To be adopted:

Proposed Changes to the B.S. Degree in Biological Sciences

**PRESENT:**

**Biological Sciences**

**Biology Track**

1. Upper-division requirements [at least 36 units from the following, including two courses with laboratory or field component (indicated by *)]

   Note: Completion of BIOL 174 will be used to satisfy one requirement, either 1.b) or 1.c).

   a) Cell/Molecular (minimum of one course from each category)

   (1) BCH 100 or both BCH 110A and BCH 110B

   (2) BIOL 102 or BIOL 115

   (3) BIOL 107A or BCH 110C, CBNS 101 or BIOL 113 or BIOL 114, BIOL 128/CBNS 128, BPSC 155/BIOL 155

   b) Functional Biology of Organisms (minimum of two courses with lecture component)


   c) Ecology/Evolution/Systematics/Behavior (minimum of two courses with lecture component)

   BIOL 185/BPSC 185, BIOL 105, BIOL 105, BIOL 112/BPSC 112/ENTM 112

**PROPOSED:**

**Biological Sciences**

**Biology Track**

1. [no change]

   Note: Courses listed in more than one category may be used to satisfy only one requirement.

   a) [no change]

   (1) [no change]

   (2) [no change]

   (3) BIOL 107A or BCH 110C, CBNS 101 or BIOL 113 or BIOL 114, BIOL 119, BIOL 128/CBNS 128, BIOL 155/BPSC 155

   b) [no change]

   c) Ecology/Evolution/Systematics/Behavior (minimum of two courses with lecture component)


d) Additional Elective Courses
BIOL 107B, BIOL 109*, BIOL 110, BIOL 168, BIOL 185 (E-Z), BIOL 191, ENTX 150/CBNS 150

2. Statistics/Computer Science requirement (two courses)
CS 010, CS 012, CS 014, CS 061, CS 120A/EE 120A, CS 143/EE 143, STAT 100A, STAT 100B, STAT 120A, STAT 120B

Cell, Molecular, and Developmental Biology Track
1. Upper-division requirements [must include at least one laboratory course (indicated by *) from either category 1.b) or 2.]
   a) Required courses (20-24 units)
      (1) BCH 110A and BCH 110B (recommended) or BCH 100
      (2) BIOL 102, BIOL 107A, CBNS 101, CBNS 108
   b) Additional requirements (a minimum of 20 units from the following list)
      Note Credit is awarded for only one of BIOL 109 or BPSC 153/BCH 153/Biol 153.
      (1) Cell Biology: BIOL 109*, BIOL 113, BIOL 114, BPSC 135, CBNS 116, CBNS 120/PSYC 120
      (3) Developmental Biology: BIOL 168, CBNS 169
   d) Additional Elective Courses
      BIOL 107B, BIOL 109*, BIOL 110, BIOL 168, BIOL 185 (E-Z), BIOL 191, ENTX 150/CBNS 150

2. Statistics/Computer Science requirement (two courses)
CS 010, CS 011/MATH 011, CS 012, CS 014, CS 020, CS 021, CS 061, CS 120A/EE 120A, CS 143/EE 143, STAT 100A, STAT 100B, STAT 120A, STAT 120B

Cell, Molecular, and Developmental Biology Track
1. [no change]
   a) [no change]

   b) Additional requirements (a minimum of 20 units from the following list)
      Note Credit is awarded for only one of BIOL 109 or BCH 153/BIOL 153/BPSC 153.
      (1) [no change]

      (2) Molecular Biology: BCH 153/BIOL 153/BPSC 153*, BCH 185/BPSC 185, BIOL 107B, BIOL 115, BIOL 155/BPSC 155
      (3) [no change]

2. Additional courses from the following to bring total units to 52.
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Conservation Biology Track
1. Additional lower-division requirements
   a) ENSC 006/ECON 006. This course also satisfies a portion of the breadth requirements in Social Sciences.
   b) GEO 002
2. Upper-division requirements [at least 36 units from the following, including two courses with laboratory or field component (indicated by *)]
   a) BIOL 102
   b) BCH 100 or BCH 110A
   c) STAT 100A or STAT 120A
   d) Breadth Electives (a minimum of one course from each of the following areas)
      (1) Evolution and Systematics: BIOL 105, BIOL 108, ENTM 112/BIO 112/BPSC 112, GEO 151*
      (3) Biological Diversity: BIOL 151*, BIOL 161A*, BIOL 163*, BPSC 104/BIO 104*, ENTM 100/BIO 100*, ENTM 109*, ENTM 114* (may be applied either to Biological Diversity or to Applications), PLPA 134/BIO 134, PLPA 134L/BIO 134L*
      (4) Biogeography and the Physical Environment: ENSC 100/SWSC 100*, GEO 152*, GEO 153, GEO 161*, GEO 162*, GEO 168*, GEO 169*
      (5) Applications: ANTH 134, ANTH 170/BPSC 170, BIOL 164A*, BIOL 164B*, BIOL 164C*, BIOL 164D*

   Conservation Biology Track
1. [no change]
   a) ECON 006/ENSC 006. This course also satisfies a portion of the breadth requirements in Social Sciences.
   b) [no change]
2. [no change]
   a) [no change]
   b) [no change]
   c) [no change]
   d) [no change]

   (1) Evolution and Systematics: BIOL 105, BIOL 108, BIOL 112/BPSC 112/ENTM 112, GEO 151*
   (2) [no change]

   (3) Biological Diversity: BIOL 100/ENTM 100*, BIOL 104/BPSC 104*, BIOL 134/LPLA 134, BIOL 134L/LPLA 134L*, BIOL 151*, BIOL 161A*, BIOL 163*, ENTM 109*, ENTM 114* (may be applied either to Biological Diversity or to Applications)
   (4) [no change]

   (5) Applications: ANTH 134, ANTH 170/BPSC 170, BIOL 164A*, BIOL 164B*, BIOL 164C*, BIOL 164D*
Entomology Track
1. Upper-division required courses (33 units)
   a) BCH 100
   b) BIOL 102, BIOL 151
   c) BPSC 104/BIOL 104
   d) ENTM 100/BIOL 100, ENTM 112/BIOL 112/ENTM 127/BIOL 127, ENTM 173/ENTM 173
2. Additional upper-division requirements (at least 6 units from the following)
   ENTM 109, ENTM 114, ENTM 124, ENTM 126, ENTM 126L, ENTM 128, ENTM 129, ENTM 129L, ENTM 132, ENTM 133, ENTM 162/BIOL 162, ENTM 190, ENTM 197 (no more than three units of ENTM 190 and ENTM 197 (in combination) may be taken toward fulfilling this requirement)
3. Related areas (at least 7 units from the following)
   a) Agriculture: BPSC 143/BIOL 143, BPSC 150, BPSC 158, BPSC 166, ENSC 100/SWSC 100, NEM 120/ENSC 120/SWSC 120, NEM 159/BIOL 159, PLPA 134/BIOL 120/MCBL 120, PLPA 134/BIOL 134, PLPA 134L/BIOL 134L
   c) Cell, Molecular, and Organismal Biology: BIOL 107A, BIOL 107B, BIOL 109, BIOL 113, BIOL 114, BIOL 121/MCBL 121, BIOL 121L/MCBL 121L, BIOL 124/MCBL 124, BIOL 174, BIOL 175, BIO 175L, BIOL 178, CBNS 101

Environmental Toxicology
1. [no change]
1. Upper-division required courses (40-44 units)
   a) BCH 100 or both BCH 110A and BCH 110B
   b) BIOL 102, BIOL 107A or BCH 110C, CBNS 101 or BIOL 113 or BIOL 114, BIOL 116
   c) ENSC 101 or ENSC 136/ENTX 136/CHM 136, ENSC 102
   d) ENTX 101, ENTX 150/CBNS 150, ENTX 154
2. Additional upper-division requirements
   (four courses from the following, with at least one from Chemical Fate and one from Health/Ecology)
   a) Chemical Fate: CHEM 005, CHEM 109, CHEM 125, CHEM 150A, CHEM 150B, ENSC 100/SWSC 100, ENSC 127/SWSC 127, ENSC 135/CHM 135/ENTX 135, ENSC 140/SWSC 140, ENSC 141/MCBL 141/SWSC 141, ENSC 142, ENSC 144/ENVE 144, ENSC 155, ENSC 163, ENSC 172, ENSC 174, ENSC 176/SWSC 176, SWSC 104/ENSC 104, SWSC 107/ENSC 107

Evolution and Ecology Track
1. Upper-division requirements [at least 36 units from the following, including one course with laboratory or field component (indicated by *)]
   a) Required courses
      (1) BCH 100
      (2) BIOL 102
   b) Additional requirements (at least one course from each of the following areas)
      a) [no change]
      b) [no change]
      c) ENSC 101 or CHEM 136/ENSC 136/ENTX 136, ENSC 102
      d) CBNS 150/ENTX 150, ENTX 101, ENTX 154
   2. [no change]
course from each of the following areas)
(1) Biological Diversity: BIOL 151*, BIOL 157*, ENTM 100/BIOl 100*, ENTM 114*, PLPA 134/BIOL 134, PLPA 134L/BIOl 134L*

2. Statistics requirement (minimum of one course): STAT 100A, STAT 100B, STAT 120A, STAT 120B
3. Additional courses in biological sciences (upper division) and related areas from the approved list to bring total units to 52.

Medical Biology Track
1. Upper-division requirements [at least 52 units from the following, including two courses with laboratory or field component (indicated by *)]
   a) Cell/Molecular
      (1) Required courses (15-20 units)
          BCH 100 or both BCH 110A and BCH 110B
          BIOl 102 or BIOl 115
          CBNS 101 or BIOl 113 or BIOl 114
          BIOl 107A or BCH 110C
      (2) Elective options: BCH 102*, BCH 110B, BCH 110C, BIOl 107B, BIOl 109*, BPSC 155/BIOl 155
   b) Physiology/Anatomy (minimum of two courses with lecture component): BCH 120, BIOl 161A*, BIOl 161B*, BIOl 171*, BIOl 174, BIOl 175, BIOl 175L*, BIOl 178
   c) Neuroscience/Pharmacology (minimum of one course with lecture component): CBNS 106, CBNS 116, CBNS 120/PSYC 120, CBNS 120L/PSYC 120L*, CBNS 124/PSYC 124, CBNS 124L/PSYC 124L*


2. [no change]
3. [no change]
CBNS 106, CBNS 116, CBNS 120/PSYC 124, CBNS 127/PSYC 127, ENTX 101, PSYC 125/CBNS 126, PSYC 127/CBNS 126

d) Pathogenesis (minimum of two courses with lecture component)
   (1) Required course: MCBL 121/BIOL 121
   (2) Elective options: BIOL 157*, CBNS 150/ENTX 150, ENTM 126, ENTM 126L*, MCBL 121L/BIOL 121L*, MCBL 122/BIOL 122, MCBL 123/BIOL 123/PLPA 123, BIOL 124/MCBL 124, NEM 159/BIOL 159, PLPA 134/BIOL 134, PLPA 134L/BIOL 134L*

e) Genomics/Bioinformatics (minimum of one course): BCH 185, BIOL 107B, BIOL 109* or BCH 153/BPSC 153* or BCH 162*, BIOL 119, BPSC 148

f) Immunology (elective option): CBNS 128/BIO 128

g) Development/Embryology (elective options): BIOL 167*, BIOL 168, CBNS 169

h) Additional elective courses to bring total units to 52: ANTH 170/BPSC 170, BIOL 100/ENTM 100*, BIOL 104/BPSC 104*, BIOL 105, BIOL 108, BIOL 110, BIOL 116, BIOL 116L*, BIOL 116M/BPSC 116M*, BIOL 151*, BIOL 160, BIOL 160L*, BPSC 104/BPSC 104*, BPSC 170/ANTH 170, ENTM 100/BIOL 100*, CHEM 109, CS 010, STAT 100B or STAT 120B

Microbiology Track

1. Upper-division core requirements (31-32 units)
   a) BCH 110A, BCH 110B; BCH 110C or BIOL 107A
   b) BIOL 102 or BIOL 115, BIOL 121/MCBL 121, BIOL 121L/MCBL 121L, BIOL 157
   c) PLPA 123/BIOL 123/MCBL 123, PLPA 134/BIOL 134

2. Additional upper-division requirements (at least three courses from the following)
   BIOL 107B, BIOL 109, BIOL 113, BIOL 114, BIOL 124/MCBL 124, BIOL 128/CBNS 128, CBNS 101, ENSC 141/MCBL 141/SWSC 141, ENSC 155

Microbiology Track

1. Upper-division core requirements (31-32 units)
   a) [no change]

2. Additional upper-division requirements (at least three courses from the following)
   BIOL 107B, BIOL 109, BIOL 113, BIOL 114, BIOL 124/MCBL 124, BIOL 128/CBNS 128, CBNS 101, ENSC 141/MCBL 141/SWSC 141, ENSC 155
141/MCBL 141/SWSC 141, ENSC 155, MCBL 122/Biol 122, NEM 159/Biol 159, PLPA 120/Biol 120/MCBL 120, PLPA 134L/Biol 134L

3. Additional courses in biological sciences (upper division) and related areas from the approved list to bring total units to 52.

JUSTIFICATION:

Biology Track
1.: Since BIOL 119 and BIOL 174 are listed in two categories, the Note is changed to indicate that courses listed in more than one category may be used to satisfy only one requirement.
1. a) (3): BIOL 119 is included because it has cell/molecular content. BIOL 155/BPSC 155 are alphabetized.
1. b): BIOL 167* and BIOL 175L* are course deletions effective Spring 2005. BIOL 171* is deleted and moved to category 1.d). The upper division prerequisites for BIOL 171 (BIOL 161A and CBNS 106) are listed in category 1.b), so BIOL 171 is not needed to fulfill the two-courses requirement in category 1.b). ENTM 162/Biol 162, Insect Behavior, is deleted and moved to category 1.c) since the latter is the category for behavior courses. The cross-listed courses are alphabetized. CBNS 106 is added to this category because it includes topics in the structure and functions of the brain, neurons, and synapses.
1. c): Cross-listed courses are alphabetized. The * is removed from BIOL 119 because it is no longer a lab course. BIOL 152/GEO 152*, Principles of Invertebrate Paleobiology and Paleoecology, and BIOL 162/ENTM 162, Insect Behavior, are included because they are appropriate courses for this category.
1. d): CBNS 150/ENTX 150 are alphabetized. Added to this section are the balance of the courses approved for the Biology major: BCH 153/BIOL 153/BPSC 153*, BIOL 120/MCBL 120/PLPA 120, BIOL 120L/MCBL 120L/PLPA 120L*, BIOL 122/MCBL 122, BIOL 123/MCBL 123/PLPA 123, BIOL 148/BPSC 148, BIOL 158, BIOL 164A*, BIOL 164B*, BIOL 164C*, BIOL 165/BPSC 165*, BIOL 166*, BIOL 171*.
2.: CS 011/MATH 011, CS 020, CS 021 are included as options for students with interests and future careers in mathematics and science.

Cell, Molecular, and Developmental Biology Track
1.: Cross-listed courses are alphabetized.
2.: Cross-listed courses are alphabetized. The * is removed from BIOL 119 because it is no longer a lab course.

Conservation Biology Track
1. a): ECON 006/ENS 006 are alphabetized.
2. d) (1): BIOL 112/BPSC 112/ENTM 112 are alphabetized.
2. d) (3): Cross-listed courses are alphabetized.
2. d) (5): BIOL 164A*, BIOL 164B*, BIOL 164C* (Integrated Methods in Landscape Ecology) are courses introduced in academic year 2003-04 that are acceptable to satisfy the Applications requirement. Cross-listed courses are alphabetized.

Entomology Track
1.: Cross-listed courses are alphabetized.
2.: BIOL 162/ENTM 162 are alphabetized.
3.: Cross-listed courses are alphabetized.
3. c): BIOL 175L is a course deletion effective Spring 2005.
Environmental Toxicology Track
1.: Cross-listed courses are alphabetized.
2.: Cross-listed courses are alphabetized.
2. b): BIOL 167 is a course deletion effective Spring 2005.

Evolution and Ecology Track
1.: Cross-listed courses are alphabetized.
1. b) (2): BIOL 175L is a course deletion effective Spring 2005.
1. b) (3): The * is removed from BIOL 119 because it is no longer a lab course.

Medical Biology Track
1.: Cross-listed courses are alphabetized.
1. b): BIOL 175L is a course deletion effective Spring 2005.
1. e): The * is removed from BIOL 119 because it is no longer a lab course.
1. g): BIOL 167 is a course deletion effective Spring 2005.

Microbiology Track
1.: Units are revised to 31-32 to reflect the deletion of 3-unit course PLPA 134/BIOL 134.
1. c): BIOL 123/MCBL 123/PLPA 123 are alphabetized. PLPA 134/BIOL 134 are deleted and moved to
category 2. PLPA 134/BIOL 134 has not been updated to include a sufficient background in molecular
biology, in contrast to the other core courses.
2.: Cross-listed courses are alphabetized.

APPROVALS:

Biology Track, Conservation Biology Track, Microbiology Track:  Approved by the Biological Sciences
Committee in Charge on January 21, 2005
Cell, Molecular, and Developmental Biology Track, Entomology Track, Environmental Toxicology
Track, Evolution and Ecology Track, Medical Biology Track:  Approved by the Biological Sciences
Committee in Charge on February 25, 2005

Approved by the CNAS Executive Committee:  March 8, 2005

Approved by the Committee on Educational Policy:  April 14, 2005