

# Engineering Handbook

Fall 2011

The faculty and staff of the Engineering Division are happy that you chose to come to Lafayette College. It is our goal to give you an excellent engineering education within a liberal arts college environment. We prepared this handbook to answer questions you might have concerning your education during the next four years. While this handbook is an unofficial publication of Lafayette College's Engineering Division and is valid only for the class of 2015, it is a good place to start looking for answers to questions, however we know that there are questions that may not be addressed. So start here, but if you don't find the answer, talk to your adviser, professors, the staff, and/or me.

Also, please refer to the Division website for updated information.

**<http://engineering.lafayette.edu/>**

Sincerely,

James Schaffer

Interim Director of the Engineering Division

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# THE FIRST YEAR

## *ACADEMIC ADVISER*

The faculty adviser guides student advisees in their course of study, helps them assess their academic capabilities and progress, and directs them to other specialized resources when needed. An engineering professor is assigned as your academic adviser for the first year. When you declare your intention to pursue a specific engineering major in the spring of the first year, you will be assigned an adviser for your remaining three years; this adviser will be an engineering faculty member in your major department.

Specific functions of the academic adviser include:

- Meet regularly with the student to assess his/her needs and progress.
- Receive reports on a student's academic progress and maintain a record of this progress.
- Discuss future plans with the student to assist him/her in making appropriate course selections, and other career choices.
- Approve a student's course selections before registration for the next semester.
- Refer the student to other offices on campus for assistance as necessary.

When you meet with your adviser feel free to ask questions about:

- Majors and minors
- AP & IB credits
- Course sequences
- Social Science and Humanities courses
- Study abroad opportunities
- Research opportunities
- Internships/employment
- Graduate school
- Co-curricular activities such as student clubs etc.

## STANDARD COURSE SEQUENCE

The standard course sequence for all engineering students during their first year is listed below. Some students will take ES101 in the spring semester and Physics (or alternate course) in the fall semester.

Fall Semester	Spring Semester
FYS: First-Year Seminar	English 110: College Writing [or Social Science/Humanities]
ES 101: Introduction to Engineering	Math 162: Calculus II
Math 161: Calculus I	Phys 131: Mechanics
Chem 121: General Chemistry I	Science/Math Elective

### FAQs

1. How do I know if Math 161 is the right course for me?

- Math 161 is the default math course for the fall semester of the first-year. If you have an AP score of 4 or 5 on the AB calculus test you earned credit for Math 161 and may enroll in Math 162 if you choose to do so. If you were unsure about this decision, the on-line placement exam you took in the summer before you started at Lafayette helped you decide the correct course to register for. The placement exam is also offered during orientation. If you have an AP score of 3, 4 or 5 on the BC calculus test, you earned credit for both Math 161 and Math 162 and may enroll in Math 263. Please speak with your academic adviser if you have additional questions about the most appropriate math course for you. Some students are advised to take Math 165 for extra preparation.

2. What do I do if I have AP credit in chemistry?

- If you have an AP chemistry score of 4 or 5 you earned credit for Chem 121 and Chem 122. There is also an on-line placement test that helped you decide if you should register for Chem 122. There are several options available for your fourth course in the fall semester and you should speak with your academic adviser to determine the best choice for you. Some of the common options include taking:
  - Another Chemistry course. Students planning to major in ChE, or the environmental side of CEE may elect to enroll in Chem 252: Environmental Chemistry (no lab). Students planning to major in ChE may wish to enroll in Chem 221: Organic Chemistry I (with lab). This is an aggressive option and should be reserved for students who are confident in both their analytical and laboratory skills in chemistry.

- A course in a field in which you wish to minor. Some students with AP chemistry credit elect to take a course in a particular field of interest outside of engineering during their first semester. You should discuss the implications of this choice with your faculty adviser before proceeding.
- Physics 151 if you've been recommended by the Physics department (you would have received a letter during the summer). Alternately, if you have credit for Math 161, you may consider taking Physics 131: Mechanics.

3. Can I take a fifth course during my first semester at Lafayette?

- NO! (Sorry.) The only exceptions are a ROTC course, or a 1/4-credit music course.

4. Can I take a fifth course during my second semester at Lafayette?

- Yes! If your GPA during the fall semester meets the College's requirements (normally 3.5), you can petition to take a fifth course during the spring semester. After your first year, these petitions normally require a 3.2 GPA or higher.

5. What should I do if I have a problem with my schedule for fall?

- See your academic adviser, and then go to the drop/add session during Orientation.

# THE ENGINEERING MAJORS

Lafayette offers B.S. degrees in four fields of engineering (Chemical, Civil, Electrical and Computer, and Mechanical Engineering), and a Bachelor of Arts degree in Engineering (offered by the Engineering Studies Program). You will be asked to state your intention to pursue one of these five degree programs during February/March of your first year in time for registration for the fall of your sophomore year. Typical course sequences for each of our engineering degree programs are shown on the next few pages.

## *CHEMICAL ENGINEERING*

Chemical engineers discover new products and implement new production processes that are useful and economical. The profession has evolved from petroleum refining at the beginning of the last century to today's biotechnology, biomedical developments, and nanotechnology. With this major, students have the option of an integrated dual major with International Studies.

## *CIVIL ENGINEERING*

Civil engineering emphasizes a broad understanding of engineering principles for solving problems. Civil engineers design and construct bridges, buildings, dams, highways, airports, mass transit, harbors, water plants, pipelines, and waste treatment centers. They look for ways to manage hazardous materials, remediate contaminated areas, and protect natural waterways. With this major, students have the option of an integrated dual major with International Studies.

## *ELECTRICAL AND COMPUTER ENGINEERING*

Electrical and computer engineers have contributed to some of the most remarkable technological advances of the last 60 years including the personal computer, the Internet, digital audio and video, and wireless communications. New technologies such as biotechnology and nanotechnology are promising to provide equally impressive contributions to technology and society. With this major, students have the option of an integrated dual major with International Studies.

## *ENGINEERING [STUDIES]*

This program presents a distinctive opportunity to obtain a strong technical education within the context of a broad liberal arts curriculum, resulting in a bachelor of arts degree in Engineering [Studies] (not ABET-accredited). Engineering courses are combined with courses in the social sciences and humanities. The program is grounded in mathematics, natural sciences, and engineering science with upper-level courses drawn from traditional engineering disciplines, engineering management, and engineering and public policy. Students have great flexibility to double major in a variety of fields.

## *MECHANICAL ENGINEERING*

Mechanical engineers design, develop, and manufacture artificial limbs, engines, sports equipment, power plants, automobiles, biomedical devices, and a wide variety of consumer items. They work in manufacturing, marketing, management, research, education, and system design and development. They also play a major role in the mechanical design and manufacture of products often thought of in connection with other branches of engineering, such as computers, chemical processing equipment, and aerospace structures. With this major, students have the option of an integrated dual major with International Studies.

## *INTERNATIONAL STUDIES AND ENGINEERING*

Globalization of engineering and technology is increasing the number of attractive job opportunities in foreign countries for engineers with proficiency in a second language, and an understanding of foreign cultures. This program enables students to earn a B.S. degree in an engineering field and an additional A.B. degree in International Studies. In this program, you acquire proficiency in a chosen language and develop an in-depth understanding of the culture of a country or region where the language is spoken. You take international politics and international history courses, as well as others in the humanities and social sciences that relate to those particular countries or regions. The capstone experience is a total immersion in a foreign culture. Students either study, or work abroad in a country where their chosen language is spoken, typically during the summer before the senior year.

This option can be completed in the standard four years plus an additional summer.

# Chemical Engineering Curriculum

<i>Fall Semester</i>		<i>Spring Semester</i>	
<b>FIRST YEAR</b>			
Introduction to Engineering (ES 101)	1	Science/Math Elective <sup>1</sup>	1
First Year Seminar (FYS)	1	Calculus II (Math 162)	1
Calculus I (Math 161 or 165)	1	College Writing (Eng 110)	1
General Chemistry I (Chem 121)	1	Physics I Mechanics (Phys 131)	1
Courses	4	Courses	4
<b>SECOND YEAR</b>			
Organic Chemistry I (Chem 221)	1	Chemistry Elective	1
Calculus III (Math 263)	1	Differential Equations (Math 264)	1
Social Science/Humanities Elective	1	Social Science/Humanities Elective	1
Engineering Science Elective	1	Thermodynamics (ChE 222)	1
Material and Energy Balances (ChE 211)	1	VaST Seminar	1
Courses	5	Courses	5
<b>THIRD YEAR</b>			
Transport Phenomena (ChE 311)	1	Applied Fluid Mechanics & Heat Transfer (ChE 321)	1
Experimental Design I (ChE 312)	1	Experimental Design II (ChE 322)	1
ChE Technical Elective	1	Fluid Phase & Reaction Equilibria (ChE 323)	1
Chemistry Elective	1	Process Control (ChE 324)	1
Social Science/Humanities Elective	1	Free Elective	1
Courses	5	Courses	5
<b>FOURTH YEAR</b>			
Mass Transfer, Separations and Bioseparations (ChE 411)	1	Design Synthesis (ChE 422)	1
Integrated Chemical Engineering (ChE 412)	1	Physical Chemistry II (Chem 324)	1
Reaction Kinetics and Design (ChE 413)	1	Free Elective	1
Design Analysis (ChE 415)	1	Technical Elective	1
Technical Elective	1	Social Science/Humanities Elective	1
Courses	5	Courses	5

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<sup>1</sup> Chemical Engineering majors need Chemistry 122 in order to take Organic Chemistry in the Fall Semester of the sophomore year.



# Chemical Engineering Curriculum – Continued

## Engineering Science Electives

Engineering Science 241 -- Basic Electric Circuit Analysis

Engineering Science 226 – Statics

## Chemistry Electives may be taken from the following:

<b>Course:</b>	<b>Prerequisites:</b>
Chemistry 212 -- Inorganic Chemistry I	Chemistry 122
Chemistry 213 -- Inorganic Chemistry I (with laboratory)	Chemistry 122
Chemistry 222 -- Organic Chemistry II	Chemistry 221
Chemistry 231 -- Analytical Chemistry I	Chemistry 122
Chemistry 252 -- Environmental Chemistry	Chemistry 121
Chemistry 342 -- Advanced Organic Chemistry	Chemistry 222
Chemistry 351 -- Biochemistry Survey	Chemistry 222
Chemistry 352 -- Experimental Biochemistry	Chemistry 351
Chemistry 462 -- Advanced Physical Chemistry	Chemistry 323
*ES 231 -- Nature of Engineering Materials [To count as a Chemistry elective, ES 231 must be taken in the first two years]	
*Biology 101 -- General Biology	
*Chemical Engineering 331 -- Polymers	
*Chemical Engineering 344 – Interfacial Phenomena in Nanotechnology	
*Only one Chemistry Elective may be chosen outside of the Chemistry Department.	

## Technical Electives

Any upper level Engineering, 3xx Science, 3xx Mathematics, or 3xx Computer Science and Computational Methods courses. At least one must be taken within the Chemical Engineering Department.

# Civil Engineering Curriculum

<i>Fall Semester</i>		<i>Spring Semester</i>	
<b>FIRST YEAR</b>			
Introduction to Engineering (ES 101)	1	Science/Math Elective <sup>2,4</sup>	1
First Year Seminar (FYS)	1	Calculus II (Math 162)	1
Calculus I (Math 161 or 165)	1	College Writing (Eng 110)	1
General Chemistry I (Chem 121)	1	Physics I Mechanics (Phys 131)	1
Courses	4	Courses	4
<b>SECOND YEAR</b>			
Calculus III (Math 263)	1	Differential Equations (Math 264)	1
Statics (ES 226)	1	VaST Seminar <sup>3</sup>	1
Environmental Engineering (CE 321)	1	Strength of Materials (ES 230)	1
Land Development-Surveying (CE 271)	1	Science/Math Elective <sup>4</sup>	1
Social Science/Humanities Elective	1	Transportation Systems (CE 341)	1
Courses	5	Courses	5
<b>THIRD YEAR</b>			
Project Management (CE 331)	1	Civil Engineering Elective	1
Fundamentals of Structural Engineering (CE 311)	1	Civil Engineering Computing (CE 201)	1
Geotechnical Engineering (CE 361) W	1	Water Resources Engineering (CE 351)	1
Fluid Mechanics (CE 251)	1	Science/Math Elective <sup>4</sup>	1
Social Science/Humanities Elective	1	Social Science/Humanities Elective	1
Courses	5	Courses	5
<b>FOURTH YEAR</b>			
Capstone Design I (CE 472)	1	Capstone Design II (CE 473)	1
Civil Engineering Elective	1	Civil Engineering Elective	1
Technical Elective	1	Technical Elective	1
Social Science/Humanities Elective	1	Social Science/Humanities Elective	1
Free Elective	1	Free Elective	1
Courses	5	Courses	5

<sup>2</sup> Civil Engineering majors prefer ES 231 or Chem 122; other science electives okay.

<sup>3</sup> VaST 203 preferred (may be substituted with a sustainability related VaST course, or any VaST course & another approved course with sustainability outcomes).

<sup>4</sup> At least one Science/Math elective must be a science from a department other than Physics or Chemistry

# Electrical and Computer Engineering Curriculum

<i>Fall Semester</i>		<i>Spring Semester</i>	
<b>FIRST YEAR</b>			
Introduction to Engineering (ES 101)	1	Math/Science Elective <sup>5</sup>	1
First Year Seminar (FYS)	1	Calculus II (Math 162)	1
Calculus I (Math 161 or 165)	1	College Writing (Eng 110)	1
General Chemistry I (Chem 121)	1	Physics I Mechanics (Phys 131)	1
Courses	4	Courses	4
<b>SECOND YEAR</b>			
Principles of Computer Science <sup>6</sup>	1	Social Science/ Humanities Elective	1
Calculus III (Math 263)	1	Basic Electrical Circuits Analysis (ECE 221)	1
Physics II Electricity & Magnetism (Phys 132)	1	Discrete Math (Math 182)	1
Social Science/Humanities Elective	1	Digital Circuits II (ECE 212)	1
Digital Circuits I (ECE 211)	1	Differential Equations (Math 264)	1
Courses	5	Courses	5
<b>THIRD YEAR</b>			
Electromagnetics (ECE 341)	1	Analysis & Design of Solid State Circuits (ECE 323)	1
Introduction to Solid State Devices & Circuit (ECE 322)	1	Communication Systems (ECE 332)	1
Signals And Systems (ECE 331)	1	Software Engineering (CS 205)	1
Social Science/Humanities Elective	1	Computer Organization (ECE 313)	1
Principles Of Computer Science II (CS 150)	1	VaST Seminar	1
Courses	5	Courses	5
<b>FOURTH YEAR</b>			
Industrial Electronics & Control (ECE 433)	1	ECE Elective	1
Physics of Semiconductor Devices (ECE 445)	1	ECE/CS Elective	1
Senior Design I (ECE 491)	1	ECE Design Lab II (ECE 492)	1
ECE Elective	1	Social Science/Humanities Elective	1
Free Elective	1	Free Elective	1
Courses	5	Courses	5

<sup>5</sup> Prefer ES 231 Natures of Material, but not required.

<sup>6</sup> CS 104, 105 or 106

## Engineering Studies Curriculum<sup>7,8,9</sup>

<i>Fall Semester</i>		<i>Spring Semester</i>	
<b>FIRST YEAR</b>			
Introduction to Engineering (ES 101)	1	Math/Science Elective <sup>10,11</sup>	1
First Year Seminar (FYS)	1	Calculus II (Math 162)	1
Calculus I (Math 161)	1	College Writing (Eng 110)	1
General Chemistry I (Chem 121)	1	Physics I Mechanics (Phys 131)	1
Courses	4	Courses	4
<b>SECOND YEAR</b>			
Calculus III (Math 263)	1	Math Elective <sup>10</sup>	1
Introduction to Engineering & Public Policy (EGRS 251)	1	Engineering Economics & Management (EGRS 261)	1
Principles of Economics (Econ 101)	1	VaST Seminar	1
Science Elective <sup>11</sup>	1	Engineering Systems Elective <sup>12</sup>	1
Courses	4	Courses	4
<b>THIRD YEAR</b>			
200 Level Engineering Elective <sup>13</sup>	1	Study Abroad - Free Elective <sup>14</sup>	1
Engineering Systems Elective <sup>12</sup>	1	Study Abroad - Free Elective <sup>14</sup>	1
Humanities/Social Science Elective <sup>15</sup>	1	Study Abroad - Free Elective <sup>14</sup>	1
Humanities/Social Science Elective <sup>15</sup>	1	Study Abroad - Free Elective <sup>14</sup>	1
Courses	4	Courses	4
<b>FOURTH YEAR</b>			
300/400 Level Engineering Elective <sup>16</sup>	1	Capstone Seminar in Engineering & Society (W) (EGRS 451)	1
300/400 Level Engineering Elective <sup>16</sup>	1	300/400 Engineering Elective <sup>16</sup>	1
Humanities/Social Science Elective <sup>15</sup>	1	Free Elective	1
Free Elective	1	Free Elective	1
Courses	4	Courses	4

<sup>7</sup> All Engineering Studies majors must meet the writing requirement (FYS, English 110, VaST, EGRS 451, one other designated W)

<sup>8</sup> Minors: no more than 1 minor; no minors if double major; no more than 3 named courses count from major or common course of study.

<sup>9</sup> Double majors: no more than 4 courses count for both majors.

<sup>10</sup> A course from the math department numbered 186 or higher.

<sup>11</sup> Must be a lab science course, a math course numbered 186 or higher, a CS course, or a CM course.

<sup>12</sup> Chosen from ES 226, ES 241, ChE 211, a fluid mechanics course, or a thermodynamics course (list published each semester.)

<sup>13</sup> Any 200 level engineering course except those that are cross-listed outside the Engineering Division.

<sup>14</sup> All Engineering Studies majors must meet the foreign culture requirement by one of the three options (1. proficiency in a foreign language through intermediate level, 2. approved semester study abroad (PREFERRED) or 3. established cluster of three related courses).

<sup>15</sup> At least one of these three H/SS courses must be a humanities course, at least one must be a social science course from a department other than economics, and at least one must be an H/SS course that addresses technological issues (list published each semester).

<sup>16</sup> At least one, and no more than two, of the 300/400 level engineering electives must be EGRS 480 or EGRS 482 or EGRS 495.

# Mechanical Engineering Curriculum<sup>17</sup>

<i>Fall Semester</i>		<i>Spring Semester</i>	
<b>FIRST YEAR</b>			
Introduction to Engineering (ES 101)	1	Science/Math Elective <sup>18</sup>	1
First Year Seminar (FYS)	1	Calculus II (Math 162)	1
Calculus I (Math 161 or 165)	1	College Writing (Eng 110)	1
General Chemistry I (Chem 121)	1	Physics I Mechanics (Phys 131)	1
Courses	4	Courses	4
<b>SECOND YEAR</b>			
Calculus III (Math 263)	1	Differential Equations (Math 264)	1
Statics (ES 226)	1	Strength of Materials (ES 230)	1
Thermodynamics & Waves (Phys 133)	1	Manufacturing & Design (ME 210)	1
Social Science/Humanities Elective	1	Dynamics (ME 240)	1
Social Science/Humanities Elective	1	VaST Seminar	1
Courses	5	Courses	5
<b>THIRD YEAR</b>			
Instrumentation & Data Acquisition (ME 331)	1	Dynamics of Physical Systems (ME 352)	1
Thermodynamics I (ME 350)	1	Thermodynamics II (ME 360)	1
Design I (ME 353)	1	Fluid Mechanics (ME 362)	1
Math/Science Elective	1	Engineering Design II (ME 371)	1
Social Science/Humanities Elective	1	Social Science/Humanities Elective	1
Courses	5	Courses	5
<b>FOURTH YEAR</b>			
Heat Transfer (ME 470)	1	Thermal/Fluids Engineering Lab (ME 475)	1
Control Systems & Mechatronics (ME 478)	1	Senior Design Project I (ME 498)	1
Dynamic Systems, Controls & Mechatronics Lab (ME 479)	1	Free Elective <sup>19</sup>	1
Senior Design Project I (ME 496)	1	Technical Elective <sup>20</sup>	1
Free Elective <sup>19</sup>	1	Technical Elective <sup>20</sup>	1
Courses	5	Courses	5

<sup>17</sup> See ME faculty adviser for list of approved math/science electives, one of these must be ES 231 or Chem 122.

<sup>18</sup> Prefer Natures of Materials (ES 231) or General Chemistry II (Chem 122).

<sup>19</sup> See ME faculty adviser for a description of free electives. One of the free electives or one of the technical electives must be either a Math or a Science course.

<sup>20</sup> See ME faculty adviser for a list of approved technical electives. One of the free electives or one of the technical electives must be either a Math or a Science course.

## Mechanical Engineering Curriculum – Continued

Technical electives are a diverse set of courses in design, thermal systems, dynamic systems, and other relevant areas of engineering, mathematics and science. These courses give students the opportunity to study advanced topics in their areas of interest. Technical electives emphasize the application of fundamental concepts and provide a sound basis for graduate study and professional practice in Mechanical Engineering.

1) The Following Courses count as Technical Electives:

- All Mechanical Engineering technical electives
- All Civil, Electrical, and Chemical Engineering courses at the 300 or higher level
- All Chemistry, Physics, and Biology courses at the 300 or higher level plus Chemistry 221 and 222
- All Math courses at the 300 or higher level
- All Engineering Studies courses at the 400 level
- Psychology 326
- All Computer Science and Computational Methods courses at the 300 or higher level

2) Courses in the above departments at the 200 level will be considered as technical electives under the following circumstances:

- The course forms part of a minor field of study
- The course is important for professional practice goals
- The course is necessary for entrance into a professional degree program

This determination will be made by the student's adviser in consultation with the Department Head.

3) Students wishing to take courses as technical elective that are not included on this list may petition the Mechanical Engineering Department for consideration.

# ELECTIVES FOR ENGINEERING STUDENTS AT LAFAYETTE COLLEGE

**last updated March 2011 and updated every semester**

[See <http://engineering.lafayette.edu/program/> for the latest version.]

## *SOCIAL SCIENCES AND HUMANITIES ELECTIVES*

The list is effective for all classes. It is the student's responsibility that any deviation from this list be approved by petition to the Director of Engineering. In addition, use of special topics, independent study, internship, and/or thesis (outside engineering) to meet this requirement must be approved by petition to the Director of Engineering.

**DEPTH:** Two (2) elective courses must be taken in the same humanities or social sciences discipline. At least one (1) of the courses must be at the 200-level or higher; the one exception is if the courses are foreign language courses where one (1) of the two (2) courses must be at the 111-level or higher.

**BREADTH:** Students must take a minimum of one (1) course in the social sciences and one (1) course in the humanities.

**ADDITIONAL:** Courses beyond the depth and breadth requirement may be taken from offerings in the humanities, social sciences, and/or interdisciplinary programs.

Classifications for disciplines are listed below:

<b>Humanities</b>	<b>Social Sciences</b>	<b>Interdisciplinary</b>
Art	American Studies	Africana Studies
English	Anthropology & Sociology	Asian Studies
Foreign Languages & Literature (each language is a separate discipline)	Economics	Environmental Studies
Music	Government & Law	Film and Media Studies
Philosophy	History	Policy Studies
Religious Studies	International Affairs	Russian & East European Studies
Theater	Psychology	Women & Gender Studies

**AFRICANA STUDIES:** All Courses

**AMERICAN STUDIES:** All Courses

**ANTHROPOLOGY & SOCIOLOGY:**  
All Courses.

**ART:** All Courses.

**ASIAN STUDIES:** All Courses

**ECONOMICS:** All Courses Except 213, 218, 303,  
319, 320, 321, 322, 324, 352, 365, 367-368

**EDUCATION:** None

**ENGLISH:** All Courses Except ENG 110

**ENVIRONMENTAL STUDIES:** All Courses

**FILM & MEDIA STUDIES:** All Courses

**FOREIGN LANGUAGES & LITERATURE:** All  
Courses (Native Tongue *Excluded*)

**GOVERNMENT & LAW:** All Courses

**HISTORY:** All Courses.

**INTERNATIONAL AFFAIRS:** All Courses

**MILITARY SCIENCE:** None

**MUSIC:** All Courses

**PHILOSOPHY:** All Courses

**POLICY STUDIES:** All Courses

**PSYCHOLOGY:** All Courses Except PSYC 110, 120,  
203, 304

**RELIGIOUS STUDIES:** All Courses  
Note: REL 221 & REL 222 are Social Science  
Courses

**RUSSIAN & EAST EUROPEAN STUDIES:** All  
Courses

**THEATER:** All Courses

**WOMEN & GENDER STUDIES:** All Courses  
Note: WS 101 is a Social Science Course

**INTERDISCIPLINARY STUDIES:**  
**Humanities (Can be used to satisfy breadth, but  
not depth.)**

INDS 123\* The Performing Arts Around the ...  
INDS 150\* Turkey: The Cradle of Civilizations  
INDS 151 Anatolia: The Cradle of Civilizations  
INDS 172 \*Voices of South Africa  
INDS 175 \*Back to Roots...Greece & Turkey  
INDS 180 The Colorful Sunset of the ...  
INDS 190 \*Politics & Culture of the Caribbean  
INDS 200 \*The Land & Landscape of Ireland  
INDS 210 \*Exploring South America  
INDS 215 Medieval Architecture in Northern ...  
INDS 220 \*Florence: Birthplace of Renaissance  
INDS 230 \*Paris, Province and the Midi: ...  
INDS 245 \*Social & Ethical Aspects of ...  
INDS 270 \*A Moveable Feast: American ...  
INDS 361 The Gothic Cathedral

**Social Science/Humanities (Can be used as a  
fourth or fifth social science/humanities, but  
cannot be used to satisfy either breadth or  
depth.)**

INDS 240 From Generosity to Justice  
INDS 380, 381 Internship in Ethical Studies  
INDS 390, 391 Independent Studies in Ethics

**Social Sciences (Can be used to satisfy breadth,  
but not depth.)**

INDS 120 \*Inside the People's Republic ...  
INDS 135 \*Thailand & Myanmar: ...  
INDS 165 \*The Open Wall & New Europe of ...  
INDS 170 \*Modern Sub-Saharan Africa  
INDS 171 \*Madagascar-Higher ...  
INDS 185 \*Guatemala: Innovations and ...  
INDS 195 \*History & Politics of Israel: The ...  
INDS 225 German Culture & ... (Bremen)  
INDS 250 \*French Commerce & Culture  
INDS 275 \*Paris: Intro to the French Exception  
INDS 280 \*Russia & Poland: Past & Present  
INDS 321, 322 Technology Clinic

**\*Denotes Interim Session**



### *SCIENCE ELECTIVES*

Last updated April 2011

Courses in geology, biology, physics, and chemistry are permitted as science electives subject to the approval of the student's major department. To view a list of geology courses that meet the ABET definition for science electives, please visit <http://engineering.lafayette.edu/files/2010/10/ABET-memo-Geo.pdf>.

### *TECHNICAL ELECTIVES*

Last updated April 2011

Upper-level courses in mathematics, sciences, computational methods, computer science, and engineering that normally require prerequisites are acceptable as technical electives for engineering students, subject to approval of the student's major department.

### *MATH ELECTIVES*

Last updated April 2011

Engineering students are allowed to complete the following courses as mathematics electives, subject to the approval of the student's major department.

- Any course offered by the Department of Mathematics above Math 264
- Mathematics 186

## ACADEMIC ADVISERS

### *CHEMICAL ENGINEERING*

Department Head: Professor Ferri

Professors Anderson & Ferri	2015
Professor Levinson	2014
Professor Martin	2013
Professor Piergiovanni	2012

### *CIVIL ENGINEERING*

Department Head: Professor Kney

Professor Kurtz	2015
Professor Raich	2014
Professors Kney	2013
Professor Brandes	2012

### *ELECTRICAL AND COMPUTER ENGINEERING*

Department Head: Professor Nestor

Professor Jouny	2015
Professor Nestor	2014
Professor Wey	2013
Professor Yu	2012

### *ENGINEERING STUDIES*

Program Chair: Professor Sanford Bernhardt

Professor Sanford Bernhardt	2015
Professor Sanford Bernhardt	2014
Professor Veshosky	2013
Professor Schaffer	2012

### *MECHANICAL ENGINEERING*

Department Head: Professor Hummel

Professors Helm & Hummel	2015
Professors Comer & Nesbit	2014
Professors Rossmann, Ulucakli & Sabatino	2013
Professors Merz, Seeler & Smith	2012

## STUDENT GROUPS IN ENGINEERING

<b>AIChE</b>	American Institute of Chemical Engineers Contact: Professor Senra
<b>ASCE</b>	American Society of Civil Engineers Contact: Professor Kurtz
<b>ASME</b>	American Society of Mechanical Engineers Contact: Professor Merz
<b>EWB</b>	Engineers Without Borders (open to all majors) Contact: Professor Smith
<b>EWH</b>	Engineers for World Health (open to all majors) Contact: Professor Yu
<b>GB</b>	Green Building Club (open to all majors) Contact: Professor Veshosky
<b>IEEE</b>	Institute of Electrical and Electronics Engineers Contact: Professor Yu
<b>Leonardo Society</b>	Organization for students pursuing an Engineering Studies degree Contact: Professor Veshosky
<b>MSE</b>	Minority Scientists and Engineers Contact: Professor Tavakoli
<b>SEES</b>	Society of Environmental Engineers and Scientists Contact: Professor Greenleaf, Professor Kney, Professor Mylon
<b>SWE</b>	Society of Women Engineers Contact: Professor Sanford Bernhardt
<b>Tau Beta Pi</b>	Engineering National Honor Society Contact: Professor Rosenbauer
<b>ESAC</b>	Organization of student leaders of Lafayette engineering organizations Contact: James Schaffer (interim director)

# INTERNATIONAL EXPERIENCES FOR ENGINEERING STUDENTS

## *FACULTY-LED SEMESTER ABROAD PROGRAM*

The faculty-led program enables B.S. engineering students to go abroad during the spring semester of their second year, and stay current with their required courses. Students take one, or two courses from the Lafayette faculty member, and additional courses at the University affiliate. A wide range of courses is available, including several in engineering. No prior knowledge of the local language is required; however students are encouraged to study the language before and during the semester abroad. Costs are similar to those for a semester on campus at Lafayette, and your financial aid applies. Look for the fall and spring information sessions. The current international locations are Bremen, Germany and Madrid, Spain. Guidelines are on pages 22-23 for the two programs. For more information, contact Professor Jordan [jordanm@lafayette.edu](mailto:jordanm@lafayette.edu).

## *ENGINEERS WITHOUT BORDERS - LAFAYETTE CHAPTER*

EWB-LC is a multidisciplinary group dedicated to meeting the basic health needs of developing communities by applying sustainable and practical engineering solutions. Since the spring of 2003, the chapter has committed itself to establishing long-term relationships with communities, associations, and organizations in the Yoro District of Honduras. Several times a year, teams of students travel to Honduras for one to two weeks to implement projects they planned and designed in partnership with the communities. If interested, see the faculty adviser, Professor Smith [smithjh@lafayette.edu](mailto:smithjh@lafayette.edu).

## *INTERIM PROGRAM*

Students have the opportunity for intensive study-abroad experiences through the optional January, or May interim session. In recent years, Lafayette faculty have traveled with students to teach courses in Australia, China and Hong Kong, England, France, Germany, Guatemala, Hawaii, Ireland, Israel, Kenya and Tanzania, South America, Turkey, and the West Indies. While most courses are interdisciplinary with a broad emphasis on culture, some, such as The London Theatre are discipline specific. The cost for these courses includes tuition, airfare, room, and other expenses. Financial aid is available and registration is in the early fall (contact Financial Aid).

As part of the Interim program, Lafayette offers a course focused on the international aspects of the engineering profession. The 2009 course was based in Scandinavia and the 2011 course in Egypt. Students enroll as part of the Interim course registration every Fall semester.

### *INTERNATIONAL STUDIES AND ENGINEERING*

Globalization of engineering and technology is increasing the number of attractive job opportunities in foreign countries for engineers with proficiency in a second language and an understanding of foreign cultures. This program enables highly capable and motivated students to earn a B.S. degree in chemical, civil, electrical and computer, or mechanical engineering, and an additional A.B. degree in International Studies in four years plus an additional summer. If interested, see Professor Van Gulick [vangulil@lafayette.edu](mailto:vangulil@lafayette.edu).

### *INTERNATIONAL EXPERIENCES FOR ENGINEERING STUDENTS*

Several Lafayette B.S. engineering students and many Engineering Studies students have taken advantage of Lafayette's semester-long study study-abroad programs (or off-campus programs) that are not led by Lafayette faculty. Students who wish to pursue these opportunities must work closely with their academic advisers to insure that the program will meet their degree requirements, and that they will remain on schedule for graduation. Locations that are popular for students include Italy, New Zealand, and Trinidad & Tobago though there are other options.

For more information, see the engineering division website at <http://engineering.lafayette.edu/international-programs-2/>.

*ADVISING POLICY FOR B.S. ENGINEERING STUDENTS PLANNING TO STUDY ABROAD SPRING SEMESTER SOPHOMORE YEAR*

*Last updated April 2011*

*[see <http://engineering.lafayette.edu/semester-study-abroad/> for the latest version]*

- All students planning on going abroad must meet with their adviser AND their Department Head in the spring (1<sup>st</sup> year) and fall (sophomore year) before they go abroad to review their course selections.
- For ABET accreditation, the B.S. Engineering curricula require that a student has a minimum of 9.5 credits of science and math courses combined, 14.25 credits of engineering courses, and a minimum of 38 total credits to graduate. Students must ensure that their academic plan will meet these requirements.
- For students studying at Bremen (Jacobs University) and Madrid (St. Louis University) faculty-led locations, all engineering courses and Math 264 will count as one Lafayette course credit; VaST courses offered abroad by Lafayette program directors will also count as one Lafayette course credit. However, St. Louis University is on a semester credit system so all other 3-semester hour courses will only count as 0.75 Lafayette course credits unless they include an extra semester hour for a laboratory.
- Students studying at Bremen are expected to take INDS German Culture and Civilization. This course counts as a Social Sciences course and can be used to satisfy the breadth requirement, but not the depth requirement.
- For questions about foreign language courses taken abroad, see the Assistant Head of Foreign Languages and Literatures, Professor Michelle Geoffrion-Vinci.
- For all faculty-led and affiliated semester abroad programs, the grades also transfer to Lafayette College. Non-affiliated programs are not permitted.
- See the following pages for typical schedules for students opting for the faculty-led semester abroad programs in either Bremen or Madrid.
- The affiliated programs that typically offer engineering courses are listed on this page. Advisers and Department Heads are strongly encouraged to go to the websites for these programs to determine the credits associated with each course (links to these programs are available at <http://studyabroad.lafayette.edu/programs/approved-semester-programs/>). All 3-semester hour courses will count as 0.75 Lafayette course credits unless they include an extra semester hour for a laboratory. A course with an extra semester hour for a laboratory will typically count as one Lafayette course. Similar ratios apply for 2-semester hour courses etc.
  - [Frontiers Abroad] in New Zealand – Universities of Auckland and Canterbury
  - [Gonzaga University] Engineering in Florence Italy – provisionally approved as an affiliated program for evaluation
  - [Pacific Lutheran University] Trinidad @ University of the West Indies

<i>Fall (at Lafayette College)</i>	<i>Spring at (Bremen or Madrid)</i>
<b>CEE<sup>22</sup></b>	
Math 263	Differential Equations
ES 226	VaST
CE 321	Strength of Materials (Solid Mechanics)
CE 271	Math/Science Elective
Social Science/Humanities Elective	Social Science/Humanities Elective
<b>ChE<sup>23</sup></b>	
Math 263	Differential Equations
Chem 221	VaST
ChE 211	Technical Elective
ChE 222	Social Science/Humanities Elective
ES Elective	Social Science/Humanities Elective
<b>ECE<sup>24</sup></b>	
Math 263	Social Science/Humanities Elective
Phys 132	Social Science/Humanities Elective
ECE 211	Electric Circuit Analysis (Intro. to Electrical and Computer Engineering)
CS 104, 105, 106	Discrete Structures (Discrete Mathematics) or a Math/Science elective
Social Science/Humanities Elective	Differential Equations
<b>ME</b>	
Math 263	Differential Equations
ES 226	VaST
Phys 133	Strength of Materials (Solid Mechanics)
Social Science/Humanities Elective	Hum/SS (Bremen) Dynamics (Madrid)
ME 210	Social Science/Humanities Elective

<sup>21</sup> Assumes that students can take Differential Equations, Strength of Materials, VAST, Electric Circuit Analysis, and Discrete Structures (Discrete Mathematics) in Bremen and Madrid.

<sup>22</sup> CEE students who go abroad spring of sophomore year will need to take CE 341 during the spring of junior year.

<sup>23</sup> ChE students must talk with their advisor to develop a plan for dealing with ChE 222, which is normally taken during the spring of sophomore year.

<sup>24</sup> ECE students must talk with their advisor to develop a plan for dealing with ECE 212 Digital Circuits II.

## OPPORTUNITIES FOR RESEARCH EXPERIENCE

### *INDEPENDENT STUDY*

A student may initiate an independent study project through discussions with a faculty member. Independent study projects are selected based on the background and interests of the student. An outline of the proposed work is submitted for approval by the department head and the faculty member who serves as adviser. A final paper presenting the results of the work is required. A presentation to students and faculty may also be required. The student receives one course credit for an independent study project. Work in these courses will be graded in the usual way.

### *HONORS*

Departmental honors are awarded for outstanding performance in writing a Senior Thesis. A sequence of two courses in the department is required. Students who hope to become candidates for departmental honors must register for the two courses beginning the first semester of their senior year, or, with the permission of the Academic Progress Committee, the second semester of their junior year. Their work in these courses will be supervised by a faculty member, and will be graded in the usual way. Candidates for honors must have and maintain cumulative (grade point) averages of 3.00 and averages of 3.20 in the honors department, and must fulfill such other requirements as may be established by the department (e.g., writing and presenting a progress report after the first semester).

### *EXCEL*

Lafayette's EXCEL Scholars Program enables selected students to participate in research projects with faculty members under their direct supervision. The purpose of the EXCEL Program is to enhance the learning opportunities for students, and to encourage collaboration in learning and research between faculty and students. The work of the student assistant, therefore, must be research-oriented and not clerical in its primary emphasis. EXCEL research assistantships are available to full-time students in all disciplines. EXCEL Scholars receive a stipend of \$8-10 per hour and may work part-time during the academic year (up to 10 hours per week), or full time during the summer (10 weeks) and the Interim Session (3 weeks). EXCEL Scholars receive College housing in the residence halls during the period they are working in the Interim and summer. To be eligible as an EXCEL Scholar, students must have completed their first year at Lafayette and should maintain an overall and major GPA of 3.25. Students who would like to be considered for the EXCEL Scholars Program must be nominated by the faculty mentor.



*RESEARCH EXPERIENCES FOR UNDERGRADUATES (REU)*

REU's are available at research institutions throughout the United States including a few at Lafayette. For further information concerning possible REU opportunities, students should speak to a professor in their field of interest, or visit the National Science Foundation web site, [www.nsf.gov](http://www.nsf.gov).

## YOUR FUTURE

For more information about internships, careers, and graduate school, please contact Career Services at 610-330-5115 to arrange a meeting with a counselor. You should meet with a counselor as early as your first year at Lafayette College, and then continue these meetings throughout your four years.

### *CAREERS*

Engineering students go on to a variety of different jobs when they graduate.

The following is just a partial list of possibilities!

- Industry (e.g., Merck, Air Products)
- Consulting (e.g., URS Greiner)
- Government (e.g. Environmental Protection Agency)
- Business
- Law
- Peace Corps

The best time to start thinking about jobs is NOW! Career Services offers a program called, *Gateway* that supports students with career development. Engineering majors are encouraged to become involved with *Gateway* during their first semester on campus. The program provides job shadowing opportunities with alumni, internships, networking events, special workshops, and a variety of other services. The best places to ask about jobs are:

- Your Gateway adviser's office
- Your academic adviser's office
- Career Services (201 Hogg Hall)
- At meetings of your professional society

### *INTERNSHIPS*

Internships are designed to focus on a special project with emphasis on learning the work related to a particular field. These experiences can be paid, volunteer, or for academic credit. Paid and unpaid internships are available during the summer months. Meet with your Gateway adviser to begin your summer internship search. Begin your search in October to secure a position for the following summer. Your Gateway adviser will show you how to search Job Vault for summer internships, alumni-sponsored internships, as well as how to apply to regional and national internship programs.

The Engineering Studies Program also offers internship courses for credit in the fall and/or spring semesters (EGRS 482). See Professor Sanford Bernhardt for more information [sanfordk@lafayette.edu](mailto:sanfordk@lafayette.edu) or 610-330-5584.

### *GRADUATE SCHOOLS*

Many students want to continue their engineering education beyond four years. These students are interested in developing specific fields of expertise within engineering, or in pursuing a career in academia. For students who are interested in doing research at the graduate level, there is usually funding available (research assistantships or teaching assistantships) to cover the cost of tuition, and a stipend for living expenses.

The best way to learn about graduate school opportunities is to:

- Talk with your academic adviser
- Visit Career Services (201 Hogg Hall)
- Attend brownbag presentations featuring current graduate students
- Browse web pages of the different graduate programs including the Petersen's Guide

# SOURCES FOR HELP

## *ACADEMIC HELP*

Academic Resource Center: ATTIC provides academic support services to all students. These services include the Tutoring Program (described above), and Study Skills Workshops. Workshops are scheduled on a regular basis with topics including time management, note taking, reading, and exam preparation skills. The office also acts as the liaison to the Athletic Department and provides services for special needs students.

Department Heads: DHs coordinate the courses and curriculum for each engineering program.

Director of the Engineering Division: The Director of the Engineering Division oversees the engineering facilities and coordinates aspects of the engineering curriculum that affect all engineering programs. The Office will sponsor various information sessions for first-year students throughout the year. Look out for these!!!

Office of the Dean of the College: The Dean of the College is responsible for the academic aspects of student life. She supervises counseling in all phases of academic work and provides for review and determination of the academic status of students. She has primary responsibility for faculty advising, major declaration, orientation programs, the Marquis Scholars Program, national fellowship competitions, and pre-professional advising.

Professors: Your professors will have posted office hours, and may also offer help sessions throughout the semester to give students assistance with assignments.

Registrar: The Office of the Registrar keeps records of the scholastic work and standing of students. The Registrar's office prepares course and hour schedules, and conducts registration and scheduling of students.

Supplemental Instruction (SI): SI is an internationally known academic assistance program that utilizes peer-assisted study sessions. SI sessions are regularly-scheduled, informal review sessions in which students compare notes, discuss readings, develop organizational tools, and predict test items. Students learn how to integrate course content and study skills while working together. The sessions are facilitated by "SI leaders", students who have previously done well in the course and who attend all class lectures, take notes, and act as model students. SI is available for many of the first year courses.

Tutors: Tutors are students recommended by faculty who are hired and trained to assist students with courses offered at the College. Tutors meet with their students one-on-one or in group sessions on a regular basis throughout the semester. Students may sign up for a tutor online at: <http://attic.lafayette.edu/peer-tutoring-programfor-active-attic-tutors/how-to-request-a-tutor/>. Tutors and students set up the tutoring schedule at their convenience. Additional information is available by contacting the Academic Tutoring and Training Information Center (ATTIC), 300 Scott Hall, (610) 330-5098.

## *NON-ACADEMIC HELP*

Career Services: Engineering majors are encouraged to participate in the *Gateway* program offered through Career Services. Counselors work with students individually as well as offer workshops and programs focusing on a range of career related topics. Students can explore engineering careers, outside of the classroom, through externships and internships. A variety of employers seeking to hire engineering students for both internship and full-time positions participate in our on-campus recruiting program.

Counseling Services: The Counseling Center is staffed by counseling psychologists who provide Lafayette students with individual and group counseling for personal and academic concerns. Consultation with one of the counselors is available by appointment. The confidentiality of the counselor-client relationship is strictly observed.

Director of Health Services: While school is in session, a registered nurse is on duty at the Health Center from 8 a.m. to 8 p.m. on weekdays, and from 10 a.m. to 6 p.m. on weekends. General clinic hours for physicians are on weekdays from 9:30 to 11:30 a.m. and from 2:30 to 4:30 p.m. Scheduled appointments are available at other times.

Office of the Chaplain: The Chaplains (Chaplain of the College, Catholic Chaplain, and Jewish Chaplain) coordinate the religious activity programs of the College. They may be contacted for religious, moral, family, personal, and emotional support, problems and questions. Such consultations are confidential.

Office of the Dean of Students: The Dean of Students is responsible for: residence life, intramural and intercollegiate athletics, other extracurricular activities and religious programs, all non-academic aspects of student life, and health services, cultural programs student conduct and discipline, and student volunteer programs.

Resident Advisers: The RA is there to help students achieve their academic goals and to derive maximum benefits from group living. In addition to student RAs, faculty residents live in several of the residence halls.

*USEFUL PEOPLE AND CONTACT INFORMATION*

	<b>Title</b>	<b>Name</b>	<b>Location</b>	<b>Phone</b>	<b>e-mail</b>
<b>Administration</b>	Interim Director of the Engineering Division	James Schaffer	303	5404	schaffej
	Coordinator	Lisa Karam	308	5403	karaml
<b>Heads of Engineering Programs</b>	Civil & Environmental Engineering	Art Kney	318	5439	kneya
	Chemical Engineering	James Ferri	262	5820	ferrij
	Electrical & Computer Engineering	John Nestor	414	5414	nestorj
	Mechanical Engineering	Scott Hummel	256	5587	hummels
	Engineering Studies	Kristen Sanford Bernhardt	310	5584	sanfordk
<b>Department Secretaries</b>	Civil & Environmental Engineering	Lisa Pezzino	319	5437	pezzinol
	Chemical Engineering	Serena Ashmore	230	5435	ashmores
	Electrical & Computer Engineering	Nicolette Stavrovsky	406	5428	stavrovn
	Mechanical Engineering	Serena Ashmore	230	5435	ashmores
	Engineering Studies	Lisa Pezzino	319	5437	pezzinol
<b>Advisers for Student Groups</b>	ASCE	Steve Kurtz	321	5441	kurtzs
	AIChE	Michael Senra	520	5130	senram
	ASME	Rich Merz	258	5451	merzr
	EWB	Josh Smith	241	5938	smithjh
	EWH	Yih-Choung Yu	415	5407	yuy
	IEEE	Yih-Choung Yu	415	5407	yuy
	Leonardo Society	David Veshosky	304	5424	veshoskd
	Tau Beta Pi	Becky Rosenbauer	223A	5400	rosenbau
	SEES	John Greenleaf	324	5896	greenlje
	GB	David Veshosky	304	5424	veshoskd
	SWE	Kristen Sanford Bernhardt	320	5584	sanfordk
MSE	Javad Tavokoli	229	5433	tavakoli	
<b>Dean of Students</b>		Annette Diorio	101 Hogg Hall	5082	diorioa
<b>Dean of the College</b>		Hannah Stewart-Gambino	Scott Hall	5080	stewarth
<b>Counseling Center</b>			Bailey Health Center	5005	
<b>Career Services</b>			201 Hogg Hall	5115	

## *TIME MANAGEMENT SUGGESTIONS*

Whether you were an efficient worker, or practicing procrastinator in high school, good time management is a key element to a successful college career. Even if you were efficient in high school, college can be overwhelming - there seems to be so much extra time! Since most classes don't meet on a daily basis, it's easy to think your economics reading assignment can wait until later while you play a game of ultimate Frisbee instead. But, beware: if this keeps up, by the time your midterm rolls along, you'll have hundreds of pages of reading to catch up on. The following tips will help you minimize your stress level, and maximize your time for college fun.

### *10 Tips for Managing Your Time*

Taken from (<http://counselingcenter.lafayette.edu/resources/promoting-healthy-behaviors/time-management/>)

- Create a “Semester Calendar” outlining your academic assignments & other events
- Create a daily “To Do” list making sure you...
  - Set priorities & distinguish between what you “must do”, “should do” & “could do”
  - Break large tasks into manageable chunks
- Use your “waiting time” between classes, appointments & other activities
- Address issues with over-scheduling – Learn to say “no”
- Be aware of procrastination & distractibility – Monitor the time you spend emailing, IMing, talking on the phone...
- Become aware of your body’s rhythm & work with it
- Study difficult & boring tasks first when you’re less fatigued
- Take study breaks to keep from becoming bored or distracted – But make sure breaks remain short (e.g. 5 mins)



## *STUDY SKILLS*

Taken from:

([http://campushealth.unc.edu/index.php?option=com\\_content&task=view&id=470&Itemid=65](http://campushealth.unc.edu/index.php?option=com_content&task=view&id=470&Itemid=65))

### **1. "I Don't Know Where To Begin"**

Take Control. Make a list of all the things you have to do. Break your workload down into manageable chunks. Prioritize! Schedule your time realistically. Don't skip classes near an exam - you may miss a review session. Use that hour in between classes to review notes. Interrupt study time with planned study breaks. Begin studying early, with an hour or two per day, and slowly build as the exam approaches.

### **2. "I've Got So Much To Study . . . And So Little Time"**

Preview. Survey your syllabus, reading material, and notes. Identify the most important topics emphasized, and areas still not understood. Previewing saves time, especially with non-fiction reading, by helping you organize and focus in on the main topics. Adapt this method to your own style and study material, but remember, previewing is not an effective substitute for reading.

### **3. "This Stuff Is So Dry, I Can't Even Stay Awake Reading It"**

Attack! Get actively involved with the text as you read. Ask yourself, "What is important to remember about this section?" Take notes or underline key concepts. Discuss the material with others in your class. Study together. Stay on the offensive, especially with material that you don't find interesting, rather than reading passively and missing important points.

### **4. "I Read It. I Understand It. But I Just Can't Get It To Sink In"**

Elaborate. We remember best the things that are most meaningful to us. As you are reading, try to elaborate upon new information with your own examples. Try to integrate what you're studying with what you already know. You will be able to remember new material better if you can link it to something that's already meaningful to you. Some techniques include:

Chunking. An effective way to simplify and make information more meaningful. For example, suppose you wanted to remember the colors in the visible spectrum (Red, Orange, Yellow, Green, Blue, Indigo, Violet); you would have to memorize seven "chunks" of information in order. But if you take the first letter of each color, you can spell the name "Roy G. Biv", and reduce the information to three "chunks".

Mnemonics. Any memory-assisting technique that helps us to associate new information with something familiar. For example, to remember a formula or equation, we may use letters of the alphabet to represent certain numbers. Then we can change an abstract formula into a more meaningful word or phrase, so we'll be able to remember it better. Sound-alike associations can be very effective, too, especially while trying to learn a new language. The key is to create your own links, then you won't forget them.

## **5. "I Guess I Understand It"**

Test yourself. Make up questions about key sections in notes or reading. Keep in mind what the professor has stressed in the course. Examine the relationships between concepts and sections. Often, simply by changing section headings you can generate many effective questions. For example, a section entitled "Bystander Apathy" might be changed into questions such as: "What is bystander apathy?", "What are the causes of bystander apathy?", and "What are some examples of bystander apathy?"

## **6. "There's Too Much To Remember"**

Organize. Information is recalled better if it is represented in an organized framework that will make retrieval more systematic. There are many techniques that can help you organize new information, including:

- Write chapter outlines or summaries; emphasize relationships between sections.
- Group information into categories or hierarchies, where possible.

Information Mapping. Draw up a matrix to organize and interrelate material. For example, if you were trying to understand the causes of World War I, you could make a chart listing all the major countries involved across the top, and then list the important issues and events down the side. Next, in the boxes in between, you could describe the impact each issue had on each country to help you understand these complex historical developments.

## **7. "I Knew It A Minute Ago"**

Review. After reading a section, try to recall the information contained in it. Try answering the questions you made up for that section. If you cannot recall enough, re-read portions you had trouble remembering. The more time you spend studying, the more you tend to recall. Even after the point where information can be perfectly recalled, further study makes the material less likely to be forgotten entirely. In other words, you can't overstudy. However, how you organize and integrate new information is still more important than how much time you spend studying.

## **8. "But I Like To Study In Bed"**

Context. Recall is better when study context (physical location, as well as mental, emotional, and physical state) are similar to the test context. The greater the similarity between the study setting and the test setting, the greater the likelihood that material studied will be recalled during the test.

## **9. "Cramming Before A Test Helps Keep It Fresh In My Mind"**

Spacing. Start studying now. Keep studying as you go along. Begin with an hour or two a day about one week before the exam, and then increase study time as the exam approaches. Recall increases as study time gets spread out over time.

## **10. "I'm Gonna Stay Up All Night 'til I Get This"**

Avoid Mental Exhaustion. Take short breaks often when studying. Before a test, have a rested mind. When you take a study break, and just before you go to sleep at night, don't think about academics. Relax and unwind, mentally and physically. Otherwise, your break won't refresh you and you'll find yourself lying awake at night. It's more important than ever to take care of yourself before an exam! Eat well, sleep, and get enough exercise.

## DIVERSITY AND INCLUSIVENESS STATEMENT

Lafayette College is committed to creating a diverse community: one that is inclusive and responsive, and is supportive of each and all of its faculty, students, and staff. The College seeks to promote diversity in its many manifestations. These include but are not limited to race, ethnicity, socioeconomic status, gender, identity, sexual orientation, religion, disability, and place of origin.

The College recognizes that we live in an increasingly interconnected, globalized world and that students benefit from learning in educational and social contexts, in which there are participants from all manner of backgrounds. The goal is to encourage students to consider diverse experiences and perspectives throughout their lives. All members of the College community share a responsibility for creating, maintaining, and developing a learning environment in which difference is valued, equity is sought, and inclusiveness is practiced.

It is a mission of the College to advance diversity as defined above. The College will continue to assess its progress in a timely manner in order to ensure that its diversity initiatives are effective.