS 256 Hinduism
   b. AAS/RLS 260 Buddhism
   c. AAS/RLS 280 Islam
4. Three of the following:
   a. AAS 211 Asian and Asian American Studies Topics in the Humanities (appropriate topic only)
   b. AAS/RLS 260 Cultural Studies
   c. AAS/RLS 380 Islamic Classics
5. One additional course (a minimum of 3 credits) chosen from the following:
   a. AAS 391, 392 Special Topics in Asian and American Studies (formerly SAS 401, 402)
   b. AAS 447 Directed Readings (formerly SAS 447)
   c. AAS 487 Supervised Research (formerly SAS 487)
   d. SKT 112 Elementary Sanskrit II
   e. SKT 211 Intermediate Sanskrit I
   f. SKT 212 Intermediate Sanskrit II
   g.THR 313 Asian Theatre and Drama

Technical Leadership (LTL)

The minor consists of:

1. LSE 201 Opportunities in Science and Engineering (1 credit)
2. EST 304 Communications for Engineers and Scientists (or ESE 300 for Electrical and Computer Engineering majors only)
3. BUS 111 Introduction to Business for Non-Business Majors or BUS 115
### Sample Course Sequence for the Major in Technological Systems Management

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<td>EST 327</td>
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### Requirements for the Minor in Technological Systems Management (TSM)

All students must complete four required EST courses and two or more EST electives (minimum 18 credits) with a g.p.a. of 2.50 or higher. No grade less than C may be used to meet the requirements for the minor.

EST courses counted toward the requirements for a student’s major may not be counted toward the requirements for the TSM minor.

1. Choose four of these required courses:
   - EST 192 Introduction to Modern Engineering
   - EST 194 Patterns of Problem Solving
   - EST 326 Management for Engineers
   - EST 327 Marketing for Engineers
   - EST 391 Technology Assessment
   - EST 393 Project Management
   - Another EST course with permission of the Undergraduate Program Director

2. Choose two electives from the following:
   - EST 201 Technological Trends in Society
   - EST 204 Communication for Engineers and Scientists
   - EST 305 Applications Software for Information Management
   - EST 320 Communication Technology Systems
   - EST 325 Technology in the Workplace
   - EST 392 Engineering and Managerial Economics

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### Spring 2008 Updates

### Applied Math and Statistics (AMS)

#### The Sequential B.S./M.S. Program in Applied Mathematics and Statistics

The sequential B.S./M.S. program in applied mathematics and statistics allows students with superior academic records to use up to nine graduate credits toward both the B.S. and M.S. degree requirements, thus reducing the normal time required to complete both programs to five years (ten semesters). For detailed program requirements, please refer to the Graduate Bulletin.

The advantage of the combined program is that the M.S. degree can be earned in less time than that required by the traditional course of study. The M.S. degree in Applied Mathematics and Statistics normally requires three to four semesters of study after completion of a bachelor’s degree. The in-depth training of a master's degree is required by many employers for professional positions in applied mathematics and statistics (beyond beginning programmer analyst jobs).

For more details about the B.S./M.S. program, see the undergraduate program director or graduate studies director in the Department of Applied Mathematics and Statistics.

#### The Combined B.S./M.P.H. Program in Applied Mathematics and Statistics

The combined B.S./M.P.H program allows students with superior academic records to use up to twelve graduate credits toward both the B.S. in Applied Mathematics and Statistics and the M.A. in Public Health degree requirements, thus reducing the normal time required to complete both programs to five years (ten semesters). For detailed program requirements, please refer to the Graduate Bulletin or contact the undergraduate program director in the Department of Applied Mathematics and Statistics or graduate studies director in the Department of Public Health.
Supplement: Majors, Minors, and Programs

Chemical and Molecular Engineering (CME)

Requirements for the Major in Chemical and Molecular Engineering (CME)
The curriculum begins with a focus on mathematics, physics, and chemistry, followed by courses covering specific chemical engineering topics as well as an intensive laboratory sequence. In addition, each student chooses a four-course sequence as an area of specialization which may also qualify the students for a minor in the respective department. The program culminates in the submission and acceptance of a senior thesis or original research project completed by the student which is defended at the end of the senior year. The students are encouraged to select original research projects which can be published in peer reviewed journals.

Requirements for the CME major

2. Natural Sciences

a. Chemistry
   CHE 131, 132 General Chemistry I, II or CHE 141, 142
   CHE 133, 134 General Chemistry Laboratory I, II or CHE 143, 144
   CHE 321 Organic Chemistry I and CHE 326 Organic Chemistry IIB
   CHE 383, 384 Introductory and Intermediate Synthetic and Spectroscopic Laboratory Techniques

b. Physics
   PHY 131, 132 Classical Physics I, II
   PHY 133, 134 Classical Physics Laboratory I, II
   PHY 251 Modern Physics and PHY 252 Modern Physics Laboratory or ESG 281 Engineering Introduction to the Solid State
   Note: The following alternate physics course sequences may be substituted for PHY 131/133, 132/142:
   PHY 125, 126, 127 or PHY 141, 142

3. Computer Programming
   one of the following:
   CSE 130 Introduction to Programming in C
   ESG 111 C Programming for Engineers
   MEC 111 Computer Science for Engineers
   MEC 112 Practical C/C++ for Scientists and Engineers
   ESE 124 Computer Techniques for Electronic Design

4. Engineering
   ESG 292 Materials Science I. Structure and Property of Materials

Grading
All courses taken to satisfy requirements 1-6 above (see full list of major requirements in the Bulletin) must be taken for a letter grade of C or higher, except in CME 304 which must be taken for a letter grade of B- or higher.

Specializations

C. Polymer Science
Provides a foundation in the properties of polymers, spectroscopy of organic compounds, polymer synthesis, and polymer processing for students interested in pursuing research in major laboratories or in academia.

ESM 369 Polymers
CHE 384 Intermediate Synthetic and Spectroscopic Laboratory Techniques
CME 370 Cellular Biology for Chemical Engineers
CME 371 Biomedical Polymers
CME 470 Polymer Synthesis

F. Chemistry
The Chemistry specialization consists of 12 credits of upper level CHE 300 courses not already required for the CME Major

CHE 383 2
PHY 132, 134 4
ESG 322 4
Total 14

Spring Credits
AMS 261 4
CHE 326 CHE 326 4
CHE 394 3
ESG 281 4
CME 304 3
Total 18

Senior Fall Credits
CME 401 3
CME 410 2
CME 440 3
Specialization course 3 3
D.E.C. 3
D.E.C. 3
CME 375 1
Total 17

China Studies (CNS)

Requirements for the Minor in China Studies (CNS)
At least 12 credits must be taken in courses numbered 300 or higher. No more than 3 credits may be taken under the Pass/No Credit option; all other courses must be completed with a letter grade of C or higher.

Completion of the minor requires 18 credits.

1. One of the following:
   AAS 220 China: Language and Culture
   AAS/HIS 219 Introduction to Chinese History and Civilization

2. Elective courses:
   Twelve credits chosen from the list of elective courses below and/or from the list of courses in China Studies (AAS) and courses in Chinese Language (CHI) listed above. At least nine credits must be in courses numbered 300 or higher.

3. Three credits AAS 487 Independent Research or three credits of AAS 404 Senior Seminar in China Studies.

Thematic Tracks
Students are recommended (but not required) to follow any one of the thematic tracks within China Studies as outlined below.

Language and Linguistics Track
AAS 220 China: Language and Culture
SUPPLEMENT: MAJORS, MINORS, AND PROGRAMS

CHI 111, 112, 210, 211, 212, 311, 312, 321, 322
AAS 250: Languages and Cultures of Asian Americans
AAS 350: Structure of Mandarin Chinese
AAS 370: Intercultural Communication

Culture and Civilization Track

HIS 219: Intro Chinese History & Civilization (foundation course)
AAS/RLS 256 Hinduism
AAS/RLS 260 Buddhism
AAS/RLS 280 Islam
AAS/RLS 300 Intellectual History of East Asia
AAS 318 Arts of China
AAS 371 Ancient China
AAS 372 Family Marriage and Kinship in China

Year 2 Fall:
AAS 318 Arts of China
AAS 371 Ancient China

Year 2 Spring:
AAS 404 China Studies Seminar

Science and Contemporary China Track

AAS 221 China: Science and Civilization (foundation course)
AAS 339 Contemporary China: history politics and diplomacy (post 1949)
HIS 341 20th Century China
AAS 352 Environmental History of China
AAS 379 Ethnicity and Ecology in China

Sample CNS Student Progress Profiles

Language and Linguistics Track

Year 1 Fall:
AAS 220 China: Language and Culture
CHI 111/210/211 or AAS 250 Language & Culture of Asian Americans
Year 1 Spring:
AAS 370 Intercultural Communication
Year 2 Fall:
CHI 311/321
AAS 350 Structure of Mandarin Chinese
Year 2 Spring:
AAS 404 China Studies Seminar

Culture and Civilization Track

Year 1 Fall:
HIS 219 Intro Chinese History & Civilization
AAS 300 Intellectual History of East Asia or AAS/RLS 256/260/280
Year 1 Spring:
AAS 372 Family Marriage and Kinship in China
Year 2 Fall:
AAS 318 Arts of China
AAS 371 Ancient China

Year 2 Spring:
AAS 404 China Studies Seminar

Science and Contemporary China Track

AAS 221 China: Science and Civilization (foundation course)
AAS 339 Contemporary China: history politics and diplomacy (post 1949)
HIS 341 20th Century China
AAS 352 Environmental History of China
AAS 404 China Studies Seminar

Computer Science (CSE)

Specialization in Human-Computer Interaction

The specialization in human-computer interaction emphasizes both the psychology aspects of effective human-computer interactions and the technical design and implementation of systems for those interactions. It requires four core course, two electives, and a project. Students may declare their participation in the specialization after completing the courses in 1a and 1b. All courses must be completed with a grade of C or higher.

1. Core Courses
   a. CSE 323 Human-Computer Interaction
   b. PSY 260 Survey of Cognition and Perception
   c. CSE 328 Fundamentals of computer Graphics or CSE 332 Introduction to Scientific Visualization
   d. CSE 333 User Interface Development or PSY 384 Research Lab: Human Factors

2. Two electives from the following, including at least one CSE course:
   CSE 327 Fundamentals of Computer Vision
   CSE 332 Introduction to Scientific Visualization
   CSE 333 User Interface Development
   CSE 334 Introduction to Multimedia Systems
   CSE 336 Internet Programming
   CSE 352 Artificial Intelligence
   CSE 364 Advanced Multimedia Techniques
   CSE 366 Introduction to Virtual Reality
   CSE 378 Introduction to Robotics
   CSE 390-394 Special Topics in Computer Science*
   PSY 366 Human Problem Solving
   PSY 368 Sensation and Perception
   PSY 369 Special Topics in Cognition and Perception
   PSY 384 Research Lab: Human Factors

*Special topic must be in human-computer interaction.

3. Project
   Completion of CSE 487 Research in Computer Science or CSE 488 Internship in Computer Science or CSE 495/496 Senior Honors Research Project I, II, on a topic in human-computer interaction.

Specialization in Game Programming

The specialization in game programming prepares students for a career as either a professional game developer or researcher. Game graphics and multiplayer network programming techniques are stressed. The specialization also emphasizes original game development, game design methodology, and team projects and presentations. It requires four core courses, two electives, and a project. Students may declare their participation in the specialization after completing the courses in 1a and 1b. All courses must be completed with a grade of C or higher.

1. Core Courses
   a. CSE 310 Data Communication and Networks or CSE 346 Computer Communications
   b. CSE 328 Fundamentals of Computer Graphics
   c. CSE 380 Computer Game Programming

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d. CSE 381 Advanced Game Programming

2. Two electives from the following:
   - CSE 306 Operating Systems
   - CSE 320 Computer Architecture
   - CSE 334 Introduction to Multimedia Systems
   - CSE 352 Artificial Intelligence
   - CSE 364 Advanced Multimedia Techniques
   - CSE 370 Wireless and Mobile Networking
   - CSE 408 Network Security

3. Project
   Completion of CSE 478 Research in Computer Science or CSE 488 Internship in Computer Science or CSE 495/496 Senior Honors Research Project I, II, on a topic in game programming.

Sample Course Sequence for the Major in Computer Science

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<tr>
<th>Freshman</th>
<th>Fall</th>
<th>Credits</th>
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<td>CSE 110</td>
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<tr>
<td>CSE Hardware Course</td>
<td>3</td>
</tr>
<tr>
<td>D.E.C.</td>
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</tr>
<tr>
<td>D.E.C.</td>
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<tr>
<td>Elective</td>
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<td>Total</td>
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</table>

<table>
<thead>
<tr>
<th>Spring</th>
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</tr>
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<tbody>
<tr>
<td>CSE Software course</td>
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<tr>
<td>CSE Elective</td>
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</tr>
<tr>
<td>Elective</td>
<td>3</td>
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</tbody>
</table>

Sample Course Sequence for the Major in Computer Science

Dance (DAN)
The minor in Dance has been reinstated.

Engineering Science (ESG)

Requirements for the Major in Engineering Science (ESG)

3. Computer Science: ESG 111
   Note: MEC 111 or MEC 112 or CSE 114 or CSE 130 or ESE 124 may be substituted with permission of the department.

Grading
All courses taken to satisfy Requirements A and B above must be taken for a letter grade. A grade of C or higher is required in the following courses (or their equivalents):

1. AMS 151, 161; PHY 131/133 and 132/134; ESG 217, 302, 312, 332, 339
2. Each of the five required technical electives offered by the college.

Areas of Specialization

Biomedical Engineering

2. Three courses from the following:
   - BIO 202 Fundamentals of Biology: Molecular and Cellular Biology
   - BIO 203 Fundamentals of Biology: Cellular and Organ Physiology
   - BIO 328 Mammalian Physiology
   - BME 301 Bioelectricity
   - BME 303 Engineering Methods in Biomechanics
   - BME 304 Genetic Engineering
   - BME 305 Biofluids

ESM 353 Biomaterials: Manufacture, Properties, and Applications

ESG 488 or 499 (See Note)
ESG 440/441 Engineering Science Design III/IV (See Note)

Note: Three credits of research (ESM 499 or 488) may be used as a technical elective with permission of the undergraduate program director.

Environmental Engineering Track:

1. Two required courses:
   - ESM 212 Intro to Environmental Materials Engineering (or CME 318 Chemical Engineering Fluid Mechanics or MEC 364 Introduction to Fluid Mechanics or BME 305 Biofluids)
   - and CHE 312 Physical Chemistry Short Course (or CHE 301 Physical Chemistry I).

CHE 312 Physical Chemistry

2. Three technical electives chosen from:
   - CME 318 Chemical Engineering Fluid Mechanics or MEC 364 Introduction to Fluid Mechanics or BME 305 Biofluids may be taken as a technical elective if not taken as a required course
   - ESG 320 Sensor Materials and Devices
   - AMS 322 Groundwater Modeling
   - GEO 316 Geochemistry of Surficial Processes
   - GEO/MAR 318 Engineering Geology and Coastal Processes
   - MAR 301 Environmental Microbiology
   - MAR 336 Marine Pollution
   - MAR 394 Environmental Toxicology and Public Health
   - ATM 397 Air Pollution and its Control
   - CHE 361 Nuclear Chemistry
   - CHE 362 Nuclear Chemistry Laboratory
   - ESM 488 Cooperative Industrial Practice (3 credits)
   - or ESM 499 Research in Materials Science (3-4 credits)
   - or other departmental independent research with permission of the program director
   - ESG 440, 441 Engineering Science Design III, IV (See Note)
An engineering science, engineering chemistry, or physics student may apply at the end of the junior year for admission to this special program, which leads to a Bachelor of Engineering or Bachelor of Science degree at the end of the fourth year and a Master of Science degree at the end of the fifth year. In the senior year, a student in the program takes ESM 511 Thermodynamics of Solids, ESM 513 Strength of Materials, and ESM 513 Strength of Materials—three credits of ESM 599 Research. In addition, the Senior Design project (ESG 440/441) is planned in consultation with the graduate and undergraduate program directors, as well as the thesis advisor (if the student will be taking a thesis option M.S.) to ensure that it meets the needs of the M.S. program. In the fifth year the student takes 24 graduate credits, of which at least 15 credits are coursework and three credits are ESM 599. The advantages of this program over the regular M.S. program are that a student may start his or her M.S. thesis in the senior year, and that he or she needs only 24 credits in the fifth year as opposed to 30 credits for a regular M.S. student. For details of the M.S. degree requirements, see the Graduate Bulletin.

Sample Course Sequence for the Major in Engineering Science

<table>
<thead>
<tr>
<th>Sophomore Fall</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AMS 261</td>
<td>4</td>
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<tr>
<td>ESE 271</td>
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<td>MEC 260</td>
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<tr>
<td>ESG 302</td>
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<td>AMS 361</td>
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<td>ESG 281</td>
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<td>ESG 316</td>
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<td>MEC 262</td>
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<table>
<thead>
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<td>ESG 312# and 300</td>
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<tr>
<td>ESG 332</td>
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<td>ESG 333</td>
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<table>
<thead>
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<td>ESM 490</td>
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<tr>
<td>Technical elective (design)#</td>
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</tr>
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<td>D.E.C.</td>
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<tr>
<td>Total</td>
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</table>

D.E.C. 3
ESG 375 1
Total 16

Information Systems (ISE)

Requirements for the Major in Information Systems (ISE)
The major in Information Systems leads to the Bachelor of Science degree. At least two of the courses under requirement A.2. below must be completed at Stony Brook.

Completion of the major requires approximately 70 credits.

A. Information Systems/Computer Science Courses
1. CSE 114 Computer Science I
   CSE 213 Foundations of Computer Science II
2. CSE 214 Computer Science II
3. CSE 215 Foundations of Computer Science
4. CSE 219 Computer Science III
5. CSE 220 Computer Organization and Systems Programming
6. CSE 410 Introduction to Computer Science
7. ISE/CSE 305 Principles of Database Systems
8. ISE/CSE 308 Software Engineering
9. ISE/CSE 310 Data Communication
10. Six additional upper-division CSE or ISE courses at a level of 200 or higher, including at least four upper division courses, excluding CSE and ISE 475.

C. Economics and Business Courses
1. BUS 111 Introduction to Business for Non-Business Majors
2. ECO 108 Introduction to Economics
3. BUS 210 Financial Accounting
4. One course chosen from the following:
   a. BUS 214 Managerial Accounting
   b. BUS 346 Operations Management
   c. BUS 349 Management Science
   d. BUS 355 Investment Analysis
   e. BUS 356 Financial Engineering
   f. ECO 348 Analysis for Managerial Decision Making
   g. ECO 368 Modern Portfolio Theory
   h. ECO 389 Corporate Finance

http://www.stonybrook.edu/ugbulletin
EST 392 Engineering and Managerial Economics
EST 393 Production and Operations Analysis

4. One course chosen from the following:
   BUS 347 Business Ethics
   BUS 348 Principles of Marketing
   ECO 326 Industrial Organization
   ECO 343 Transformation in Economic Systems
   ECO 345 Law and Economic Issues
   POL 319 Business Law
   POL 359 Public Policy Analysis
   POL 364 Organizational Decision Making
   SOC 381 Sociology of Organizations

5. One course chosen from the following:
   BUS 340 Information Systems in Management
   BUS 343 Expert Systems in Business
   EST 302 Assessment of Computer-Based Technologies
   EST 305 Applications Software in Information Management
   EST 320 Communication Technology Systems
   EST 325 Technology in the Workplace

Specialization in Psychology

Students may take a specialization in Psychology consisting of the following courses:

1. Core Courses
   a. PSY103 Introduction to Psychology
   b. PSY 201 Statistical Methods in Psychology
   c. PSY 310 Research and Writing in Psychology

2. One of the following:
   PSY 220 Survey in Developmental Psychology
   PSY 230 Survey in Clinical Psychology
   PSY 240 Survey in Social Psychology
   PSY 250 Survey in Biopsychology
   PSY 260 Survey in Cognition and Perception

3. Two additional courses numbered 200 or higher other than PSY 273, 283, 310, 399, 447, 475, 476, 487, 488, 495, 496

Specialization in Other Application Areas

A student may design a specialization in another application area of information systems in consultation with the ISE Undergraduate Director before the courses for the specialization are completed.

Sample Course Sequence for the Major in Information Systems

<table>
<thead>
<tr>
<th>Freshman Fall</th>
<th>Credits</th>
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<tbody>
<tr>
<td>First Year Seminar 101</td>
<td>1</td>
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<tr>
<td>CSE 110</td>
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<tr>
<td>CSE 113</td>
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<tr>
<td>AMS 151</td>
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<tr>
<td>BUS 111</td>
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<tr>
<td>WRT 101</td>
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<table>
<thead>
<tr>
<th>Sophomore Fall</th>
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</thead>
<tbody>
<tr>
<td>CSE 212</td>
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<tr>
<td>CSE 214</td>
<td>3</td>
</tr>
<tr>
<td>CSE 215</td>
<td>3</td>
</tr>
<tr>
<td>AMS 201</td>
<td>3</td>
</tr>
<tr>
<td>ECO 10B (D.E.C.F)</td>
<td>4</td>
</tr>
<tr>
<td>D.E.C.</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
</tr>
</tbody>
</table>

Mechanical Engineering (MEC)

Grading

All courses taken to satisfy requirements 1 through 8 above must be taken for a letter grade. The grade point average for the courses MEC 260, 262, 301, 305, 310, 316, 317, 320, 326, 363, 364, 410, 411, 422, 440, 441, and all technical electives (with the exception of MEC 488) must be at least 2.00. A minimum grade of “C” in MEC 260 and MEC 262 is required for the BE degree. When a course is repeated, the higher grade will be used in calculating this average.
Fall 2007 Updates

Astronomy/Planetary Sciences (AST)

A. Required Departmental Courses:
1. AST 203 Astronomy
   AST 341 Stars and Radiation
   AST 346 Galaxies
   AST 347 Cosmology
   AST/PHY 277 Computation for Physics and Astronomy
2. At least six credits from additional AST courses numbered 203 or higher (except AST 248, 277, 301, 304, and 475). Up to three credits of AST 287, 447, and 487 may be used toward this requirement.

Biochemistry (BCM)

Freshman Spring Credits
First Year Seminar 102 1
D.E.C. A 3
CHE 132 4
CHE 134 1
MAT 126 or 132 3-4
D.E.C. 3
Total 15-16

Sophomore Fall Credits
BIO 201 or 202 3
CHE 321 4
MAT 127 (if MAT 125, 126, 127 sequence taken) 3
BIO 204 2
D.E.C. 3
Total 15

Sophomore Spring Credits
BIO 203 3
CHE 326 4
CHE 327 2
BIO 205 3
D.E.C. 3
Total 15

Requirements for the Major in Biochemistry

B. Core Courses in Biology
2. BIO 201 Fundamentals of Biology: Organisms to Ecosystems
3. BIO 202 Fundamentals of Biology: Molecular and Cellular Biology
4. BIO 203 Fundamentals of Biology: Cellular and Organ Physiology
4. BIO 204 Fundamentals of Scientific Inquiry in the Biological Sciences I
4. BIO 205 Fundamentals of Scientific Inquiry in the Biological Sciences II

Note: Beginning in 2007 BIO 201, 202, and 203 will be only lecture courses. Two new laboratory classes, BIO 204 and BIO 205, will be required of all biochemistry majors.

Biology (BIO)

Freshman Spring Credits
First Year Seminar 102 1
D.E.C. A 3
CHE 321 4
CHE 327 2
BIO 203 3
CHE 134 1
MAT 126 3
D.E.C. 3
Total 18

Sophomore Fall Credits
CHE 321 4
AMS 110 3
BIO 201 and BIO 204 5
D.E.C. 3
D.E.C. 3
Total 18

Sophomore Spring Credits
CHE 322 or 326 4
CHE 327 2
BIO 202 and BIO 205 5
D.E.C. 3
D.E.C. 3
Total 17

Junior Fall Credits
PHY 121/123 4
BIO 201 3
BIO Area 3
D.E.C. 3
Upper-Division elective 3
Total 16

Requirements for the Major in Biology (BIO)

A. Biology Core
1. BIO 150 The Living World (See Note 1)
2. BIO 201, 202, 203 Fundamentals of Biology (See Note 2)
3. BIO 204 and 205 Fundamentals of Scientific Inquiry in the Biological Sciences I and II

Notes:
1. All students with a high school Biology course and a math placement score of 3 or better receive a waiver of BIO 150 The Living World. A waiver of BIO 150 does not count toward the minimum 33 credits in Requirements A and C.
2. Requests for waivers of major requirements must be approved by the Undergraduate Biology Studies Committee. Biology majors must meet the major requirements of the bulletin of their latest matriculation date.
3. Up to six credits of electives may be chosen from a list of courses offered outside the department; see the Undergraduate Biology Office for the current list.
4. Students having completed one or fewer of BIO 201, 202, 203 prior to Fall 2007 must complete BIO 204 and 205; Students having completed two or more of BIO 201, 202, 203 prior to Fall 2007 are exempt from completing BIO 204 AND BIO 205.

Requirements for the Minor in Biology (BIO)

Completion of the minor requires at least 20 credits in those biology courses designed for the Biology major, including:

A. Two of the following courses:
   BIO 201 Fundamentals of Biology: Organisms to Ecosystems
   BIO 202 Fundamentals of Biology: Cell and Molecular Biology
   BIO 203 Fundamentals of Biology: Cellular and Organ Physiology

B. BIO 204 Fundamentals of Scientific Inquiry in the Biological Sciences I
   and
   BIO 205 Fundamentals of Scientific Inquiry in the Biological Sciences II

C. Nine credits at the 300 level
D. A lecture course in at least two of the five areas of inquiry (I-V) listed under the biology major.
**Biomedical Engineering (BME)**

**Sophomore Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMS 261</td>
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<tr>
<td>MEC 260</td>
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</tr>
<tr>
<td>BIO 202</td>
<td>3</td>
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<tr>
<td>D.E.C.</td>
<td>3</td>
</tr>
<tr>
<td>AMS 210</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>16</strong></td>
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</table>

**Business Management (BUS)**

**Requirements for the Major in Business Management (BUS)**

The major in Business Management leads to the Bachelor of Science degree.

Completion of the major requires approximately 67 credits (including 21 credits for the minor requirement).

**A. Core Courses**

- BUS 115 Introduction to Business for Business Majors
- BUS 210 Financial Accounting
- BUS 215 Introduction to Business Statistics (see Note)
- BUS 220 Introduction to Decision Sciences (formerly Management Science) (see Note)
- BUS 330 Principles of Finance
  or ECO 389 Corporate Finance
- BUS 346 Operations Management
- BUS 347 Business Ethics
- BUS 348 Principles of Marketing
- BUS 441 Business Strategy
  or BUS 353 Entrepreneurship
- ECO 108 Introduction to Economics (see Note)

Note: MAT 122—Overview of Calculus with Applications satisfies DEC C and must be completed as a prerequisite for ECO 108, BUS 215 and BUS 220.

**B. Business Electives**

One from the following:

- BUS 301 Corporate Communications
- BUS 340 Information Systems in Management
- BUS 351 Human Resource Management
- BUS 352 Electronic Commerce
- BUS 354 Understanding Business Agreements
- BUS 390 Special Topics in Management

**BUS 391** Management of Sports Organizations

**BUS 401** Negotiations Workshop

**BUS 440** International Management

**POL 319** Business Law

**D. Upper-Division Writing Requirement**

BUS 347 – Business Ethics, contains the necessary writing components which satisfy the Upper Division Writing Requirement for the business major. This requirement is effective for those students who are accepted to the business major in the fall 2007 semester and subsequent.

**Freshman Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>First Year Seminar 102</td>
<td>1</td>
</tr>
<tr>
<td>WRT 102 or D.E.C.</td>
<td>3</td>
</tr>
<tr>
<td><strong>BUS 115</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>BUS 215</strong></td>
<td>3</td>
</tr>
<tr>
<td>ECO 108</td>
<td>4</td>
</tr>
<tr>
<td>D.E.C.</td>
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</tr>
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<td><strong>Total</strong></td>
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**Junior Fall**

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<th>Course</th>
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<tr>
<td>BUS 347</td>
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<td>Specialization course</td>
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<tr>
<td>Minor course</td>
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<tr>
<td>Minor course</td>
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<tr>
<td>Upper-Division D.E.C.</td>
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**Spring**

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<td><strong>BUS Mgmt. elective</strong></td>
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<td>Minor course</td>
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<td>Minor course</td>
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<tr>
<td>Upper-Division D.E.C.</td>
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<tr>
<td><strong>Total</strong></td>
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</table>

**The Honors Program in Business Management**

The honors program in Business Management is oriented toward research. For admission to the program, students must be BUS majors with junior standing and have earned a cumulative g.p.a. of at least 3.30 through the spring semester of their sophomore year. Three BUS courses, BUS 110 or BUS 115, 210, and 220, must have been completed with a cumulative g.p.a. of at least 3.30. Qualified students must submit an essay describing innovative ideas for business research and a letter of recommendation from a faculty member. They will be interviewed to assess motivation to pursue the honors program curriculum, which includes a research methods course taken in the junior year and a two-semester honors research project and paper completed in the senior year.

Students must maintain a 3.00 cumulative g.p.a. to remain in the program, but conferral of honors is contingent upon completion of all required courses with a g.p.a. of 3.50 or higher, both overall and in business management courses.

**Requirements for the Minor in Business Management (BUS)**

The Business Management minor is intended for students pursuing other majors who seek a foundation in business studies. The minor complements their chosen major by introducing them to principles and techniques used in business and management.

The minor can be completed with 21 to 22 credits, assuming the appropriate prerequisite courses have been taken. All courses must be taken for a letter grade.

1. BUS 111 Introduction to Business for Non-Business Majors
2. Two courses from the following:
   - BUS 215 Introduction to Business Statistics
   - BUS 220 Introduction to Decision Sciences (formerly Management Science)
   - ECO 108 Introduction to Economics
3. Three courses from the following:
   - BUS 210 Financial Accounting
   - BUS 340 Information Systems in Management
   - BUS 346 Operations Management
   - BUS 348 Principles of Marketing
   - BUS 351 Human Resource Management
4. BUS 441 Business Strategy
Chemical and Molecular Engineering (CME)

Program Educational Objectives
The undergraduate program in chemical and molecular engineering has the following four specific program educational objectives:

1. Provide students with an in-depth knowledge of the basic physical sciences, mathematical techniques, and computational tools that form the foundation of modern chemical and molecular engineering.

2. Educate students to operate effectively as part of a coordinated team, which requires good communication skills (written and oral); leadership and mentoring skills; the ability to provide original contributions that build upon and enhance the group effort; and a strong commitment to upholding ethical and moral standards of intellectual property.

3. Train students to meet the constantly emerging needs of the profession by being well prepared and committed to a lifetime of continuous learning.

4. Give students a sense of workplace relevance by integrating classroom instruction with research, management, and industrial experience.

Acceptance into the Major in Chemical and Molecular Engineering
Freshman and transfer applicants who have specified their interest in the major in Chemical and Molecular Engineering may be accepted directly into the major upon admission to the University. Applicants admitted to the University but not immediately accepted into the Chemical and Molecular Engineering major may apply for acceptance at any time during the academic year by contacting the director of the undergraduate program. Final decisions on admission will be made by the undergraduate program director. Minimum requirements for acceptance are as follows:

1. Students who have completed any of the math, physics, and chemistry required classes from the CME grid with grades of B or better,

2. Students must have an overall g.p.a. of 3.0 with not more than one grade of C or lower in any course, unless permission to waive is granted by the undergraduate program director.

3. Department must receive completed course evaluations for all transferred courses that are to be used to meet requirements of the major.

Major Requirements

5. Chemical Engineering
CME 101 Introduction to Chemical and Molecular Engineering
CME 304, 314 Chemical Engineering Thermodynamics I, II
CME 312 Material and Energy Balance
CME 315 Numerical Methods and Statistical Analysis
CME 327 Molecular Modeling for Chemical Engineers or 300-level BUS course
CME 318 Chemical Engineering Fluid Mechanics
CME 322 Chemical Engineering Heat and Mass Transfer
CME 323 Reaction Engineering and Chemical Kinetics
CME 401, 402 Separation Technologies I, II
CME 310, 320, 410, 420 Chemical Engineering Laboratory I, II, III, IV
CME 440, 441 Process Engineering and Design I, II

Specializations

A. Pharmacology
Ensures a sound background in pharmacology coupled with a foundation in chemical process control, distillation, and molecular modeling for students interested in pursuing a career in the food, cosmetics, or pharmaceutical industries or in medical instrumentation.

BIO 203 Fundamentals of Biology: Cellular and Organ Physiology
BIO 328 Mammalian Physiology
BCP 401 Principles of Pharmacology
BCP 402 Advanced Pharmacology

F. Custom Specialization
This category is created to allow students to choose their own specialization. Students will select four upper level courses related to the chosen specialty within the courses offered at the university and approved by the CME undergraduate program director. The goal is to provide a basic foundation for students and prepare them for the job market in the chosen specialty.

Computer Engineering (ECE)

Junior Year

<table>
<thead>
<tr>
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<tbody>
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<td>ESE 300#</td>
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<tr>
<td>ESE 382#</td>
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<td>ESE 306</td>
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<tr>
<td>ESE xxx#</td>
<td>3</td>
</tr>
<tr>
<td>ESE 219</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
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</table>

2. Natural Sciences
PHY 131/133, 132/134 Classical Physics I, II and laboratories
CHE 131 General Chemistry I and laboratory
Note: The physics course sequence PHY 125, 126, 127 or 141, 142 is accepted in lieu of PHY 131/133, 132/134. (Students are advised to take PHY 127 before PHY 126.) CHE 141/143 or ESG 198 are accepted in lieu of CHE 131/133.

Dance (DAN)
The minor in Dance has been suspended effective fall 2007.
Electrical Engineering (ESE)

2. Natural Sciences
   PHY 131/133, 132/134 Classical Physics I, II and Laboratories
   CHE 131 General Chemistry I and Laboratory

   Note: The physics course sequence PHY 125, 126, 127 or 141, 142 is accepted in lieu of PHY 131/133, 132/134. (Students are advised to take PHY 127 before PHY 126.)
   The chemistry course sequence CHE 141 and 143 or ESG 198 are accepted in lieu of CHE 131 and 133.

Engineering Science (ESG)

B. Engineering Specialization and Technical Electives

   The area of specialization, composed of five technical electives including at least two design-oriented courses, (or four electives plus the upper-division prerequisite in electrical engineering, ESE 372, or mechanical engineering, MEC 363) must be declared in writing by the end of the junior year. It is selected in consultation with a faculty advisor to ensure a cohesive course sequence with depth at the upper level.

   The eight areas of specialization are biomedical engineering, civil and environmental engineering, electrical engineering, materials science and engineering, mechanical and manufacturing engineering, nanoscale engineering, engineering management, and engineering research. The engineering research specialization requires: 1) a g.p.a. of at least 3.00, 2) a letter of intent from the student that indicates a particular area of research, and 3) permission of the undergraduate program director.

Environmental Engineering (ENE)

   Environmental engineering is the application of science and engineering principles to improving the environment (air, water, and/or land resources), to providing healthy water, air and land for human habitation and for other organisms, and to investigate the possibilities for remediation of polluted sites. Environmental engineering also involves design and application of technology, including development of new materials, in support of the principles of sustainability and green manufacturing. The coursework of the Minor emphasizes the chemical mechanisms at work behind environmental processes which govern production and transport of pollutants, bioavailability and toxicity, and changing ecological and geochemical factors, and design of remediation and pollution prevention methodologies. The Minor also provides coursework on materials and technology development for sustainable development and manufacturing.

   The Minor in Environmental Engineering is composed of the following courses:

   A. Two required courses:
      ESM 212: Introduction to Environmental Materials Engineering
      One course selected from CHE 312: Physical Chemistry, short course or CHE 301: Physical Chemistry I

   B. Technical electives (choose 4, of which at least 1 must be an ESG or ESM course):
      ESG 301: Sustainability of the Long Island Pine Barrens
      ESG 320: Sensor Materials and Devices
      ESG 332: Materials Science I: Structure and Properties of Materials
      ESM 334: Materials Engineering
      ESM 488 Cooperative Industrial Practice or 499 Research in Materials Science or ESG 487 Cooperative Research in Technological Solutions: at least 3 credits, with permission of Director of the Minor.
      BIO 386/ENS 311: Ecosystem Ecology and the Global Environment
      CHE 302: Physical Chemistry II
      GEO 315: Groundwater Hydrology
      GEO 316: Geochemistry of Surficial Processes
      GEO 318: Engineering Geology and Coastal Processes
      MAR 301: Environmental Microbiology
      MAR 336: Marine Pollution
      MAR 392: Waste Management Issues
      MAR 394: Environmental Toxicology and Public Health
      ATM 397: Air Pollution and Its Control
      CHE 310: Chemistry in Technology and the Environment

   Note: Students in the College of Arts and Sciences (but not CEAS majors) may also use
      ESG 302: Thermodynamics of Materials
      or
      CME 304: Chemical Engineering Thermodynamics I

   as a technical elective for the Minor in Environmental Engineering.

   Any substitution of a course outside this list for a technical elective requires the permission of the director of the minor prior to registering for the desired course.

Environmental Studies (ENS)

Requirements for the Major in Environmental Studies (ENS)

A. Foundation Courses (34 credits)

   1. Natural Sciences
BIO 201 Fundamentals of Biology: Organisms to Ecosystems
BIO 204 Fundamentals of Scientific Inquiry in the Biological Sciences I
CHE 131, 133 General Chemistry and Lab (See Note 1)
MAT 125 or MAT 131 or MAT 141 Calculus
PHY/ENS 119 Physics for Environmental Studies (See Note 2)
One of the following:
GEO 101 Environmental Geology
or
MAR 104 Oceanography
or
ATM 102 Weather and Climate Change
or
ENS 101 Prospects for Planet Earth

2. Social Sciences
ANP 120 Introduction to Physical Anthropology
ECO 108 Introduction to Economic Analysis
POL 102 Introduction to American Government

3. Humanities
PHI 104 Moral Reasoning
or
PHI 105 Politics and Society

4. Communications
Proficiency in writing, oral communication, and computer literacy will be encouraged in all students. These skills will be developed within the context of formal coursework and no additional credits are required.

5. Upper-Division Writing Requirement
All students in the major must submit two papers from any upper division course in the major to the Director of Undergraduate Programs for evaluation by the end of the junior year.

**Linguistics (LIN)**

**Honors Program**
Linguistics majors who have maintained a G.P.A. of 3.50 in the major are eligible to graduate with departmental honors. An additional requirement for honors is the submission of a senior thesis based on research performed during the senior year. Students must submit a written thesis proposal for approval to a sponsoring faculty member in the semester prior to the start of their senior year. Acceptance into the honors program depends on approval of the proposal by the sponsoring faculty member, the director of undergraduate studies and the department.

LIN 495 and LIN 496 will be taken as a 2 semester sequence during the senior year, for a total of six credits. Students will receive only one grade upon completion of the sequence. These courses must be taken in addition to the total credits required for the major. The student's thesis must be completed and submitted no later than 3 weeks prior to the end of the semester in which they are enrolled in LIN 496. The thesis will be read and evaluated by a committee consisting of the student's sponsor, one other member of the Department of Linguistics, and one faculty member from another department, as arranged by the director of undergraduate studies.

If the thesis is accepted by the committee and the student retains a 3.50 G.P.A. for all linguistics courses taken, the department will recommend that honors be conferred.

### Sophomore Fall Credits

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMS 110 or other statistics</td>
<td>3</td>
</tr>
<tr>
<td>D.E.C.</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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### Junior Fall Credits

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 201 and 204</td>
<td>5</td>
</tr>
<tr>
<td>MAR 340</td>
<td>3</td>
</tr>
<tr>
<td>PHY 11B</td>
<td>4</td>
</tr>
<tr>
<td>Upper-Division elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

### C. Concentration (12 credits)
All students in the major must complete an area of concentration consisting of four courses to develop depth of knowledge in a specific field of interest.

9. Public Policy
   - POL 325 Civil Liberties and Civil Rights
   - POL 359 Public Policy Analysis
   - POL 364 Organizational Decision Making
   - POL 366 Government Regulation of Business
   - PHI 364 Philosophy of Technology or PHI 366 Philosophy and the Environment

One additional upper-division waste reduction or environmental policy course (with permission of the undergraduate director)

### Sophomore Fall Credits

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIN 307@</td>
<td>3</td>
</tr>
<tr>
<td>LIN 201@</td>
<td>3</td>
</tr>
<tr>
<td>LIN 345@</td>
<td>3</td>
</tr>
<tr>
<td>Foreign language 211*</td>
<td>3</td>
</tr>
<tr>
<td>D.E.C.</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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### Sophomore Spring Credits

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>LIN 330@</td>
<td>3</td>
</tr>
<tr>
<td>LIN 301@</td>
<td>3</td>
</tr>
<tr>
<td>Foreign language 212*</td>
<td>3</td>
</tr>
<tr>
<td>D.E.C.</td>
<td>3</td>
</tr>
<tr>
<td>D.E.C.</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
</tr>
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</table>

### Junior Fall Credits

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIN 355@</td>
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</tr>
<tr>
<td>LIN 340@</td>
<td>3</td>
</tr>
<tr>
<td>LIN 211@</td>
<td>4</td>
</tr>
<tr>
<td>D.E.C.</td>
<td>3</td>
</tr>
<tr>
<td>SSE 327@</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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</table>

### Junior Spring Credits

<table>
<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>LIN 344#</td>
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<tr>
<td>LIN 300#</td>
<td>1</td>
</tr>
<tr>
<td>LIN 431#</td>
<td>3</td>
</tr>
<tr>
<td>LIN 375#</td>
<td>3</td>
</tr>
<tr>
<td>LIN 445#</td>
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<tr>
<td>SSE 350#</td>
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<td>Upper-Division Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

* Course must be taken for the major.
# Course must be taken for certification.
@ Course fulfills the major requirement but is not obligatory.

### Sample Course Sequence for the Major in Linguistics

<table>
<thead>
<tr>
<th>Freshman Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Year Seminar 101</td>
<td>1</td>
</tr>
<tr>
<td>D.E.C. A</td>
<td>3</td>
</tr>
<tr>
<td>LIN 101</td>
<td>3</td>
</tr>
<tr>
<td>D.E.C.</td>
<td>3</td>
</tr>
<tr>
<td>Foreign language 111</td>
<td>4</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>14</strong></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Junior Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Year Seminar 102</td>
<td>1</td>
</tr>
<tr>
<td>D.E.C. A</td>
<td>3</td>
</tr>
<tr>
<td>D.E.C.</td>
<td>3</td>
</tr>
<tr>
<td>Foreign language 112</td>
<td>4</td>
</tr>
<tr>
<td>D.E.C.</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>14</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sophomore Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIN 307</td>
<td>3</td>
</tr>
<tr>
<td>LIN 201</td>
<td>4</td>
</tr>
<tr>
<td>LIN 345</td>
<td>3</td>
</tr>
<tr>
<td>Foreign language 211</td>
<td>3</td>
</tr>
</tbody>
</table>

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### Marine Sciences (MAR)

#### Requirements for the Major in Marine Sciences (MAR)

1. **Foundation Courses (41-42 credits)**
   - BIO 201 Organisms to Ecosystems
   - BIO 202 Molecular and Cellular Biology
   - BIO 203 Cellular and Organ Physiology
   - BIO 204 Fundamentals of Scientific Inquiry in the Biological Sciences I
   - BIO 205 Fundamentals of Scientific Inquiry in the Biological Sciences II
   - CHE 131/133, 132/134 General Chemistry and Lab (see Note 1)
   - CHE 321 Organic Chemistry
   - MAT 125, 126 Calculus (see Note 2)
   - ENS/PHY 119 Physics for Environmental Studies or PHY 121/123 Physics for Life Sciences with lab (see Note 3)
   - AMS 102 or AMS 110 Statistics

**Freshman Spring Credits**

- First Year Seminar 102 1
- D.E.C. A 3
- CHE 132 4
- CHE 134 1
- MAT 126 3
- Total 12

**Sophomore Fall Credits**

- BIO 201 and 204 5
- AMS 110 3
- CHE 321 4
- D.E.C. 3
- D.E.C. 3
- Total 18

**Sophomore Spring Credits**

- BIO 203 and 205 5
- MAR elective 3
- D.E.C. 3
- D.E.C. 3
- D.E.C. 3
- Total 17

**Junior Fall Credits**

- BIO 202 3
- MAR 349 4
- ENS/PHY 119 4
- Upper-Division D.E.C. 3
- Total 14

---

### Marine Sciences Research Center (MSRC)

Effective fall 2007, the education and research programs in marine and atmospheric sciences will become known as the “School of Marine and Atmospheric Sciences” (SoMAS). The Marine Sciences Research Center will continue but will be nested within the school along with other research institutes.

### Marine Vertebrate Biology (MVB)

#### Requirements for the Major in Marine Vertebrate Biology (MVB)

1. **Foundation Courses (43-46 credits)**
   - BIO 201 Organisms to Ecosystems
   - BIO 202 Molecular and Cellular Biology
   - BIO 203 Cellular and Organ Physiology
   - BIO 204 Fundamentals of Scientific Inquiry in the Biological Sciences I
   - BIO 205 Fundamentals of Scientific Inquiry in the Biological Sciences II
   - CHE 131/133, 132/134 General Chemistry and Lab (see Note 1)
   - CHE 321 Organic Chemistry
   - MAT 125, 126 Calculus (see Note 2)
   - ENS/PHY 119 Physics for Environmental Studies or PHY 121/123 Physics for Life Sciences with lab (see Note 3)
   - AMS 102 or AMS 110 Statistics

**Freshman Spring Credits**

- First Year Seminar 102 1
- D.E.C. A 3
- CHE 132 4
- CHE 134 1
- MAT 126 3
- Total 12

**Sophomore Fall Credits**

- BIO 201 and BIO 204 5
- AMS 110 3
- CHE 321 4
- D.E.C. 3
- D.E.C. 3
- Total 18

**Sophomore Spring Credits**

- BIO 203 and BIO 205 5
- MAR elective 3
- D.E.C. 3
- D.E.C. 3
- D.E.C. 3
- Total 17

**Junior Fall Credits**

- BIO 202 3
- MAR 349 4
- ENS/PHY 119 4
- Upper-Division D.E.C. 3
- Total 14

---

### Marine Sciences Research Center (MSRC)

Effective fall 2007, the education and research programs in marine and atmospheric sciences will become known as the “School of Marine and Atmospheric Sciences” (SoMAS). The Marine Sciences Research Center will continue but will be nested within the school along with other research institutes.
D.E.C.  3  
D.E.C.  3  
Total  15

Junior Spring Credits
BIO 203  3  
BIO 354  3  
MAR 350  2  
Elective  3  
Upper-Division D.E.C.  3  
Total  14

Mechanical Engineering (MEC)

Sophomore Spring Credits
MEC 203  2  
MEC 262  3  
MEC 363  3  
AMS 361 or MAT 303  4  
ESG 198 or CHE 131  4  
MEC 214  1  
Total  17

Junior Fall Credits
MEC 301  3  
ESG 332  4  
MEC 316  3  
MEC 364  3  
EST 392 (D.E.C. F)  3  
Total  16

Junior Spring Credits
MEC 300  1  
MEC 305  3  
MEC 310  3  
MEC 317  2  
MEC 323  3  
MEC 125  1  
MEC 325  3  
Total  16

4. Mechanical Engineering
   MEC 101 Engineering Computing and Problem Solving I
   MEC 102 Engineering Computing and Problem Solving II
   MEC 125 Fundamentals of Machining
   MEC 202 Engineering Drawing and CAD I
   MEC 203 Engineering Drawing and CAD II
   MEC 214 Probability and Statistics
   MEC 260 Engineering Statics
   MEC 262 Engineering Dynamics
   MEC 301 Thermodynamics
   MEC 325 Manufacturing Processes
   MEC 305 Heat and Mass Transfer
   MEC 363 Mechanics of Solids
   MEC 364 Introduction to Fluid Mechanics

Pharmacology (BCP)

Requirements for the Major in Pharmacology (BCP)

B. Courses in Biological Sciences
   1. BIO 202 and 203 Fundamentals of Biology
   2. BIO 204 and 205 Fundamentals of Scientific Inquiry I and II
   3. BIO 310 Cell Biology
   4. HBY 350 Physiology (BIO 328 will be allowed as a substitute under extenuating circumstances.)
   5. BIO 361, 362 Biochemistry I, II
   6. BIO 365 or BIO 311 Biochemistry Laboratory

Sophomore Fall Credits
CHE 321  4  
BIO 202 and BIO 204  5  
D.E.C.  3  
D.E.C.  3  
Total  18

Sophomore Spring Credits
BIO 203 and BIO 205  5  
CHE 322  4  
CHE 327  2  
D.E.C.  4  
D.E.C.  3  
Total  18

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Physics (PHY)

Requirements for the Major in Physics (PHY)
The major in Physics leads to the Bachelor of Science degree. Each course used to satisfy the major numbered 300 or above must be completed with a grade of C or higher; a maximum of three courses at the 100 or 200 level passed with a grade of C- may be applied to the major.
Completion of the major requires approximately 67 credits.

Specialization in Optics
Students majoring in Physics may decide to pursue a specialization in Optics. This specialization is listed on the official transcript.
Students must complete the following courses with a grade if C or better to satisfy the requirements for the specialization:

A. Required Departmental Courses (12 credits)
   PHY 301 Electricity and Magnetism I
   PHY 302 Electricity and Magnetism II
   PHY 308 Quantum Mechanics I
   PHY 452 Lasers

B. Optics-related laboratory experience
   PHY 487 Research (at least 3 credits - optics related)

C. One additional elective course:
   Either PHY 405 Quantum Mechanics II, or
   One of many courses in other departments and also in the College of Engineering and Applied Sciences (CEAS) that could meet the requirements for this additional elective. Advance approval of such courses must be obtained from the Director of Undergraduate Studies. Examples of such courses in the CEAS are: ESE-340, (Communication Theory); ESE-357 (Digital Image Processing); ESE-358 (Computer Vision); ESE-362 (Opto-electronic Devices); ESE-363 (Fiber Optic Communications); and ESM-325 (Diffraction Techniques).

Psychology (PSY)

Sample Course Sequence for the Major in Psychology (B.S. Degree)

<table>
<thead>
<tr>
<th>Freshman</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Year Seminar 102</td>
<td>1</td>
</tr>
<tr>
<td>D.E.C. A</td>
<td>3</td>
</tr>
<tr>
<td>PSY Group A (220 or 230 or 240) OR PSY Group B (250 or 260)</td>
<td>3</td>
</tr>
<tr>
<td>D.E.C.</td>
<td>3</td>
</tr>
<tr>
<td>MAT 126 or 132 or 142</td>
<td>3-4</td>
</tr>
<tr>
<td>D.E.C.</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>16-17</td>
</tr>
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</table>

Sophomore Fall

<table>
<thead>
<tr>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSY 201**</td>
</tr>
<tr>
<td>PSY Group B (if Group A taken) OR Group A (if Group B taken)</td>
</tr>
<tr>
<td>BIO 201, 202, or 203, and 204</td>
</tr>
<tr>
<td>D.E.C.</td>
</tr>
<tr>
<td>D.E.C.</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Sophomore Spring

<table>
<thead>
<tr>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSY 310</td>
</tr>
<tr>
<td>PSY Group A or B</td>
</tr>
<tr>
<td>PSY elective***</td>
</tr>
<tr>
<td>BIO 201, 202, or 203, and 205</td>
</tr>
<tr>
<td>D.E.C.</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

For the B.S. Student
All three categories below are required.

1. Mathematics:
   a. MAT 125 and 126; or
   b. MAT 131 and 132; or
   c. MAT 141 and 142; or
   d. AMS 151 and 161; or
   e. Passing the mathematics placement examination at level 8 or higher.

2. Biology:
   Two courses from the following:
   BIO 201, 202, and 203

Note: One course of the two-course requirement is waived if students elect the biology concentration below. Students enrolling in BIO 201, 202, or 203 in the fall 2007 semester and subsequent semesters will be required to take BIO 204 plus 205 (lab components).

Technological Systems Management (TSM)

In major course sequence, Junior fall EST 325 changed to EST 326, and in Junior spring EST 327 replaces elective.

D. Technological Systems Management

1. Required courses (10)
   - EST 192 Introduction to Modern Engineering
   - EST 194 Patterns of Problem Solving
   - EST 202 Introduction to Science, Technology, and Society Studies
   - EST 305 Applications Software for Information Management
   - EST 326 Management for Engineers
   - EST 327 Marketing for Engineers
   - EST 391 Technology Assessment
   - EST 392 Engineering and Managerial Economics
   - EST 393 Project Management
   - EST 440 Interdisciplinary Research Methods
   - EST 441 Interdisciplinary Senior Project

2. Electives
   Three from the following list:
   - EST 303 Crisis Communication
   - EST 304 Communication for Engineers and Scientists
   - EST 320 Communication Technology Systems
   - EST 325 Technology in the Workplace
   - EST 330 Natural Disasters; Societal Impacts and Technological Solutions
   - EST 331 Ethics and Intellectual Property
   - EST 421 Starting the High-Technology Venture

Requirements for the Minor in Technological Systems Management (TSM)
All students must complete four required EST courses and two or more EST electives (minimum 18 credits) with a g.p.a. of 2.50 or higher. No grade less than C may be used to meet the requirements for the minor.
EST courses counted toward the requirements for a student's major may not be counted towards the requirements for the TSM minor.

1. Choose four of these required courses:
EST 192 Introduction to Modern Engineering
EST 194 Patterns of Problem Solving
EST 326 Management for Engineers
EST 327 Marketing for Engineers
EST 391 Technology Assessment
EST 393 Project Management

2. Choose two electives from the following:

EST 201 Technological Trends in Society
EST 304 Communication for Engineers and Scientists
EST 305 Applications Software for Information Management
EST 320 Communication Technology Systems
EST 325 Technology in the Workplace
EST 392 Engineering and Managerial Economics