

## **BIOLOGY AND THEMATIC ELECTIVE COURSES FOR THE CSE/EE CLASSES OF 2007 AND BEYOND**

### **BIOLOGICAL SCIENCE COURSE REQUIREMENT**

Beginning with the Class of 2007, every CSE or EE student **must** take either BIOL 100 (offered every Fall) or BIOL 102 (offered every Spring).

- Either course will fulfill the General Education Biological Science (BS) requirement.
- Students who would like to have the option of pursuing more advanced coursework in Biology should take BIOL 100, normally followed by BIOL 101 as the Spring semester Thematic Elective.
- BIOL 102 is a condensed version of the material in BIOL 100-101 and is the appropriate choice for students who do not plan to pursue further studies in Biology.
- Examples of how the choice of a Biological Science elective fits with thematic electives are given on pp. 3-7.

### **THEMATIC ELECTIVES**

Thematic electives are intended to allow depth of study in a field of the sciences, mathematics or engineering management that is relevant to the student's career objectives and interests.

- The tracks for thematic elective sequences consist of at least three, and up to four, courses from one of the following fields:
  1. Biology/Biochemistry
  2. Chemistry
  3. Physics
  4. General Science (courses from Biology, Chemistry and Physics)
  5. Mathematics or Physics/Mathematics
  6. Engineering Management.
- At least one course in any thematic elective sequence must be at the 200-level or above.
- AP credit cannot be applied toward thematic elective requirements.
- The set of courses from which electives for each track can be drawn is given on p. 2, and examples of possible choices for the Biological Science and thematic electives are given on pp. 3-7.

### **Thematic Elective Course Lists (as of April 2004)**

((\*) denotes a course that typically can be taken by EE or CSE Sophomores in the Fall)

#### **Biology, Biochemistry**

BIOL 101 (Intro. Biology II)	BIOCHM 420 (Elem. Biochem.)
BIOL 280 (Evolution)	BIOL 521 (Comparative Anatomy)
BIOL 283 (Genetics)	BIOL 523 (Histology)
BIOL 285 (Cellular and Molecular Biology)	BIOL 559 (Cell. & Molec. Biol. II)
BIOL 287 (Intro. Ecology)	BIOL 567 (Comparative Physiology)
BIOL 297A (Intro. Physiology)	BIOL 572 (Neurobiology)
BIOL 397 (Gene and Genome)	BIOL 580 (Developmental Biology)

#### **Chemistry**

CHEM 111 (General Chemistry I) (*)	CHEM 250 (Organic Chemistry)
CHEM 112 (General Chemistry II)	CHEM 261 (Organic Chem. I)
CHEM 241 (Intro. Inorganic Chem.)	CHEM 262 (Organic Chem. II)

#### **Physics**

PHYS 284 (Modern Physics) (*)	PHYS 530 (Radiation Physics)
PHYS 423 (Statistical Physics and Thermo.)	PHYS 553 (Optics)
PHYS 424 (Modern Physics II)	PHYS 558 (Solid State Physics)

#### **Mathematics**

Math 233 (Multivar. Calc.) (CSE only) (*)	MATH 455 (Discrete Math) (EE only)
MATH 300 (Fund. Concepts Math) (*)	MATH 471 (Number Theory)
MATH 411 (or 511) (Modern Alg. I)	MATH 523 (Intro. Modern Analysis)
MATH 412 (or 512) (Modern Alg. II)	MATH 532 (Topics in ODEs)
MATH 421 (Complex Variables)	MATH 534 (Intro. PDEs)
MATH 425 (Adv. Multivar. Calc.)	MATH 545 (Lin. Alg. Appl. Math)
	MATH 551 (Intro. Scientific Comput.)

#### **Engineering Management**

ACCTG 221 (Financial Accounting) (*)	MKTG 301 (Fund. Marketing)
MGMT 301 (Prin. of Management)	SOM 593 (Design of Experiments)
FIN 301 (Corporation Finance)	MGMT 597 (Tech. Mgmt. Seminar)

## EXAMPLES OF BIOLOGY/THEMATIC ELECTIVE COURSE SEQUENCES

*(Note: These are just examples – in each track there are more possible sequences than those listed.)*

### I. For students interested in Biology:

<b>2<sup>nd</sup> Year Courses</b>	BIOL 100 (Intro. Biol. I)  Biological Science Elective	BIOL 101 (Intro. Biol. II) (Prereq: BIOL 100)  Thematic Elective 1
<b>3<sup>rd</sup> Year Courses</b>		BIOL 297A (Intro. Physiology) (Prereq: C or better in BIOL 100 and 101)  Thematic Elective 2
<b>4<sup>th</sup> Year Courses</b>	BIOL 521 (Compar. Anatomy) (Prereq: BIOL 100 and 101)  Thematic Elective 3	BIOL 567 (Compar. Physiology) (Prereq: C or better in BIOL 100 and 101)  Thematic Elective 4 (optional)

<b>2<sup>nd</sup> Year Courses</b>	BIOL 100 (Intro Biol. I)  Biological Science Elective	BIOL 101 (Intro. Biol. II) (Prereq: BIOL 100)  Thematic Elective 1
<b>3<sup>rd</sup> Year Courses</b>		BIOL 280 (Evolution) (Prereq: C or better in BIOL 100 and 101)  Thematic Elective 2
<b>4<sup>th</sup> Year Courses</b>	BIOL 287 (Intro. Ecology) (Prereq: C or better in BIOL 100 and 101)  Thematic Elective 3	BIOL 523 (Histology) (Prereq: BIOL 100 and 101)  Thematic Elective 4 (optional)

### (For students having AP credit for CHEM 111)

<b>2<sup>nd</sup> Year Courses</b>	BIOL 100 (Intro. Biol. I)  Biological Science Elective	BIOL 101 (Intro. Biol. II) (Prereq: BIOL 100)  Thematic Elective 1
<b>3<sup>rd</sup> Year Courses</b>		CHEM 112 (General Chem. II) (Prereq: CHEM 111)  Thematic Elective 2
<b>4<sup>th</sup> Year Courses</b>	BIOL 285 (Cell. And Molec. Biol.) (Prereq: C or better in BIOL 100 and 101; CHEM 111 and 112) Thematic Elective 3	BIOL 397 (Gene and Genome) (Prereq: BIOL 285)  Thematic Elective 4 (optional)

*(Note: It is possible to meet most or all of the requirements for a Minor in Biology through the choice of thematic electives. See the Biology Department web site for details on the Biology Minor.)*

## II. For students interested in Chemistry or Biochemistry:

<b>2<sup>nd</sup> Year Courses</b>	BIOL 100 (Intro Biol. I)  Biological Science Elective	BIOL 101 (Intro. Biol. II) (Prereq: BIOL 100)  Thematic Elective 1
<b>3<sup>rd</sup> Year Courses</b>		CHEM 111 (General Chem. I.)  Thematic Elective 2
<b>4<sup>th</sup> Year Courses</b>	CHEM 112 (General Chem. II) (Prereq: CHEM 111)  Thematic Elective 3	BIOCHM 285 (Cell. and Molec. Biol.) (Prereq: C or better in BIOL 100 and 101; Chem 111 and 112) Thematic Elective 4

(Note: In this case, the 4<sup>th</sup> thematic elective is required since it is the only course above the 100-level.)

<b>2<sup>nd</sup> Year Courses</b>	CHEM 111 (General Chem. I)  Thematic Elective 1	BIOL 102 (Intro. Animal Biology)  Biological Science Elective
<b>3<sup>rd</sup> Year Courses</b>		CHEM 250 (Organic Chem.) (Prereq: CHEM 111)  Thematic Elective 2
<b>4<sup>th</sup> Year Courses</b>	BIOCHM 420 (Elementary Biochem.) (Prereq: Organic Chemistry)  Thematic Elective 3	BIOL 523 (Histology) (Prereq: BIOL 102)  Thematic Elective 4 (optional)

<b>2<sup>nd</sup> Year Courses</b>	CHEM 111 (General Chem. I)  Thematic Elective 1	BIOL 102 (Intro. Animal Biology)  Biological Science Elective
<b>3<sup>rd</sup> Year Courses</b>		CHEM 112 (General Chem. II) (Prereq: CHEM 111)  Thematic Elective 2
<b>4<sup>th</sup> Year Courses</b>	CHEM 261 (Organic Chem. I) (Prereq: CHEM 112)  Thematic Elective 3	CHEM 262 (Organic Chem. II) (Prereq: CHEM 261)  Thematic Elective 4 (optional)

(Note: This selection of courses meets medical school admission requirements for organic chemistry.)

(Note: It is possible to meet most or all of the requirements for a Minor in Chemistry through the choice of thematic electives. See the Chemistry Department web site for details on the Chemistry Minor.)

### III. For students interested in Physics:

<b>2<sup>nd</sup> Year Courses</b>	PHYS 284 (Modern Physics) (Prereq: PHYS 151, 153)  Thematic Elective 1	BIOL 102 (Intro. Animal Biology)  Biological Science Elective
<b>3rd Year Courses</b>		PHYS 423 (Stat. Phys. & Thermo.) (Prereq: PHYS 284, MATH 233)  Thematic Elective 2
<b>4<sup>th</sup> Year Courses</b>	PHYS 424 (Modern Physics II) (Prereq: PHYS 284)  Thematic Elective 3	PHYS 558 (Solid State Physics) (Prereq: PHYS 423, 424)  Thematic Elective 4 (optional)

(Note: It is possible to meet most or all of the requirements for a Minor in Physics through the choice of thematic electives. See the Physics Department web site for details on the Physics Minor.)

### IV. For students interested in General Science:

<b>2<sup>nd</sup> Year Courses</b>	CHEM 111 (General Chem.1)  Thematic Elective 1	BIOL 102 (Intro. Animal Biology)  Biological Science Elective
<b>3rd Year Courses</b>		CHEM 112 (General Chem. II) (Prereq: CHEM 111)  Thematic Elective 2
<b>4<sup>th</sup> Year Courses</b>	PHYS 284 (Modern Physics) (Prereq: PHYS 151, 153)  Thematic Elective 3	PHYS 424 (Modern Physics II) (Prereq: PHYS 284)  Thematic Elective 4 (optional)

<b>2<sup>nd</sup> Year Courses</b>	CHEM 111 (General Chem.1)  Thematic Elective 1	BIOL 102 (Intro. Animal Biology)  Biological Science Elective
<b>3rd Year Courses</b>	CHEM 250 (Organic Chem.) (Prereq: CHEM 111)  Thematic Elective 2	
<b>4<sup>th</sup> Year Courses</b>	PHYS 284 (Modern Physics) (Prereq: PHYS 151, 153)  Thematic Elective 3	BIOL 523 (Histology) (Prereq: BIOL 102)  Thematic Elective 4 (optional)

**V. For students interested in Mathematics:**

<b>2<sup>nd</sup> Year Courses</b>	MATH 300 (Fund. Concepts of Math) (Prereq: MATH 132 or 136)  Thematic Elective 1	BIOL 102 (Intro. Animal Biology)  Biological Science Elective
<b>3<sup>rd</sup> Year Courses</b>		MATH 456 (Math. Modeling) (Prereq: MATH 235)  Thematic Elective 2
<b>4<sup>th</sup> Year Courses</b>	MATH 471 (Number Theory) (Prereq: MATH 235)  Thematic Elective 3	MATH 545 (Lin. Alg. Appl. Math.) (Prereq: MATH 235)  Thematic Elective 4 (optional)

**(Example appropriate for CSEs)**

<b>2<sup>nd</sup> Year Courses</b>	MATH 233 (Multivar. Calc.) (Prereq: MATH 132 or 136)  Thematic Elective 1	BIOL 102 (Intro. Animal Biology)  Biological Science Elective
<b>3<sup>rd</sup> Year Courses</b>		MATH 300 (Fund. Concepts of Math.) (Prereq: MATH 132 or 136)  Thematic Elective 2
<b>4<sup>th</sup> Year Courses</b>	MATH 551 (Intro. Scientific Comput.) (Prereq: MATH 233, 235)  Thematic Elective 3	MATH 456 (Math. Modeling) (Prereq: MATH 235)  Thematic Elective 4 (optional)

**(Example appropriate for EEs)**

<b>2<sup>nd</sup> Year Courses</b>	MATH 300 (Fund. Concepts of Math.) (Prereq: MATH 132 or 136)  Thematic Elective 1	BIOL 102 (Intro. Animal Biology)  Biological Science Elective
<b>3<sup>rd</sup> Year Courses</b>		MATH 425 (Adv. Multivar. Calc.) (Prereq: MATH 233, 235)  Thematic Elective 2
<b>4<sup>th</sup> Year Courses</b>	MATH 523 (Intro. Modern Analysis) (Prereq: MATH 233, 235)  Thematic Elective 3	MATH 545 (Lin. Alg. Appl. Math.) (Prereq: MATH 235)  Thematic Elective 4 (optional)

(Note: It is possible to meet most or all of the requirements for a Minor in Mathematics through the choice of thematic electives. See the Math Department web site for details on the Mathematics Minor.)

**For students interested in combining Physics and Mathematics:**

<b>2<sup>nd</sup> Year Courses</b>	PHYS 284 (Modern Physics) (Prereq: PHYS 151, 153)  Thematic Elective 1	BIOL 102 (Intro. Animal Biology)  Biological Science Elective
<b>3<sup>rd</sup> Year Courses</b>		MATH 425 (Adv. Multivar. Calc.) (Prereq: MATH 233, 235)  Thematic Elective 2
<b>4<sup>th</sup> Year Courses</b>	PHYS 424 (Modern Physics II) (Prereq: PHYS 284)  Thematic Elective 3	MATH 551 (Intro. Scientific Comput. ) (Prereq: MATH 233, 235)  Thematic Elective 4 (optional)

**VI. For students interested in Engineering Management:**

<b>2<sup>nd</sup> Year Courses</b>	ACCTG 221 (Financial Accounting))  Thematic Elective 1	FIN 301 (Corporation Finance) (Prereq: ACCTG 221)  Thematic Elective 2
<b>3<sup>rd</sup> Year Courses</b>		MGMT 301 (Prin. of Management) (Prereq: Junior standing)  Thematic Elective 3
<b>4<sup>th</sup> Year Courses</b>	MKTG 301 (Fund. Of Marketing ) (Prereq: ECON 103, 104)  Thematic Elective 4 (optional)	BIOL 102 (Intro. Animal Biology)  Biological Science Elective

(Note: Students interested in Engineering Management should take ECON 103 and ECON 104 as part of their Social World electives.)

(Note: It is possible to meet most of the requirements for an Engineering Management Minor through the choice of thematic electives. Completion of the Minor also requires the course MGMT/ENGIN 597, Technology Management Seminar, after completion of ACCTG 221, FIN 301, MGMT 301 and MKTG 301. See Dean Rivera for more details about the Engineering Management Minor.)