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**Information**

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**for**

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**Engineering Students**

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**Class of 2012**

**Academic Year 2008-09**

**Bucknell**  
UNIVERSITY

**College of Engineering  
Bucknell University  
Lewisburg, Pennsylvania 17837**





## NOTICE OF NONDISCRIMINATORY POLICY RELATED TO STUDENTS:

Bucknell University admits students without regard to race, national or ethnic origin, religion, disability, or gender to all the rights, privileges, programs, and activities generally accorded or made available to students at Bucknell and does not discriminate on the basis of race, color, gender, sexual orientation, gender identity, age, religion, national or ethnic origin, marital status, veteran status, or disability in the administration of its educational policies, admissions policies, scholarships and loan programs, and athletic and other University-administered programs.

Bucknell University hereby gives notice to participants, beneficiaries, applicants and employees, including those with impaired vision or hearing, that it does not discriminate on the basis of handicap and that it is prepared to comply with the requirements of Section 504 of the Rehabilitation Act of 1973. Bucknell does not discriminate in admission or access to, or treatment or employment in, its programs and activities.

### \*POLICY ON RELEASE OF INFORMATION ABOUT STUDENTS

1. Bucknell University communicates with the student directly and releases information about a student to others, including parents, only with the student's consent.
2. The university transmits bills and academic status reports (grade reports and official letters concerning academic standing) as directed in advance by the student.
3. The release by university personnel of other information, including communications to parents from academic deans, individual faculty members, the student's faculty adviser and staff members of the Office of the Dean of Students, requires the consent of the student prior to each release.
4. Exceptions to the above, as permitted by the Family Educational Rights and Privacy Act of 1974, are:
  - (a) Directory information.
  - (b) Release of information in an emergency where such information is necessary to the protection of health or safety.
  - (c) Release of information to Bucknell staff members who have a legitimate educational need for the information.
  - (d) In connection with financial aid for which the student has applied.
  - (e) Under court order or subpoena.

## BACHELOR OF ARTS/MANAGEMENT FOR ENGINEERS-BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

The requirements for the degree of Bachelor of Arts/Management for Engineers-Bachelor of Science in Mechanical Engineering for the class of 2013 are:

### FRESHMAN YEAR

First Semester -- ENGR 100; MATH 201; PHYS 211; First-year course in English literature and composition; ..... 4.00  
Second Semester -- ENGR 220; MATH 202; ENGR 214; Elective ..... 4.00

### SOPHOMORE YEAR

First Semester -- ENGR 240; MATH 211; MATH226\*; 2 Electives ..... 4.50  
Second Semester -- MATH 212; MECH 252; 2 Electives..... 4.00

### JUNIOR YEAR

First Semester --MECH 213; MECH 353; 2 Electives ..... 4.00  
Second Semester -- MECH216; MECH 202\*; 3 Electives..... 4.50

### SUB-SENIOR YEAR

First Semester -- ELEC 105; MECH 313; MECH 355; Elective ..... 4.00  
Second Semester -- MECH 302; MECH 312; MECH 392; Elective ..... 4.00

### SENIOR YEAR

First Semester -- MECH 401\*; MECH 403; MECH 405; 2 Electives..... 4.50  
Second Semester -- MECH 402\*, 4 Electives ..... 4.50

The 19 elective courses shown above are distributed as follows:

- One course in chemistry (CHEM 201 or CHEM 211 or CHEM 221) which must be taken in the first two years.
- Select any TWO full-credit courses, one of which must be in chemistry or physics at the 200+ level, the other of which must be from the following list or any full-credit 300-level courses in astronomy, biology, chemistry, geology or physics (except 336) for which prerequisites have been satisfied: ASTR 201, BIOL 121; BIOL 122; BIOL 205; BIOL 208; BIOL 221;CHEM 160; CHEM 202; CHEM 211; CHEM 212; CHEM 231; GEOL 103; GEOL 150; GEOL 201; GEOL 205; GEOL 210; GEOL 214; GEOL 217; PHYS 212; PHYS 221; PHYS 222; PHYS 235.
- Five approved social science and humanities courses with the following distribution:
  1. A minimum of two courses in the humanities; one must be a first-year course in English literature and composition and
  2. A minimum of two courses in the social sciences.Two of these five courses must be from the same department OR at least one course must be at the 200-level or above. A minimum of one of these five courses must satisfy the global and societal perspectives requirement. Lists of approved social science courses, humanities courses, and courses that contain global and societal perspectives are published by the College of Engineering.
- One 400 level course in any department of the College of Engineering.
- One 400-level course in the Department of Mechanical Engineering or, with permission of the department, a course required for the expected fulfillment of a minor.
- One course in any department or program of the university.
- Eight courses to satisfy requirements for the Arts (BA) major.
- See "Academic Programs" for additional requirements.

\*Half-credit course; all others are one-credit courses.

Three courses in each student's program must fulfill the university writing requirement.  
ABME '13 (6/30/08)

## BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

The requirements for the degree of Bachelor of Science in Mechanical Engineering for the class of 2012 are:

### FRESHMAN YEAR

First Semester -- ENGR 100; MATH 201; PHYS 211; First-year course in English literature and composition ..... 4.00  
Second Semester -- ENGR 220; MATH 202; ENGR 214; Elective..... 4.00

### SOPHOMORE YEAR

First Semester -- ENGR240; MATH 211; MATH226\*; MECH 213; Elective..... 4.50  
Second Semester -- MATH 212; MECH 202\*; MECH 216; MECH 252; Elective 4.50

### JUNIOR YEAR

First Semester -- ELEC 105; MECH 313; MECH 353; MECH 355 ..... 4.00  
Second Semester -- MECH 302; MECH 312; MECH 392; Elective..... 4.00

### SENIOR YEAR

First Semester -- MECH 401\*; MECH 403; MECH 405; Two electives ..... 4.50  
Second Semester -- MECH 402\*; Four Electives ..... 4.50

The 11 elective courses shown above are distributed as follows:

- One course in chemistry (CHEM 201 or CHEM 211 or CHEM 221) which must be taken in the first two years.
- Select any TWO full-credit courses, one of which must be in chemistry or physics at the 200+ level, the other of which must be from the following list or any full-credit 300-level courses in astronomy, biology, chemistry, geology or physics (except 336) for which prerequisites have been satisfied: ASTR 201, BIOL 121; BIOL 122; BIOL 205; BIOL 208; BIOL 221; CHEM 160; CHEM 202; CHEM 211; CHEM 212; CHEM 231; GEOL 103; GEOL 150; GEOL 201; GEOL 205; GEOL 210; GEOL 214; GEOL 217; PHYS 212; PHYS 221; PHYS 222; PHYS 235.
- Five approved social science and humanities courses with the following distribution:
  1. A minimum of two courses in the humanities; one must be a first-year course in English literature and composition and
  2. A minimum of two courses in the social sciences.Two of these five courses must be from the same department OR at least one course must be at the 200-level or above. A minimum of one of these five courses must satisfy the global and societal perspectives requirement. Lists of approved social science courses, humanities courses, and courses that contain global and societal perspectives are published by the College of Engineering.
- One 400-level or equivalent courses in any department of the College of Engineering.
- One 400-level course in the Department of Mechanical Engineering or, with permission of the department, a course required for the expected fulfillment of a minor.
- One course in any department or program of the university.

\*Half-credit course; all others are one-credit courses.

Three courses in each student's program must fulfill the university writing requirement.  
BSME '12 (6/30/08)

## \*NOTE

This is an unofficial publication of the College of Engineering and is valid for the incoming class of 2012 only. In the event of a conflict, the university catalog or other official university publication will prevail. This booklet of information has been assembled to help engineering students with questions related to academic programs and standing. The materials are grouped into the following sections:

- \* Academic Matters
- \* Academic Programs
- \* Counseling Careers and Graduate Studies
- \* Degree Requirements
- \* Changes in Degree Requirements

We hope you become familiar with this booklet and consult it often. Any suggestions you have for improving or expanding the coverage of this booklet should be sent to the Associate Dean of the College of Engineering.

## \*ACADEMIC MATTERS

### Academic Responsibility

Faculty and students are responsible for reading, understanding and following the university's policy on academic responsibility printed in the student handbook and at [www.bucknell.edu/x1324.xml](http://www.bucknell.edu/x1324.xml). If you have any questions consult with the Associate Dean of Engineering.

### Attendance

When, in the judgment of an instructor, any student has been absent from a class or laboratory too frequently, the faculty member is expected to report this situation to the Associate Dean of Engineering with a recommendation of the appropriate action.

A student may be dismissed from the university for extensive cutting of classes.

### Liberal Arts-Engineering Students

For the first five semesters of their programs, official academic matters for liberal arts-engineering ("five-year," AB-BS) students are handled by the Associate Dean of the College of Arts and Sciences. For the last five semesters, the Associate Dean of the College of Engineering handles them. Throughout the five years each liberal arts - engineering student will have the Associate Dean of Engineering and one faculty member in each college as academic advisors.

2008-09 Class Advisers

<b>Biomedical Engineering</b>	<b>BS</b>	<b>BME/Chem-Bio Studies Minors</b>
Professor Cavanagh	'09	
Professor Ebenstein	'10	
Professor Kennedy	'11	
Professor Tranquillo	'12	
Professor King		all classes
<b>Chemical Engineering</b>	<b>BS</b>	<b>AB-BS</b>
Professor Jablonski	'09	'10
Professor Vigeant	'10	'11
Professor Gross	'11	'12
Professor Wakabayashi	'12	'13
<b>Civil and Environmental Engineering</b>	<b>BS</b>	<b>AB-BS</b>
Professor Crago	'09	
Professor R Ziemian	'10	
Professor Buonopane	'11	
Professor Malusis	'11	
Professor Toole	'12	
Professor Evans		all classes
<b>Computer Science and Engineering</b>		
Professor Guattery (BCSE)	'09	
Professor Steinhurst (BSCS & BA)	'09	
Professor Meng (BCSE)	'10	
Professor Perrone (BSCS & BA)	'10	
Professor Wittie (BCSE)	'11	
Professor Haggard (BSCS & BA)	'11	
Professor Zaccone (BCSE)	'12	
Professor Hyde (BSCS & BA)	'12	
<b>Electrical Engineering</b>	<b>BS</b>	<b>AB-BS</b>
Professor Nickel	'09	
Professor Aburdene	'10	
Professor Kozick	'11	
Professor Nepal	'12	
Professor Kozick		all classes + transfer students and all Bio Chemical Studies
<b>Mechanical Engineering</b>	<b>BS</b>	<b>AB-BS</b>
Professor Sharma	'09	
Professor Stryker (A – L)	'10	
Professor C Ziemian (M – Z)	'10	
Professor Knisely	'11	
Professor Kim	'12	
Professor Buffinton		all classes

**BACHELOR OF ARTS/MANAGEMENT FOR ENGINEERS-BACHELOR OF SCIENCE IN COMPUTER SCIENCE AND ENGINEERING**

The requirements for the Bachelor of Arts/Management for Engineers-Bachelor of Science in Computer Science and Engineering for the class of 2013 are:

**FRESHMAN YEAR**

First Semester - ENGR 100; MATH 201; PHYS 211; First-year course in English literature and composition ..... 4.00  
 Second Semester - CSCI 203; MATH 202; PHYS 212; Elective ..... 4.00

**SOPHOMORE YEAR**

First Semester - CSCI 204; MATH 211; Two Electives..... 4.00  
 Second Semester - CSCI 206; ENGR 220; MATH 222\*; MATH 241; Elective..... 4.50

**JUNIOR YEAR**

First Semester - CSCI 208; CSCI 311; CHEM 201\*\*; MATH 226\*; Elective ..... 4.50  
 Second Semester - CSCI 240\*; CSCI 315; ENGR 139; Two Electives ..... 4.50

**SUB-SENIOR YEAR**

First Semester - CSCI 320; ELEC 101; Two Electives ..... 4.00  
 Second Semester - CSCI Elective; ELEC 245; Two Electives ..... 4.00

**SENIOR YEAR**

First Semester - CSCI 475\*; MATH 343; CSCI Elective; Two Electives ..... 4.50  
 Second Semester - CSCI 476; CSCI Elective; Two Electives ..... 4.00

The fifteen elective courses shown are distributed as follows:

- One laboratory course in the Natural Sciences.
- Five approved social science and humanities courses (in addition to the first-year course in English literature and composition) distributed as follows:
  1. A minimum of two courses in the humanities; (one could be the required first-year course in English literature and composition) and
  2. A minimum of two courses in the social sciences; one must be ECON 103. Two of these six courses (including the English literature and composition course) and ECON 103 must be from the same department OR at least one course must be at the 200-level or above. A minimum of one of these five courses must satisfy the global and societal perspectives requirement. Lists of approved social science courses, humanities courses, and courses that contain global and societal perspectives are published by the College of Engineering.
- Eight courses selected to satisfy the Bachelor of Arts degree requirements including a Capstone course in the senior year, and a departmental, interdepartmental or college major.
- Two courses in any department or program of the university provided the prerequisites are satisfied.
- See "Academic Programs" for additional information.

Note: Three of the courses described in #4, #5 & #6 above must be from the Humanities Division, two must be from the division of Social Sciences Division and one must meet the "Perspectives on Human Diversity" requirement. MATH 203, MATH 204, and MATH 214 are equivalent to MATH 201, MATH 202, and MATH 211, respectively.

\*Half credit course

\*\*See department policy for use of AP credit in chemistry

ACSE '13 (6/30/08)

## BACHELOR OF SCIENCE IN COMPUTER SCIENCE AND ENGINEERING

The requirements for Bachelor of Science in Computer Science and Engineering for the class of 2012 are:

### FRESHMAN YEAR

First Semester-ENGR 100; MATH 201; PHYS 211; First-year course in English literature and composition; ..... 4.00  
Second Semester - CSCI 203; MATH 202; PHYS 212; Elective..... 4.00

### SOPHOMORE YEAR

First Semester - CHEM 201\*\*; CSCI 204; MATH 211; Elective..... 4.00  
Second Semester - CSCI 206; ENGR 220; MATH 222\*; MATH 241; Elective .... 4.50

### JUNIOR YEAR

First Semester - CSCI 208; CSCI 311; ELEC 101; MATH 226\*; Elective..... 4.50  
Second Semester - CSCI 240\*; CSCI 315; ENGR 139; ELEC 245; One computer science elective..... 4.50

### SENIOR YEAR

First Semester - CSCI 320; CSCI 475\* (Senior Design Project); MATH 343;  
One computer science elective; Elective ..... 4.50  
Second Semester - CSCI 476; Computer science elective; Two electives..... 4.00

The seven elective courses shown are distributed as follows:

- One laboratory course in natural sciences.
- Five approved social science and humanities courses (in addition to the first-year course in English literature and composition) distributed as follows:
  1. A minimum of two courses in the humanities; (one could be the required first-year course in English literature and composition) and
  2. A minimum of two courses in the social sciences; one must be ECON 103. Two of these six courses (including the English literature and composition course) must be from the same department OR at least one course must be at the 200-level or above. A minimum of one of these five courses must satisfy the global and societal perspectives requirement. Lists of approved social science courses, humanities courses, and courses that contain global and societal perspectives are published by the College of Engineering.
- One course in any department or program of the university provided the prerequisites are satisfied.

\*Half credit course

\*\*See department policy for use of AP credit in chemistry

Three courses in each student's program must fulfill the university writing requirement.

BCSE '12 (6/30/08)

**NOTE:** First-year students in the 5-year AB-BS program are given the same class year as the 4-year students. After completion of five semesters, their class year is shifted. Therefore, the 5-year students entering in the fall 2008 will have a class year of 2012 until January 2011, when their class year will be changed to 2013.

5-year (AENG) first-year engineers are assigned to the Associate Dean of Engineering. Undecided first-year engineers will be assigned to one of five advisers representing the departments. This information is available in the Office of the Associate Dean of Engineering.

### General Education Requirement

\*The Accreditation Board for Engineering and Technology, which accredits undergraduate engineering programs, requires a general education component in each engineering program. The College of Engineering has prepared a list of courses that can meet the ABET criteria for acceptable general education courses. This list, which has been compiled with the assistance of the Engineering Curriculum Committee, the faculty, and the chairpersons of the involved departments, is not intended to reflect on the quality of these courses, but only to indicate the extent to which the individual courses satisfy the ABET criteria. Courses that instill cultural values are approved, while courses that develop personal or professional skills are not. Thus, approved courses that involve performance must also include theory or history of the subject.

The general education component lends perspective to the traditional engineering studies to promote an understanding of the impact of engineering solutions in a global and societal context. The general education component is also intended to broaden the intellectual and experiential horizons of the student, to develop creative and critical abilities, and to facilitate an understanding of the social problems faced by humankind in the past, present, and future.

The general education requirement provides broadened studies in humanities and social sciences, and helps develop global and societal perspectives. The humanities include: art, art history, Chinese, classics, dance, East Asian studies, English, French, German, Greek, history, humanities, Japanese, Latin, Latin American studies, music, philosophy, religion, Russian, Spanish, theatre, and some women's studies. The social sciences include: anthropology, economics, education, some environmental studies, some geography, international relations, linguistics, management, political science, psychology, sociology, and some women's studies. Humanities and social science courses that aid the development of global and societal perspectives focus on themes of human diversity across national borders.

To fulfill the general education requirement, engineering students must successfully complete approved courses in humanities and social sciences. Ordinarily, courses that instill cultural values are approved, while courses that develop personal or professional skills are not. Therefore, approved courses that involve performance must also include theory or history of the subject. Students will fulfill the general education component through a minimum of five approved humanities and social sciences courses, with the following distribution:

- A minimum of two courses in humanities; one must be a first-year course in English literature and composition, and
- A minimum of two courses in social sciences

At a minimum, one of the humanities or social sciences courses must satisfy the global and societal perspectives requirement. Of the five courses, two must be from a single department, or at least one course must be at the 200 level or above. Individual departments may have additional requirements.

The current list of approved social science, humanities and global and societal perspectives courses can be obtained in the Office of the Dean of Engineering and at [www.bucknell.edu/x6864.xml](http://www.bucknell.edu/x6864.xml). The list is updated annually by the Engineering Curriculum Committee.

The social science, humanities and global and societal perspectives course list provides guidance to engineering students in choosing his or her electives in this area. Students should read the course descriptions in the catalog and observe any prerequisites or restrictions. The list is intended to include all courses currently being offered or listed in the catalog. Because of continual changes in particular courses and the offerings of the university, the list will sometimes be incomplete or in error. Questions or concerns should be brought to the attention of Associate Dean of Engineering for review.

Courses not listed or not approved may be submitted for review to the Associate Dean of Engineering.

#### **NOTES:**

1. None of the courses with the following prefixes are approved as social science-humanities electives: ANBE, ASTR, BIOL, BICH, CENG, CHEM, CHEG, CSCI, ELEC, ENGR, GEOL, MATH, MCAN, MECH, MILS, PHYS.
2. Some courses whose numbers are not listed below may be evaluated and will be included in a revised list.
3. The Engineering Curriculum Committee will evaluate new or changed courses after a course description and syllabus are submitted to the Associate Dean of Engineering.
4. Independent study, interdepartmental, and off-campus study courses must be submitted by the student for consideration.
5. Foreign language courses in the student's native language(s) are not approved for social science, humanities or global and societal perspectives course credit.
6. Credit by examination and/or advanced placement credit in foreign language courses cannot be accepted for social science, humanities or global and societal perspectives course credit.

## **BACHELOR OF ARTS/MANAGEMENT FOR ENGINEERS-BACHELOR OF SCIENCE IN COMPUTER ENGINEERING**

The requirements for the Bachelor of Arts/Management for Engineers – Bachelor of Science in Computer Engineering for the class of 2012 are:

Please see Program Director of Computer Engineering.

**BACHELOR OF SCIENCE IN COMPUTER ENGINEERING**

The requirements for Bachelor of Science in Computer engineering for the class of 2012 are:

**FRESHMAN YEAR**

First Semester - ENGR 100; MATH 201; PHYS 211; Elective ..... 4.00  
 Second Semester - CSCI 203; ELEC 120; MATH 202, PHYS 212 ..... 4.00

**SOPHOMORE YEAR**

First Semester - CHEM 201; MATH 211; CSCI 204; ELEC 225\*; Elective ..... 4.50  
 Second Semester - MATH 212; CSCI 206; ELEC 226\*; ELEC 247; Elective ..... 4.50

**JUNIOR YEAR**

First Semester - CSCI 208; ELEC 320; ELEC 350; Elective ..... 4.00  
 Second Semester - ELEC 340; MATH 241; CSCI 315; ENGR 138\*; Elective ..... 4.50

**SENIOR YEAR**

First Semester - ELEC 471; ELEC 400\*; CSCI 320; Elective; Elective ..... 4.50  
 Second Semester - ELEC 421; Elective; Elective; Elective ..... 4.00

The 10 elective courses are distributed as follows:

- Five approved social science and humanities courses to meet the engineering General Education requirements. Those courses are distributed as follows:
  1. A minimum of two courses in the humanities; one must be a first-year course in English literature and composition.
  2. A minimum of two courses in the social sciences.
  3. One of the courses must satisfy the global and societal perspectives requirement.
- One course at the 200 level or above in the natural sciences (physics, chemistry, biology, or BIOL 121, 122, GEOL 103, 150)
- Two courses chosen from the 300-level computer science or 400-level electrical engineering course offerings
- Two unrestricted courses in any department or program in the university
- Three courses in each student’s program must fulfill the University writing requirement

\*Half Course

BCEN '12 (06/30/08)

**Social Science, Humanities and Global and Societal Perspectives Course List 6/30/08 (Global and Societal Perspectives Courses noted by \*)**

Most current course list found at: <http://www.bucknell.edu/x6864.xml>

Anthropology (ANTH) -- *Social Science*

Approved:	100*	109	127	200	212	219*	227	228	232	235*
	245*	246*	247	249*	251*	252*	253	256	260	265
	270	273	282*	283	287	303	314	329	400	410
	446									
Not approved:	201	319	320	325	326	330	351			

Arabic (ARBC) -- *Humanities*

Approved:	101*	102*
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Art (ART) -- *Humanities*

Approved:	101	102	103	106	113	129	204	211	213	214
	215*	218	219	221	225	266	271	272	273	275
	300	302	314	315	323	325*	330	362	370	371
	419									
Not Approved:	112	120	130	131	150	229	230	231	234	237
	238	243	247	250	251	255	263	264	335	336
	340	345	346	347	348	435				

Chinese (CHIN) -- *Humanities*

Approved:	101	102	103	104	201	202	203	204	301	302
Not Approved:	310	319	320							

Classics (CLAS) -- *Humanities*

Approved:	131	132	141	161	215	217	218	220	221	222
	223	224	226	231	232	233	234	236	237	238
	239	241	242	243	247	250	332	350		
Not Approved:	311	321	322	344	450					

Dance (DANC) -- *Humanities*

Approved:	250	264*								
Not Approved:	210	225	230	262	263	265	275	300	310	315
	325	330	350	355	360					

East Asian Studies (EAST) -- *Humanities*

Approved:	111	115	211	212	213	214	219	220	222	224
	233	234*	240*	245*	246*	247	248*	249*	250	251
	252*	253	254	255*	256*	257*	261*	262	266	267
	268*	274*	277	278*	340*					
Not Approved:	321	322	339	369	370					

Economics (ECON) -- *Social Science*

Approved:	103	104	221	222	227*	231	235*	236	237	238
	240	252*	256	257	258*	265	266*	271	274	275*
	276*	277*	278*	279*	280	305	311	312	313	317
	318	319	324	326	327	328	330	333	334	336
	338*	339	340*	357*	358	383	400	407		
Not Approved:	201	301	302	331	335	337	341			

Most current course list found at: <http://www.bucknell.edu/x6864.xml>

Education (EDUC) -- *Social Science*

Approved:	101	201	225	228	240	290	308	318	323	334
	335	350	351	353	370	420	432	484		
Not Approved:	301	305	309	312	314	315	317	319	322	325
	328	331	341	342	343	344	345	346	349	354
	355	359	362	375	385	398	439	449	459	

English (ENGL) -- *Humanities*

Approved:	090	098	101	106	107*	109	120	130	140	150
	205	206	207	208	209	210	211	212	213	214
	215	216	217	218	219	220	221	222	223	224
	225	226	227	228	230	231	232	233	234	238
	240	243	250	251	253	257	258	259	260	261
	270	271	274	280	283	284	285	286	287	288
	290	291	292	293	295	296	298	299	301	302
	305	307	310	311	321	323	326	327	331	332
	336	337	340	350	358	360	370	381	382	391
	392	393	398	399	460	470	499			
Not Approved:	201	202	203	204	297	300	304	308	309	319
	339	378	379	397						

Environmental Studies (ENST) -- *Social Science*

Approved:	205	207	215	235	242	245	247	250	255	260
	265									
Not Approved:	100	200	211	221	230	240	257	319	349	350

French (FREN) -- *Humanities*

Approved:	101	102	103	104	150	215	216	217	230	231
	235*	236*	255	270*	271	276	295	322	324	325
	326	327	330	335*	336*	344	370	371		
Not Approved:	219	261	285	302	390	395				

Geography (GEOG) -- *Social Science*

Approved:	101*	123	206	208	209	210	211	213*	214*	216
	219	220	223	224*	226	229	230	236*	237*	238
	255	265	309	310	311					
Not Approved:	110	113	175	203	204	231	232	233	235	257
	301	319	320	321	322					

German (GRMN) -- *Humanities*

Approved:	101	101A	102	103	104	105	127	128	204	225
	230	231	240	270*	272*	273*	295	296	315	316
	317	322	325	326	328	329	392	393	410	425
	427									
Not Approved:	201	202	220	221	390					

Greek (GREK) -- *Humanities*

Approved:	101	102	151	201	221
Not Approved:	235	311			

**BACHELOR OF ARTS/MANAGEMENT FOR ENGINEERS-BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING**

The requirements for the degree of Bachelor of Arts/Management for Engineers-Bachelor of Science in Electrical Engineering for the class of 2013 are:

**FRESHMAN YEAR**

First Semester -- ENGR 100; PHYS 211; MATH 201; Elective .....	4.00
Second Semester -- ELEC 120; MATH 202; PHYS 212; Elective .....	4.00

**SOPHOMORE YEAR**

First Semester -- MATH 211; CHEM 201; CSCI 203; ELEC 225*; Elective .....	4.50
Second Semester --MATH 212; ENGR 220; ELEC 226*; ELEC 247; .....	4.50

**JUNIOR YEAR**

First Semester -- ELEC 320; ELEC 350; ENGR 240; One Elective .....	4.00
Second Semester -- ELEC 340; ELEC 351; ENGR 138*;Two Electives .....	4.50

**SUB-SENIOR YEAR**

First Semester -- ELEC 471;Three .....	4.00
Second Semester -- ELEC 390; Three Electives .....	4.00

**SENIOR YEAR**

First Semester -- ELEC 480; ELEC 491; ELEC 400*; Two Electives.....	4.50
Second Semester -- Senior Design; Three Electives .....	4.00

The 18 elective courses shown above are distributed as follows:

- Five approved social science and humanities courses to meet the Engineering General Education Component requirement. Those courses will be distributed as follows:
  1. A minimum of two courses in humanities; one must be a first-year course in English literature and composition. That course is shown above in the first semester of first year but may be taken the second semester of the first year.
  2. A minimum of two courses in the social sciences.
  3. One of the social science and humanities courses must satisfy the global and societal perspectives requirement.
- One course at the 200 level or above in the natural sciences (physics, chemistry, biology or BIOL 121, 122, GEOL 103, 150).
- At least one other course in electrical engineering.
- Three courses in any department or program of the university, provided the prerequisites are satisfied. It is recommended that students intending to attend graduate school should also choose at least one of these courses; MATH 343, MATH 345, MATH 362.
- Eight courses selected to satisfy the Bachelor of Arts degree requirements including a capstone course in the senior year, and a departmental, interdepartmental or college major.
- See "Academic Programs" for additional requirements.

\*Half course; all others are one-credit courses

Three courses in each student's program must fulfill the university writing requirement.

ABEE '13 (6/30/08)

**BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING**

The requirements for the degree of Bachelor of Science in Electrical Engineering for the class of 2012 are:

**FRESHMAN YEAR**

First Semester -- ENGR 100; PHYS 211; MATH 201; Elective..... 4.00  
 Second Semester -- ELEC 120; MATH 202; PHYS 212; Elective ..... 4.00

**SOPHOMORE YEAR**

First Semester -- MATH 211; CHEM 201; CSCI 203; ELEC 225\*; Elective..... 4.50  
 Second Semester -- MATH 212; ENGR 220; ELEC 226\*; ELEC 247; Elective.... 4.50

**JUNIOR YEAR**

First Semester -- ELEC 320; ELEC 350; ENGR 240; Elective ..... 4.00  
 Second Semester -- ELEC 340; ELEC 351; ELEC 390; ENGR138\*; Elective..... 4.50

**SENIOR YEAR**

First Semester -- ELEC 480; ELEC 491; ELEC 400\*; ELEC 471; Elective..... 4.50  
 Second Semester -- ELEC 420; Three Electives..... 4.00

The 10 elective courses shown above are distributed as follows:

- Five approved social science and humanities courses to meet the Engineering General Education Component requirement. Those courses will be distributed as follows:
  1. A minimum of two courses in humanities; one must be a first-year course in English literature and composition.
  2. A minimum of two courses in the social sciences.
  3. One of the social science and humanities courses must satisfy the global and societal perspectives requirement.
- One course at the 200 level or above in the natural sciences (physics, chemistry, biology or BIOL 121, 122, GEOL 103, 150).
- At least one other course in electrical engineering.
- Three courses in any department or program of the university provided the prerequisites are satisfied. It is recommended that students intending to attend graduate school should also choose at least one of these courses; MATH 343, MATH 345, MATH 362.

\*Half course; all others are one-credit courses

Three courses in each student’s program must fulfill the university writing requirement.

Electrical Engineering students who wish to pursue graduate studies in Bioengineering or who wish to acquire the biology and chemistry needed in preparation for work or further study in the life sciences are encouraged to take the minor in chemical and biological studies. These students will be excused from the ENGR 240 requirement.

BSEE '12 (6/30/08)

**Most current course list found at:** <http://www.bucknell.edu/x6864.xml>

History (HIST) -- *Humanities*

Approved:	101	111	112	113	117	118	121	122	131	132
	167	170*	171	180	181	182	210	211	212	217
	218	219	220	221	222	223	225	227	228	229
	231	232	233	235	236	237	238	239	240	241
	242	243	245	247	248	249	252	258	259	260*
	261	262	263	264	265	266	267	268*	269*	270*
	271	272*	273*	279	288	289	290*	291	293	294
	295	296*	297*	298	299	310	311	312	313	319
	320	321	322	323	361	370	385			
Not Approved:	214	330	351	360	390					

Humanities (HUMN) -- *Humanities*

Approved:	098	128	150	250	301	302	303	304	310	320
	330	340	398	450						
Not Approved:	350	351								

International Relations (IREL) -- *Social Science*

Approved:	200	218*	230	235*	245*	250*	252*	255*	310*	323
	400*	425								
Not Approved:	300	361								

Italian (ITAL) -- *Humanities*

Approved:	101	102	103	104	127	128	205	295		
Not Approved:	201	202	390							

Japanese Studies (JAPN) -- *Humanities*

Approved:	101	102	103	104	201	202	203	204	301	302
	319	320								
Not Approved:										

Latin (LATN) -- *Humanities*

Approved:	101	102	106	151	201	221				
Not Approved:	235	241	311							

Linguistics (LING) -- *Social Science*

Approved:	105	110	120	205	210	295	390			
Not Approved:	241									

Latin American Studies (LAMS) -- *Humanities*

Approved:	150*	297								
Not Approved:	295	319	365							

Management (MGMT) -- *Social Science*

Approved:	212*	285	312							
Not Approved:	101	160	161	220	221	240	242	250	251	300
	301	305	312	315	317	318	319	330	335	336
	339	340	341	342	346	347	348	349	350	353
	354	355	357	359	365	370	372	374	375	376
	377	378	380	382	384	385	386	389	390	393
	419	476								

Most current course list found at: <http://www.bucknell.edu/x6864.xml>

Music (MUSC) -- *Humanities*

Approved:	100	103	104	105	108	109	111	120	167	204
	205	206	215	221	222	223	224	225	226	228
	229	242	250	251	261*	264*	265	267		
Not Approved:	101	102	106	107	115	116	117	119	132	136
	141	152	170-198		201	202	209	210	211	234
	235	236	237	238	243	244	245	246	259	260
	262	269	270-298		304	350	362	370-398		

Philosophy (PHIL) -- *Humanities*

Approved:	098	100	150	204	205	206	207	212	213	214	
		215	218	219	220	221	222	223	224	225	227
	228	230	231	233	235	240	250	254	255	256	
	258	259	260	262	265	266	267	268	269	272	
	275	309	310	311	475	480					
Not Approved:	103	201	319	320	321	322	323				

Political Science (POLS) -- *Social Science*

Approved:	140	150	170*	200	203	204	205	206	207*	208
	209	210	211*	212	214*	215*	216*	217	218*	219*
	220*	221*	222*	223*	224*	227	228*	229	230*	231
	232	234	235	236	237	238	239*	240	243	244
	247	250	251	252	253	254	255	256	260	261
	262	263	264	265	266*	268*	270	271	272	273*
	274*	275*	276*	278	280*	281	284*	285*	286*	287*
	288*	290	330	332	336	340	350*	360	370	380*
	390	401	426*							
Not Approved:	269	295	391	395	396	397				

Psychology (PSYC) -- *Social Science*

Approved:	100	203	204	207	209	210	212	228	231	232
	233	234	242	301	304	305	306	307	308	310
	316	318	325	330	333	338	373			
Not Approved:	215	250	252	266	290	291	292	293	294	295
	296	297	298	299	309	317	319	324	329	343
	349	352	360	366	369	370				

Religion (RELI) -- *Humanities*

Approved:	100	105	110	115	125	180	200	201	202	206
	207	208	209	210	212	214	216	218	220	221
	222*	223	224	225	226	227	228	234	235	240
	241	242	243	245*	246*	248	255	265	280	281
	310									
Not Approved:	319	320	330	350	380	411				

Residential College (RESC)

Approved:	150	219
Not Approved:	115	

**BACHELOR OF ARTS/MANAGEMENT FOR ENGINEERS-BACHELOR OF SCIENCE IN CIVIL ENGINEERING**

The requirements for the degree of Bachelor of Arts/Management for Engineers-Bachelor of Science in Civil Engineering for the class of 2013 are:

**FRESHMAN YEAR**

First Semester -- ENGR 100; PHYS 211; MATH 201; Elective: First-year course in English literature and composition ..... 4.00

Second Semester -- ENGR 101\*; ENGR 220; MATH 202; GEOL 150; Elective.... 4.50

**SOPHOMORE YEAR**

First Semester -- ENGR 208; CHEM 201; MATH 211; MATH 226\*; Elective ..... 4.50

Second Semester -- ENGR 222; MATH 222\*; Science Elective CHEM/PHYS (200 level or above) or BIOL; Two Electives..... 4.50

**JUNIOR YEAR**

First Semester -- CENG 300; CENG 340; ENGR 212\*; Two Electives..... 4.50

Second Semester -- ENGR 242; CENG 330; Two Electives ..... 4.00

**SUB-SENIOR YEAR**

First Semester -- CENG 350; Technical Elective; Two Elective ..... 4.00

Second Semester -- CENG 320; CENG 330 CENG Electives; Elective..... 4.00

**SENIOR YEAR**

First Semester -- CENG 490; CENG Elective; Two Electives ..... 4.00

Second Semester -- CENG 491; CENG Elective; Technical Elective; Elective ..... 4.00

The 22 elective courses shown above include:

- One science elective; chemistry, physics (200 level or higher), or biology course approved by the department.
- Students must fulfill the General Education Component through a minimum of five approved humanities and social science courses, with the following distribution:
  1. A minimum of two courses in humanities; one must be a first-year course in English literature and composition, and
  2. A minimum of two courses in social sciences.
 At a minimum, one of the humanities or social science courses must satisfy the global and societal perspectives requirement. Of the five courses, two must be from a single department, or at least one course must be at the 200-level or above.
- Eight courses selected to satisfy departmental and interdepartmental or college major.
- Two unrestricted electives.
- Four civil engineering electives.
- Two technical electives; one must be either ENGR 200 or ELEC 105; the other must be an approved course which is usually in either civil engineering, computer science, engineering, mathematics or science.

Three courses in each student's program must fulfill the university writing requirement. Arts and Sciences courses included above may be used to satisfy the Bachelor of Arts requirements.

Note: Three of the courses described above must be from the Humanities Division, two must be from the division of Social Sciences Division and one must meet the "Perspectives on Human Diversity" requirement.

\*Half-credit course  
ABCE '13 (6/30/08)

**BACHELOR OF SCIENCE IN CIVIL ENGINEERING**

The requirements for the degree of Bachelor of Science in Civil Engineering for the class of 2012 are:

**FRESHMAN YEAR**

First Semester -- ENGR 100; MATH 201; PHYS 211; Elective: First-year course in English literature and ..... 4.00  
 Second Semester -- ENGR 101\* ENGR 220; MATH 202; GEOL 150; Elective ... 4.50

**SOPHOMORE YEAR**

First Semester -- ENGR 208; CHEM 201; MATH 211; MATH 226\*; Elective..... 4.50  
 Second Semester -- ENGR 222; ENGR 242; MATH 222\*; Science Elective:  
 CHEM/PHYS (200 level or above) or BIOL; Elective..... 4.50

**JUNIOR YEAR**

First Semester -- CENG 300; CENG 340; CENG 350; ENGR212\*; Elective ..... 4.50  
 Second Semester -- CENG 320; CENG 330; CENG Elective; Technical Elective. 4.00

**SENIOR YEAR**

First Semester -- CENG 490; CENG Elective; Technical Elective; Elective. .... 4.00  
 Second Semester -- CENG 491; Two CENG Electives; Elective..... 4.00

The 14 elective courses shown above are distributed as follows:

- One science elective; chemistry, physics (200 level or higher), or biology course approved by the department.
- Students must fulfill the General Education Component through a minimum of five approved humanities and social science courses, with the following distribution:
  1. A minimum of two courses in humanities; one must be a first-year course in English literature and composition, and
  2. A minimum of two courses in social sciences.
 At a minimum, one of the humanities or social science courses must satisfy the global and societal perspectives requirement. Of the five courses, two must be from a single department, or at least one course must be at the 200-level or above.
- Two unrestricted electives.
- Four civil engineering electives.
- Two technical electives; one must be either ENGR 200 or ELEC 105; the other must be an approved course which is usually in either civil engineering, computer science, engineering, mathematics or science.

Three courses in each student's program must fulfill the university writing requirement.

\*Half-credit course

BSCE '12 (6/30/08)

**Most current course list found at:** <http://www.bucknell.edu/x6864.xml>

Russian (RUSS) -- *Humanities*

Approved:	101	101A	102	103	104	109	125*	205	211
	215	222	225	250	253	255	265	270	301
	302*	311	312	321	322	325	340		
Not Approved:	106	201	204	209	280	295	350	390	393

Sign Language, American (SIGN)

Not Approved:	101	102
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Sociology (SOCI) -- *Social Science*

Approved:	100	115	123	130	140	210	211	212	213	215
	234	236	239	243	250	251	253	255	256	260
	263	270	280	290*	303	305	310*	311*	315	322
	330*	340	409	410	412	422	431	433	434	447
	448									
Not Approved:	201	208	319	320	325	326	351	370	372	402
	408	418								

Spanish (SPAN) -- *Humanities*

Approved:	101	102	103	104	105	207	208	220	222	270*
	280*	285	295	310	321	322	323	324	331	334
	335	336	337	338	346*	351	353*	360*	361	363
	366	370	375	382	421	422*	423	424	435	436
	446									
Not Approved:	290	295	310	361	362	364	365	390	399	410
	461	462	464	465						

Theatre (THEA) -- *Humanities*

Approved:	256	258	259	261						
Not Approved:	101	102	103	104	110	145	149	215	220	230
	240	246	247	248	249	250	251	252	254	264
	265	314	319	393	397					

University Course (UNIV) (can be Humanities or Social Science)

Approved:	215	219	220	222	223	228	229	233	239	243
	245	246	254	255	256	258	270	272	273	276
	277	278	280	285	293	320				
Not Approved:	260	274	290							

Women's Studies (WMST) (can be Humanities or Social Science)

Approved:	140	150	155	160	232*	251	255	273	335*
Not Approved:	270	319	320	370	375	390	375		

**Foundation Seminar Courses for Fall 2008 – can be Humanities or Social Science**

Check with the Office of the Associate Dean of Engineering.

### Normal Course Load

The normal course load is four course credits. All degree candidates, including seniors, are expected to be enrolled each semester as full-time students, carrying a minimum of 3.0 and a maximum of 4.5 course credits, regardless of the number of course credits previously earned or planned for the future.

The Associate Dean of the student's college must approve exceptions for more course credits, or overloads. Such approval will be given only when the student previously has demonstrated superior performance and mastery of the material in a normal course load.

### Drop/Add Courses

Students may add and drop courses, subject to space availability, during the first two weeks of the semester.

Students may withdraw from a course during the usual two-week drop/add period by filing a completed Drop/Add form with the registrar. If another course is not added, the remaining course load must be no less than the minimum required three courses credits and normal progress toward the degree will be considered. Reducing the course load to three course credits requires the approval of the faculty adviser and Associate Dean.

After the two-week drop/add period, all course withdrawals must be approved by the student's Associate Dean. In unusual circumstances dropping a course may be approved through the fourth week of the semester if the student is still carrying three course credits; in two semesters, as exceptions to this four-week limit, dropping a course may be permitted through the tenth week of the semester. The grade of "W" is assigned for all such approved course withdrawals after the first two weeks of the semester.

### Calculation of Grade Point Average

In order to graduate, engineering students must satisfy two grade point requirements:

- Every candidate for a bachelor's degree must have a cumulative grade point average of 2.0. In addition, every candidate for an engineering degree or for the combination degree of bachelor of science in one of the branches of engineering and bachelor of arts must have a cumulative grade point average of 2.0 for all courses in the College of Engineering.
- Grading System - The performance of a student in each course is evaluated on the grade report by the use of the following symbols:

A = Superior achievement	B-	D = Low Pass
A-	C+	P = Passing work; no grade assigned
B+	C = Pass	F = Failing work
B = High pass	C-	I = Incomplete work

- Students who have not earned the minimum grade point average required are either subject to dismissal from the university or, if the average is close to the minimum, are placed on "university grade point warning." Students on warning are required to attend the Bucknell summer session and to earn sufficiently high grades so as to reduce significantly their grade point deficits before the beginning of the next academic year.

### BACHELOR OF ARTS/MANAGEMENT FOR ENGINEERS-BACHELOR OF SCIENCE IN CHEMICAL ENGINEERING

The requirements for the degree of Bachelor of Arts/Management for Engineers-Bachelor of Science in Chemical Engineering for the class of 2013 are:

#### FIRST-YEAR

First Semester-- ENGR 100; MATH 201; PHYS 211; First-year course in English literature and composition as prescribed below ..... 4.00  
 Second Semester -- CHEM 221; CHEG 200; ENGR 215\*; CHEG 101\*\*;  
 MATH 202; Elective ..... 4.50

#### SOPHOMORE YEAR

First Semester -- CHEM 211; ENGR 240; ENGR 211\*; MATH 211; Elective ..... 4.50  
 Second Semester -- CHEM 212; CHEM 231; ENGR 233; CHEG 102\*\*;  
 CHEG 210 ..... 4.00

#### JUNIOR YEAR

First Semester -- CHEM 343; CHEG 300; CHEG 302\*; Two Electives ..... 4.50  
 Second Semester -- CHEG 103\*\*; CHEG 310; CHEG 31 Three Electives ..... 4.50

#### SUB-SENIOR YEAR

First Semester -- CHEG 320; ELEC 105; Two Electives ..... 4.00  
 Second Semester -- CHEG 104\*\*; CHEG 330; Three Electives ..... 4.00

#### SENIOR YEAR

First Semester -- CHEG 400; Three Electives ..... 4.00  
 Second Semester -- CHEG 410; Three Electives ..... 4.00

Three of the courses above must fulfill the university's writing requirement. An approved W1 course must be taken during the first year. CHEG 400 and CHEG 410 are approved W2 courses.

The elective courses shown above must include the following:

- Five social science and humanities courses selected from the list of approved courses provided in "Information for Engineering Students Handbook" (published by the College of Engineering) to fulfill the General Education Component required of all engineering students. These courses must be distributed as follows:
  - A minimum of two courses in humanities; one must be a first-year course in English literature and composition or creative writing, or a Foundation Seminar in English;
  - A minimum of two courses in social sciences.
 Two of these five electives must be taken in one department or at least one elective must be taken at the 200+ level in any department. One of the five courses must satisfy the global and societal perspectives requirement.
- One approved technical elective course selected from the list of approved courses published by the department which may be found on the department web page.
- One approved biological-science elective selected from the list of approved courses published by the department which may be found on the department web page.
- Two additional courses in chemical engineering.
- Two unrestricted electives in any department or program of the university.
- Eight courses selected to satisfy the Bachelor of Arts degree requirements including a capstone course in the senior year, and a departmental, interdepartmental or college major.
- See "Academic Programs" for additional requirements.

\*Half credit course

\*\*No credit

ACHE '13 (6/30/08)

## BACHELOR OF SCIENCE IN CHEMICAL ENGINEERING

The requirements for the degree of Bachelor of Science in Chemical Engineering for the class of 2012 are:

### FIRST-YEAR

First Semester -- ENGR 100; MATH 201; PHYS 211 First-year course in English literature and composition as prescribed below ..... 4.00  
 Second Semester -- CHEM 221; CHEG 200; ENGR 215\*; CHEG 101\*\*;  
 MATH 202; Elective ..... 4.50

### SOPHOMORE YEAR

First Semester -- CHEM 211; ENGR 240; ENGR 211\*; MATH 211; Elective..... 4.50  
 Second Semester--CHEM212; CHEM231; ENGR233; CHEG102\*\*;  
 CHEG 210 ..... 4.00

### JUNIOR YEAR

First Semester -- CHEM 343; CHEG 300; CHEG 302\*; Two Electives..... 4.50  
 Second Semester -- CHEG 103\*\*;CHEG 310; CHEG 315\*; Three Electives; ..... 4.50

### SENIOR YEAR

First Semester -- CHEG 320; CHEG 400; Two Electives ..... 4.00  
 Second Semester -- CHEG 104\*\*; CHEG 330; CHEG 410; Two Electives ..... 4.00

Three courses in each student's program must fulfill the university writing requirement. The following sequence of courses emphasizes design across the curriculum and develops the professional skills of communication, problem-solving, team work, and self-directed learning: CHEG 200, ENGR 233, CHEG 300, CHEG 315, CHEG 400, and CHEG 410.

The 12 elective courses shown above are distributed as follows:

- Five social science and humanities courses selected from the list of approved courses provided in "*Information for Engineering Students Handbook*" (published by the College of Engineering) to fulfill the General Education Component required of all engineering students. These courses must be distributed as follows:
  1. A minimum of two courses in humanities; one must be a first-year course in English literature and composition or creative writing, or a Foundation Seminar in English;
  2. A minimum of two courses in social sciences.
 Two of these five electives must be taken in one department OR at least one elective must be taken at the 200+ level in any department. One of the five courses must satisfy the global and societal perspectives requirement.
- Two courses selected from the list of approved technical electives published by the department which may be found on the department web page.
- One approved biological-science elective selected from the list of approved biological-science electives published by the department which may be found on the department web page.
- Two additional courses in chemical engineering.
- Two unrestricted electives in any department or program of the university.

\*Half credit course

\*\*No credit

BSCM '12 (6/30/08)

4. Engineering students who have not met the minimum grade point average in all courses in the College of Engineering are placed on "engineering grade point warning," and may be required to attend the Bucknell summer session to earn sufficiently high grades so as to reduce significantly their engineering grade point average deficit or may be subject to dismissal from the engineering degree programs. Minimum engineering grade point averages are: 1.80 at the start of the third semester, 1.90 at the start of the fourth semester, and 2.00 at the start of the fifth and subsequent semesters.
5. Students who have a credit deficiency will be notified by the Associate Dean of Engineering that they are not in good academic standing, and will be placed on "credit warning." Such credit deficits will need to be made up during the following summer at Bucknell or elsewhere.

Several important points to note:

- a. Grades earned in college courses taken at other institutions do not affect Bucknell GPAs.
- b. Failing grades are not replaced by the subsequent grade in a repeated course. Both the "F" and the second grade count in the GPA computation.
- c. A student cannot repeat for credit a course in which advanced placement credit or a grade of D or higher was received.
- d. A 4-year student must complete 13 courses at Bucknell; a 5-year student must complete 17 courses at Bucknell.
- e. Every candidate for a degree in the College of Engineering must earn credits for 34 courses including four half courses. Every candidate for the combined degree of Bachelor of Science in one of the branches of engineering and bachelor of arts must earn credit for 42 courses.

### Requirements for Good Academic Standing

To be in good academic standing and to be eligible for continued enrollment, a student must normally pass a minimum number of courses and achieve a minimum cumulative GPA as follows:

Beginning of Semester	Minimum Number of Courses Passed	Grade Point Average	Engineering Grade Point Average
2	3	1.8	1.8
3	7	1.8	1.8
4	*	1.9	1.9
5	*	1.9	2.0
6	*	2.0	2.0
7	*	2.0	2.0
8	29.5	2.0	2.0

\*Students must have earned within one (1) course credit of the credits required for their curriculum.

In exceptional circumstances, the definition of "normal" progress toward the degree may, at the discretion of the Associate Dean of Engineering, be altered to allow a student to extend his or her undergraduate career to nine semesters.

### Summer School

The summer school at Bucknell offers courses in the six-week session. The session for the summer of 2009 begins on Monday, June 8, 2009. Student inquiries about summer school courses at Bucknell should be directed to the Office of the Director of Summer School. Generally, preliminary listings of courses are available in January and the summer catalog is usually available just prior to spring break.

Bucknell students who are not in good academic standing may be required to attend Bucknell summer school to improve their standing. Grades obtained at other institutions are not transferred and therefore cannot affect the student's grade point average.

Students planning to attend summer school elsewhere must obtain prior approval of their course selection. A copy of the form "Application for Transfer Credit" may be obtained from the Registrar's Office, the Office of the Associate Dean of Engineering, or at website <http://www.bucknell.edu/x3836.xml>. This form should be completed prior to taking the summer school course to ensure acceptance of the credit at Bucknell.

### Change of Major

The procedure to be followed by a student to change his or her major depends on the change.

Within the College of Engineering: The student should consult with the chairperson of the new major department to work out a program to satisfy the requirements of the new engineering major. Then the student should obtain the "Change of Engineering Degree Program" form from the Office of the Associate Dean of Engineering, obtain the necessary signatures, and return the forms to the Office of the Associate Dean of Engineering.

From the College of Engineering to the College of Arts and Sciences: In order to transfer between the two colleges, a student must meet with the Associate Dean of Engineering and discuss the transfer with his or her engineering adviser and department chairperson. Then the student should obtain and complete an "Application for Transfer between Colleges of the University." Students should recognize that restrictions may be placed on transfers into certain programs due to limitations on faculty size and facilities in a given department.

Prior to matriculation as a student at Bucknell, any accepted student can request to be re-evaluated by the Office of Admissions as an applicant to the College of Engineering. If the student qualifies for admission to the College of Engineering and the degree program (or undecided category) specified, he or she will be admitted to the College of Engineering providing:

1. The College enrollment target of 175 students has not been reached or exceeded, *and*
2. The enrollment target in the degree program (or undecided category) has not been reached or exceeded.

## BACHELOR OF ARTS/MANAGEMENT FOR ENGINEERS-BACHELOR OF SCIENCE IN BIOMEDICAL ENGINEERING

The requirements for the degree of Bachelor of Arts/Management for Engineers-Bachelor of Science in Biomedical Engineering for the class of 2012 are:

### FIRST-YEAR

First Semester – ENGR100; MATH 201; PHYS 211; First-year course in English literature and composition ..... 4.00  
 Second Semester–CHEM 221; MATH 202; PHYS 212; Elective..... 4.00

### SOPHOMORE YEAR

First Semester – BMEG 210; MATH 226\*; CHEM 211; MATH 211; Elective ..... 4.50  
 Second Semester – BIOL 206; CHEM 212; CHEM 231; MATH 212 ..... 4.00

### JUNIOR YEAR

First Semester – BIOL 205; CHEM 343; BMEG 220\*; Two Electives ..... 4.50  
 Second Semester – BMEG 300; ENGR 240; Two Electives ..... 4.00

### FOURTH YEAR

First Semester – BMEG 400; BMEG 205; Two Electives..... 4.00  
 Second Semester – BMEG 408\*; BMEG 350; Three Electives ..... 4.50

### FIFTH YEAR

First Semester – BMEG 401; BMEG 409\*; Three Electives..... 4.50  
 Second Semester – BMEG 402; Three Electives..... 4.00

Three of the courses above must fulfill the university's writing requirement. An approved W1 course must be taken during the first year. BMEG 401 and BMEG 402 are approved W2 courses.

The 18 elective courses are distributed as follows:

- Five social science and humanities courses selected from the list of approved courses provided in "*Information for Engineering Students Handbook*" (published by the College of Engineering) to fulfill the General Education Component required of all engineering students. These courses must be distributed as follows: 1) minimum of two courses in humanities; one must be a first-year course in English literature and composition or creative writing, or a Foundation Seminar in English literature; 2) minimum of two courses in social sciences. Two of these five electives must be taken in one department OR at least one elective must be taken at the 200+ level in any department. One of the five courses must satisfy the global and societal perspectives requirement.
- One approved 200+ level engineering course from the list published by the department.
- One approved 300+ level engineering course from the list published by the department.
- One BMEG engineering elective course from the list published by the department.
- One approved 200+ level physiology course from the list published by the department.
- One course in any department or program of the university provided that the prerequisites are satisfied.
- Eight courses selected to satisfy the Bachelor of Arts/Management for Engineers degree requirements including a capstone course in the senior year, and a departmental, interdepartmental or college major.
- See "*Academic Programs*" for additional requirements.

\*Half course

AMBM '13 (6/30/08)

## BACHELOR OF SCIENCE IN BIOMEDICAL ENGINEERING

The requirements for the degree of Bachelor of Science in Biomedical Engineering for the class of 2012 are:

### FIRST-YEAR

First Semester – ENGR100; MATH 201; PHYS 211; First-year course in English literature and composition ..... 4.00  
Second Semester – CHEM 221; MATH 202; PHYS 212; Elective ..... 4.00

### SOPHOMORE YEAR

First Semester – BMEG 210; MATH 226\*; CHEM 211; MATH 211; Elective..... 4.50  
Second Semester – BIOL 206; CHEM 212; CHEM 231; MATH 212 ..... 4.00

### JUNIOR YEAR

First Semester – BIOL 205; CHEM 341; BMEG 220\*; BMEG 205; Elective..... 4.50  
Second Semester – BMEG 300; BMEG 350; BMEG 408\*; ENGR 240; Elective.. 4.50

### SENIOR YEAR

First Semester – BMEG 400; BMEG 401; BMEG 409\*; Two Electives ..... 4.50  
Second Semester – BMEG 402; Three Electives ..... 4.00

The 10 elective courses are distributed as follows:

- Five social science and humanities courses selected from the list of approved courses provided in “*Information for Engineering Students Handbook*” (published by the College of Engineering) to fulfill the General Education Component required of all engineering students. These courses must be distributed as follows: 1) minimum of two courses in humanities; one must be a first-year course in English literature and composition or creative writing, or a Foundation Seminar in English literature; 2) minimum of two courses in social sciences. Two of these five electives must be taken in one department OR at least one elective must be taken at the 200+ level in any department. One of the five courses must satisfy the global and societal perspectives requirement.
- One approved 200+ level engineering course from the list published by the department.
- One approved 300+ level engineering course from the list published by the department.
- One BMEG engineering elective course from the list published by the department.
- One approved 200+ physiology course from the list published by the department.
- One course in any department or program of the university provided that the prerequisites are satisfied.

\*Half course

Three courses in each student’s program must fulfill the university writing requirement (see the university catalog).

BSBE (6/30/08)

Requests will be reviewed by the Office of Admissions in the order in which they are received.

After the matriculation of students for a given year, applications for transfer to the College of Engineering will be considered at the end of each semester based on the space available in each degree program. Students who apply to transfer to the College of Engineering will be subject to a review of their academic performance at Bucknell for entrance into any engineering program.

If a student would like to transfer during his/her first semester, or is denied transfer prior to matriculation, the student should enroll, at a minimum, in ENGR 100 and MATH 201 during their first semester, enrollment in PHYS 211 is also recommended. A minimum of a B- will be required in both ENGR 100 and MATH 201 for entrance into any engineering program. Students who elect to take ENGR 100, MATH 201 and PHYS 211 and meet or surpass the minimum B- grade in all three classes will be given priority should enrollment space within the programs be limited. The grade requirements do not apply to students with AP math credit and/or AP physics credit. If a student meets these requirements, transfer into a specific degree program will be authorized providing:

- 1 The degree program has 34 or fewer first year majors (17 in the BME program), *or*
2. The degree program has 35 or more first-year majors and the department and Dean elect to accept additional majors (does not apply to the BME program at this time).

Once admitted subsequent transfers into programs that would not have accepted transfer students due to enrollments will not be authorized. Selection for transfer approval will be based on GPA if enrollment limits prevent transfer of all eligible applicants.

If a student has not taken both ENGR 100 and MATH 201 by the end of the first semester and would like to apply to the College of Engineering, they may apply at the end of the second semester. During the second semester the student should enroll, at a minimum, in a math or science course required by the degree program of interest, and an engineering course in that discipline. At the end of the semester the student’s academic record will be reviewed by the appropriate department chair and Associate Dean of Engineering. If the student’s academic record is satisfactory, transfer into a specific degree program will be authorized providing:

1. It is still possible for the student to graduate in a total of 8 semesters and the student has discussed a tentative course plan to complete the specified degree with the Associate Dean of Engineering.
2. The degree program has 34 or fewer first year majors (14 in the BME program, with priority given to students in the College of Engineering), *or*
3. The degree program has 35 or more first-year majors and the department and Dean elect to accept additional majors (does not apply to the BME program at this time).

Once admitted subsequent transfers into programs that would not have accepted transfer students due to enrollments will not be authorized. Selection for transfer approval will be based on GPA if enrollment limits prevent transfer of all eligible applicants.

The Associate Dean of Engineering and the appropriate department chair will evaluate students who wish to apply for transfer to the College of Engineering following their second semester on a case-by-case basis.

### **Administrative Policy on Enrollment Restrictions**

Admission to the university, to a college, to a degree program, or to a major does not guarantee enrollment in any individual course, transfer from one college to another, or registration in any particular degree program or declaration of a particular major. Registration in or transfer from one-degree program, or declaration of a major, is authorized only with the approval of the university through the academic deans. The university reserves the right to cancel or limit enrollment in any individual course.

### **Leave of Absence**

A student in good standing who wishes to temporarily interrupt studies may apply to the Associate Dean of Engineering for a leave-of-absence if the student intends to complete degree requirements at Bucknell and if the courses for the semester preceding the leave have been satisfactorily completed.

The leave may be for one semester in any 12-month period. A student on leave will not be carried on Bucknell rolls during the period of the leave.

Applications for leaves-of-absence normally will be submitted by August 1 for the fall semester, and by January 1 for the second semester. In no case will they be accepted more after the student has completed the first day of class for a given semester. Students not wishing to continue their coursework after completing the first day of class will be processed as a voluntary withdrawal.

Leaves-of-absence will not be granted if the reason for separation is health, academic, or disciplinary, or if, in the opinion of the Associate Dean of Engineering, the student may require advice and consultation before returning. During a leave of absence, students are not permitted to take academic coursework. Any exception to this regulation would require prior permission of the Associate Dean of Engineering and in no case would more than two course credits be approved.

A student who withdraws because of pregnancy or pregnancy-related disabilities will be reinstated for any semester or term requested to the status held prior to withdrawal.

### **Withdrawal**

A student who is unable to meet the demands of an academic program during a semester, due to personal or health reasons, should contact the Office of the Associate Dean of Engineering to discuss possible options. Withdrawals after the second week of the semester will result in the records of "WP" or "WF" grades for each course. Withdrawals after the first week of the semester normally will result in the loss of some or all tuition. A student who does not plan to continue at the university, for whatever reason, at the conclusion of a given semester, should be referred to the Office of the Associate Dean of Engineering to complete the necessary forms for effecting a voluntary withdrawal.

## **DEGREE REQUIREMENTS for the Class of 2012**

The current engineering degree requirements for the Bachelor of Science programs (Class of '12) and the joint degree programs (Class of '13) are shown on the following pages.

### **MINOR IN BIOMEDICAL ENGINEERING**

Engineering students not pursuing the bachelor of science in biomedical engineering may choose to pursue a minor in biomedical engineering. This minor is attained through a judicious use of electives that combine the study of the basic biological sciences with their area of technological interest. To complete the biomedical engineering minor, engineering students must successfully complete at least four courses from select courses as prescribed by the biomedical engineering department. The minor in biomedical engineering requirements are:

- One 400+ level biomedical engineering course. Current courses include:

BMEG 421	Light-activated Therapy
BMEG 431	Biomimetic Materials
BMEG 451	Biomechanics and Injury Prevention
BMEG 441/ELEC 411	Neural Signals and Systems
BMEG 471/472	Advanced Topics in Biomedical Engineering

- Three courses from the following:

#### *Engineering*

CHEG 452	Bioprocess Engineering
CHEG 470	Biomaterials

#### *Biology or Chemistry*

BIOL 205	Introduction to Molecules and Cells
BIOL 206	Organismal Biology
BIOL 207	Genetics
BIOL 221	Human Physiology
BIOL 312	Comparative Vertebrate Anatomy
BIOL 318	Comparative Physiology
BIOL 322	Physiological Mechanisms
BIOL 323	Microanatomy
BIOL 324	Neurophysiology
BIOL 326	Cytogenetics
BIOL 327	Molecular Biology
BIOL 328	Endocrinology
BIOL 340	Biochemical Methods (CHEM 358)
BIOL 343	Neural Plasticity
BIOL 348	Immunobiology
BIOL 352	Cell Biology
BIOL 356	Introduction to Microscopy
CHEM 340	Biological Physical Chemistry
CHEM 351	Biochemistry I
CHEM 352	Biochemistry II
CHEM 358	Biochemical Methods (BIOL 340)

**ADDITIONAL REQUIREMENTS FOR THE BACHELOR OF ARTS/  
BACHELOR OF MANAGEMENT FOR ENGINEERS-BACHELOR OF  
SCIENCE IN ENGINEERING JOINT PROGRAM  
(COMMON LEARNING AGENDA)  
FOR CLASS OF 2012 AND THOSE THEREAFTER**

1. **FOUNDATION SEMINAR**  
One course required of all students in their first year. Foundation Seminars on appropriate topics may count toward the Broadened Perspectives requirement; or, in some cases, Foundation Seminars may count toward the Disciplinary Breadth requirement.
2. **DISCIPLINARY BREADTH\***
  - a. Humanities - four courses (no more than two in one department)
  - b. Social Sciences - two courses (in different departments)
3. Natural Sciences and Mathematics - engineers will meet requirement in their major
4. **BROADENED PERSPECTIVES FOR THE 21<sup>ST</sup> CENTURY\*\***  
Foundation Seminars and Disciplinary Breadth courses also may double-count as Broadened Perspectives courses if they address the relevant topics in a significant way.
  - a. Perspectives on the Natural and Fabricated Worlds - One course  
ENGR100 satisfies this requirement.
  - b. Perspectives on Human Diversity - One course  
Courses address themes of human diversity either within or across national borders; may also count as a humanities, social science and/or soc-hum course.
5. **DISCIPLINARY DEPTH**  
A department, interdepartmental or college major.
6. **CAPSTONE EXPERIENCE**  
Capstone course in the senior year; typically fulfilled by senior design in the engineering major.

Note: The departmental, interdepartmental or college major may include courses in Category I and II.

\*The Disciplinary Breadth requirements may be fulfilled by any courses in the appropriate division. (Note that two of the courses in natural sciences must have laboratories.

\*\*Courses which fulfill the Broadened Perspectives requirement are published each semester and distributed with the *Schedule of Classes*.

A student who withdraws from the university during a semester or at the end of a given semester may apply for readmission. A written request should be sent to the Director of Admissions before July 1 for the fall semester, or before December 1 for the spring semester. Normally, a student who withdraws during a semester, but after the first four weeks of the semester, will not be considered for readmission for the next regular semester.

**Medical Withdrawal**

A student who withdraws for approved health reasons, as certified by the Director of the Student Health Services or the Director of Psychological Services, and approved by the Associate Dean of Engineering, must submit a request for readmission to the Associate Dean of Engineering by June 1 for the fall semester and by November 1 for the spring semester. Further, the student also must submit a request for return to the appropriate health director (i.e., Student Health Services or Psychological Services) not less than two months before the beginning of the semester. This request must be accompanied by a statement from the attending physician or psychologist for review by the appropriate director.

Readmission in such instances requires, at a minimum, clearance by the appropriate Bucknell health director and may require approval of the Associate Dean of Engineering.

**Readmission**

A student who has been dropped by the university for academic reasons must wait at least one year before applying for readmission, must provide convincing evidence of being able to complete degree work satisfactorily, and must earn six quality points in two 6-week summer school courses at Bucknell.

**Premedical Preparation**

Any student considering pursuing a career in medicine or dentistry should inform his or her engineering faculty adviser as early as possible. This is particularly important since completion of the premed requirements is most readily accomplished by beginning that work in the first term of the first year. Any student who expresses an interest in this possibility should also contact Dr. Allison Patterson in the Career Development Center. The premedical requirements can be completed in any one of the engineering degree programs but the timing is very tight. Therefore, it is imperative that the student begins planning as early as possible.

**Prelaw Preparation**

Bucknell does not offer a prelaw major as such, and most law schools appear to believe that diversified undergraduate education is far more beneficial in providing a firm footing for later study of law.

The Association of American Law Schools stresses certain fundamental skills and abilities that should be developed and refined on the undergraduate level. The quality of a student's education can be measured by his: "(1) comprehension and expression in words, (2) critical understanding of the human institutions and values with which the law deals, and, (3) creative power in thinking." . . . What the law schools seek in their entering students is not accomplishment in mere memorization, but accomplishment in understanding, the capacity to think for themselves, and the ability to express their thoughts with clarity and force." All law schools expect applicants to have a firm command of the basic verbal and written communication skills.

Any student who expresses an interest in preparing to study law should contact the prelaw adviser at the Career Development Center.

### **Transfer Students**

All incoming transfer students are provided with an "Academic Progress Report" (an official evaluation of credits) by the registrar's office after the final transcript is received. This is available on Banner web. Frequently a student will have questions regarding the meaning of this document and the following information may be helpful.

Quantitative credits transferred: Generally speaking, course work from other colleges is transferable as long as it represents work that would be permitted if the student had been at Bucknell. However, courses in mathematics at a level lower than our introductory calculus course and language courses, which are repetitious of high school work under our language placement formula, are not transferable.

Most students transfer to Bucknell from schools that employ the semester hour credit system in which 120-128 semester hours of credit are required for a degree. This means that the student typically would take 15-16 semester hours each semester for a normal full-time load. For transfer purposes, one of our courses is equivalent to four semester hours of work. In determining the number of Bucknell credits which the transfer student will receive, therefore, the number of transferable semester hours is totaled and divided by four, with any fractions being rounded down to the nearest half credit.

Major requirements: The applicability of courses elected at another institution toward the major is often not clear and the student is usually directed on the "Degree Progress Report" to check with the adviser and the department of his/her chosen major. After consultation between the student and the adviser, the adviser should send a memorandum through the department chairperson to the Dean's Office indicating the number of credits that are applicable toward the major and those specific course requirements for the major that are considered as having been fulfilled.

Grade requirements: All students admitted to advanced standing will be held to the standards applicable to continuing students (See "Requirements for Good Academic Standing.")

Modification of Degree Requirements: Any request for modification of degree requirements such as substitutions of courses or waiver of requirements must be approved by the appropriate department chairperson and the Associate Dean of Engineering before becoming effective.

Special problems: Special problems or questions regarding transfer students should be referred to the Office of the Associate Dean of Engineering.

### **Participation in Commencement Ceremonies**

A student who is within two courses of meeting the requirements for graduation at the end of spring semester and who has made arrangements with the Associate Dean of Engineering to complete the courses within one year may participate in the commencement ceremonies before receiving a diploma. The registrar should be consulted to determine eligibility in the individual case.

In addition to formal master's degree programs, the regular undergraduate student who has arranged to complete all undergraduate degree requirements may, with prior approval, take up to two courses for graduate credit. An application for graduate credit by undergraduate students may be obtained from the Office of Graduate Studies or the Office of the Registrar.

Most graduate programs require an applicant to take the Graduate Record Examination (GRE) and, in certain instances, an Advanced Test in a particular area. Application forms for the GRE's may be acquired in the Office of the Associate Dean of Engineering.

### **Bachelors of Mgmt for Engineers / Bachelor of Science in Engineering – Dual Degree Graduation Requirements**

Engineering students now have an additional educational option, a 5-year joint degree – BS in Engineering / Bachelors of Management for Engineers. Students admitted to this program will earn a single combined degree consisting of a full BS degree in any one of the seven engineering disciplines, augmented by a Bachelor of Management for Engineers degree in management. If you have questions about this program, contact the Office of the Associate Dean of Engineering.

### **Off-Campus Study**

As noted in the university catalog there are several opportunities for students to study off-campus. The Junior Year Abroad program has been used by several engineering students to combine work toward an undergraduate engineering degree with study in a foreign country. Any engineering student interested in this possibility should discuss this interest with the Associate Dean of Engineering as early as possible.

### **Graduate Credit**

Seniors may take up to two courses for graduate credit during their senior year, provided they have a cumulative GPA of at least 3.0. Prior approval must be obtained on a form, which is available in the Office of Graduate Studies in Marts Hall.

## **COUNSELING, GRADUATE STUDY AND CAREERS**

### **Psychological Services**

The counselors at Psychological Services offer a wide range of services to a student who may be experiencing academic difficulty, psychological difficulty, or uncertainty about a career choice. In addition, extensive libraries of career information are maintained there and in the Career Development Center.

### **Career Counseling**

The Career Development Center makes available career counseling assistance to all Bucknell students. As early as the first year the office helps students to explore career options open to them and to develop strategies for successful placement.

Registration with the Career Development Center is voluntary. Assistance is available for issues such as: self-assessment and career decision-making, the development of job search tools, preparing for interviews, resources for conducting employment and graduate school research, and internship and full-time employment leads.

### **Graduate Studies**

Bucknell's graduate program leads to the degrees of Master of Science in chemical, civil, electrical, environmental, or mechanical engineering. Each graduate program is individually tailored to meet the needs, preparation, and goals of the student.

Undergraduate students who have completed three years in the chemical, civil, electrical, or mechanical engineering program at Bucknell, earned a cumulative grade point average of at least 2.8, and who show aptitude for graduate student, may apply for admission to the integrated 3-2 program. This program permits selected students to complete all requirements for both a bachelor of science degree and a master of science degree in five years. Those students who are selected receive a full tuition scholarship for the fifth year.

Traditional master's degree programs are offered in addition to the special 3-2 program. assistantships are available. Information can be obtained from the Office of the Associate Dean of Engineering or the Director of Graduate Studies.

## **ACADEMIC PROGRAMS**

### **Five-Year Program in Liberal Arts and Engineering**

A student may combine any one of the Bachelor of Arts majors with the study of chemical, civil, electrical, or mechanical, computer engineering or computer science and engineering. A student who is interested in a combination of liberal arts and engineering should be urged to consult with the Associate Dean of Engineering as early as possible in his or her career at Bucknell.

### **The Writing Requirement**

In fulfilling the university writing requirement, each undergraduate degree candidate must successfully complete one course designated W1 (to be taken before the W2 courses) and two courses designated W2 among the courses required for the degree. The W1 course must be completed in the first year. The two W2 courses are usually taken during the last three years. However, one of the W2 courses may be taken during the first year. Lists of W1 and W2 courses are distributed each semester with the *Schedule of Classes*. See the 2008-09 university catalog for a detailed description of the Writing Program.

### **Non-Traditional Study**

Credit toward an undergraduate degree may be awarded for non-traditional study provided prior approval has been obtained from the chairperson of an appropriate department. Copies of the regulations and procedures may be obtained from the Office of the Associate Dean.

### **The Academic Minor**

Academic minors are offered by departments in the College of Arts and Sciences and are available to all students, including engineering students. Details of the requirements for each minor may be obtained from the Office of the Dean of the College of Arts and Sciences.

The following stipulations pertain to a minor:

1. Courses may not be double counted in majors and minors; however, corequisite or major-related courses may be counted toward a minor.
2. Courses in a minor may also satisfy distribution requirements.
3. Students in one-degree program may do a minor in another degree program.
4. There is no minor in business, accounting, or any engineering discipline with the exception of biomedical engineering.
5. No substitution of courses required for a minor is permitted.

In order to declare a minor, the student should obtain a Declaration of Minor card from the Office of the Dean of Arts and Sciences, fill it out and have it signed by the head of the department offering the minor. The completed and signed card should be returned to that office no later than three weeks into the last semester of the senior year.