

**EXECUTIVE COMMITTEE  
COLLEGE OF NATURAL AND AGRICULTURAL SCIENCES  
REPORT TO THE RIVERSIDE DIVISION  
MAY 29, 2018**

To be adopted:

Proposed changes to the Cell, Molecular, and Developmental Biology Major

**Major**

The Cell, Molecular and Developmental Biology major is designed to prepare students for diverse and exciting careers that include research, professional programs in the health sciences, and biotechnology. Course work is structured so that students first receive a solid grounding in the basic genetic and biological principles. Subsequent course requirements expand upon these themes and include courses in cell biology, molecular biology, developmental biology and genetics. Problem based learning is employed throughout the curriculum to produce graduates with the analytical and critical thinking skills necessary to become successful researchers and professionals. After completing required core courses, students take intermediate level courses that lay the foundation for more advanced undergraduate courses. Several mechanisms exist to tailor the curriculum to the needs of the individual student, including by choosing either Disciplinary or Health Science track options.

Both the Disciplinary and Health Science tracks can lead to B.A. or B.S. degrees. They have similar major requirements, but the B.A. degree requires 12 additional units of Humanities and Social Sciences courses and 16 units in a foreign language (see College Breadth Requirements).

**University Requirements**

See the Undergraduate Studies section for requirements that all students must satisfy.

**College Requirements**

**Major**

(no change)

**University Requirements**

(no change)

**College Requirements**

See Degree Requirements, College of Natural and Agricultural Sciences, in the Undergraduate Studies Section, for requirements that students must satisfy.

(no change)

### Major Requirements

### Major Requirements

Some of the following requirements for the Cell, Molecular and Developmental Biology major may also fulfill the College's breadth requirements. Consult with an advisor for course planning.

#### 1. Life Sciences core curriculum (72-76 units)

#### 1. (no change)

- a) BIOL 005A, BIOL 05LA or BIOL 020, BIOL 005B, BIOL 005C
- b) CHEM 001A, CHEM 001B, CHEM 001C, CHEM 01LA, CHEM 01LB, CHEM 01LC
- c) CHEM 008A, CHEM 008B, CHEM 008C, CHEM 008LA, CHEM 008LB, CHEM 008LC, or CHEM 08HA, CHEM 08HB, CHEM 08HC, CHEM 08HLA, CHEM 08HLB, CHEM 08HLC
- d) PHYS 002A, PHYS 002B, PHYS 02LA, PHYS 02LB, PHYS 002C, PHYS 02LC
- e) MATH 007A or MATH 009A, MATH 007B or MATH 009B
- f) STAT 100A
- g) BCH 100, or BCH 110A and BCH 110B  
Students must complete all required Core Curriculum courses with a grade of C- or better and with a cumulative GPA in the courses of at least 2.0. Grades of D or F in two required courses, either separate courses or repetitions of the same course, are grounds for discontinuation from the major.

#### 2. Upper-division requirements (~~48 units~~)

#### 2. Upper-division requirements (40 units)

- a) Major core (16 units) BIOL 102, BIOL 107A, CBNS 101, CBNS 108.

- a) Major core (16 units) BIOL 102, BIOL 107A, CBNS 101, CBNS 108.

b) Major electives (24 units from the following).

b) (no change)

**Cellular emphasis.** At least one of the following is required: BIOL 113; BIOL 114; BIOL 121/MCBL 121, BIOL 128/CBNS 128; BPSC 135; CBNS 116; CBNS 120/PSYC 120; CBNS 165.

**Molecular emphasis.** At least one of the following is required: BCH 180A; BCH 180B; BIOL 107B; BIOL 119; BIOL 124/MCBL 124; BIOL 155/BPSC 155; CBNS 150/ENTX 150.

**Developmental emphasis.** At least one of the following is required: BCH 183; BIOL 123/MCBL 123; BIOL 132/BPSC 132; BIOL 138/BPSC 138; BIOL 168; CBNS 121/PSYC 121; CBNS 169.

**Laboratory course:** Two courses in a biological science are required. Courses including at least 3 hours of lab per week are eligible, including combined lecture and lab classes. Eligible classes include BCH 153/BIOL 153/BPSC 153; BIEN 155; BIOL 118; BIOL 121L/MCBL 121L; BIOL 104/BPSC 104; BIOL 132/BPSC 132; BIOL 138/BPSC 138; BIOL 143/BPSC 143; BIOL 161A; CBNS 120L/PSYC 120L; MCBL 125; and others. Students in the Health Science Track may substitute one laboratory course with a course in ethics.

**Note** A maximum of 8 units of 190-199 courses, including no more than 4 units of 198 courses, may be counted towards the major elective requirement. Three units of BCH 197, BIOL 197, BPSC 197, CBNS 197, ENTM 197, PLPA 197, MCBL 197, NEM 197, BCH 199, BIOL 199, BPSC 199, CBNS 199, ENTM 199, PLPA 199, MCBL199, or NEM 199 may substitute for one of the required laboratory courses.

3. *Depth requirement (16 units).* For B.A. students, this requirement can be fulfilled

3. *(no change)*

with additional courses in Humanities and Social Sciences, and Foreign Languages. For the B.S. degree, students are required to take an additional 16 units of course work in natural sciences (including a biological or chemical science) or mathematics. Additional major elective units beyond the 32 required in 2b may be applied to this requirement.

4. *Health Science track*. Students wishing to apply to medical, dental or veterinary professional schools must follow the requirements listed above, but are encouraged to select from the following courses. For B.A. students, some of these will fulfill their Humanities and Social Sciences and Foreign Languages requirements. Please consult the faculty adviser.
4. (no change)
- i. Foreign language: three courses are recommended.
  - ii. Community service: a maximum of 4 units may be counted towards the 180 unit graduation requirement, using CBNS 198-I or equivalent.
  - iii. Ethics: A course is strongly recommended, such as PHIL 009 or PHIL 167.
  - iv. Two upper-division classes in Psychology are recommended, such as CBNS 126/PSYC 126; CBNS 127/PSYC 127; PSYC 129; PSYC 178; or PSYC 179.
  - v. When selecting electives in the natural sciences, students are recommended to include classes in an area of microbiology (e.g. BIOL 157, BIOL 171, ENSC 133/MCBL 133/SWSC 133, NSC141/MCBL 141/SWSC 141, BIOL 121/MCBL 121, BIOL 123/MCBL 123/PLPA 123, BIOL 124/MCBL 124, BIOL 134/PLPA 134), and in anatomy, zoology, or physiology (BIOL 151, BIOL 161A, BIOL 175, BIOL 176).

**1. Bachelor of Science Degree (Disciplinary track)**

The sample program for B.S. students provides a solid science background for students interested in research or teaching careers in biomedical science. Undergraduate laboratory research is strongly recommended as an important element in the program.

Freshman Year	Fall	Winter	Spring
NASC 093	2		
ENGL 001A, 001B	4		4
CHEM 001A, 001B, 001C, 01LA, 01B, 01C	5	5	5
<del>BIOL 005A or 020</del>		5	4
MATH 007A or MATH 009A, MATH 007B or MATH 009B	4	4	
Total Units	15	14	13

Sophomore Year	Fall	Winter	Spring
PHYS 002A, 002B, 002C, 02LA, 02LB, 02LC	5	5	5
BIOL 005C, 102	4		4
CHEM 008A, 008B, 008C, 008LA, 008LB, 008LC	4	4	4
Human/Soc. Sci Elect.	2	8	4

**1. Bachelor of Science Degree (Disciplinary track)**

The sample program for B.S. students provides a solid science background for students interested in research or teaching careers in biomedical science. Undergraduate laboratory research is strongly recommended as an important element in the program.

Freshman Year	Fall	Winter	Spring
NASC 093	2		
ENGL 001A, 001B	4		4
CHEM 001A, 001B, 001C, 01LA, 01B, 01C	5	5	5
BIOL 005A, <u>BIOL 05LA</u> or 020, <u>BIOL 005B</u>		5	4
MATH 007A or MATH 009A, MATH 007B or MATH 009B	4	4	
Total Units	15	14	13

Sophomore Year	Fall	Winter	Spring
PHYS 002A, 002B, 002C, 02LA, 02LB, 02LC	5	5	5
BIOL 005C, 102	4		4
CHEM 008A, 008B, 008C, 008LA, 008LB, 008LC	4	4	4
Human/Soc. Sci Elect.	2	8	4

Total Units	15	17	17	Total Units	15	17	17
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<b>Junior Year</b>	<b>Fall</b>	<b>Winter</b>	<b>Spring</b>	<b>Junior Year</b>	<b>Fall</b>	<b>Winter</b>	<b>Spring</b>
BIOL 107A		4		BIOL 107A		4	
CBNS 101			4	CBNS 101			4
STAT 100A	5			STAT 100A	5		
BCH 100	4			BCH 100	4		
Major Elect. & Depth reqs (e.g. BIOL 121/MCBL 121, 121L; BIOL 107B, BIOL 128/ CBNS 128	4	8	8	Major Elect. & Depth reqs (e.g. BIOL 121/MCBL 121, 121L; BIOL 107B, BIOL 128/ CBNS 128	4	8	8
Human/Soc. Sci Elect.		4	4	Human/Soc. Sci Elect.		4	4
<hr/>				<hr/>			
Total Units	13	16	16	Total Units	13	16	16
<hr/>				<hr/>			
<b>Senior Year</b>	<b>Fall</b>	<b>Winter</b>	<b>Spring</b>	<b>Senior Year</b>	<b>Fall</b>	<b>Winter</b>	<b>Spring</b>
ENGL 001C			4	ENGL 001C			4
CBNS 108			4	CBNS 108			4
Major Elect. & Depth reqs (e.g. BIOL 113, 168; BIOL 132/BPSC 132; BPSC 135; CBNS 120/PSYC 120; CBNS 169)	8	8	4	Major Elect. & Depth reqs (e.g. BIOL 113, 168; BIOL 132/BPSC 132; BPSC 135; CBNS 120/PSYC 120; CBNS 169)	8	8	4
Human/Soc. Sci Elect.	4	4		Human/Soc. Sci Elect.	4	4	
XXX 190, 197, 198, 199	2	3	3	XXX 190, 197, 198, 199	2	3	3
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Total Units            14      15      15

Total Units            14      15      15

**2. Bachelor of Science Degree (Health Science track)**

The sample program for B.S. students with a professional emphasis provides a very strong science background, with recommended elective course choices emphasizing biomedical pertinence. Additionally, a foreign language is recommended, as well as Community Service (for course credit). Further breadth may be developed by electing Humanities and Social Science course options within the major depth requirement.

**2. Bachelor of Science Degree (Health Science track)**

The sample program for B.S. students with a professional emphasis provides a very strong science background, with recommended elective course choices emphasizing biomedical pertinence. Additionally, a foreign language is recommended, as well as Community Service (for course credit). Further breadth may be developed by electing Humanities and Social Science course options within the major depth requirement.

**Freshman Year            Fall    Winter    Spring**

NASC 093

2

ENGL 001A, 001B

4

4

CHEM 001A, 001B,  
001C, 01LA, 01B,  
01C

5

5

5

BIOL 005A ~~or 020,~~

**Freshman Year            Fall    Winter    Spring**

NASC 093

2

ENGL 001A, 001B

4

4

CHEM 001A, 001B,  
001C, 01LA, 01B,  
01C

5

5

5

BIOL 005A, 05LA  
or 020, 005B

5

4

MATH 007A or  
MATH 009A,  
MATH 007B or

4

4

MATH 007A or  
MATH 009A,  
MATH 007B or  
MATH 009B

4

4

Total Units

15

14

13

Total Units

15

14

13

**Sophomore Year            Fall    Winter    Spring**

PHYS 002A, 002B,  
002C, 02LA, 02LB,  
02LC

5

5

5

**Sophomore Year            Fall    Winter    Spring**

PHYS 002A, 002B,  
002C, 02LA, 02LB,  
02LC

5

5

5

BIOL 005C, 102

4

4

BIOL 005C, BIOL  
102

4

4

CHEM 008A, 008B, 008C, 008LA, 08LB, 008LC	4	4	4
Human/Soc. Sci Elect.	2	4	4
<b>Total Units</b>	<b>15</b>	<b>13</b>	<b>17</b>

CHEM 008A, 008B, 008C, 008LA, 08LB, 008LC	4	4	4
Human/Soc. Sci Elect.	2	4	4
<b>Total Units</b>	<b>15</b>	<b>13</b>	<b>17</b>

<b>Junior Year</b>	<b>Fall</b>	<b>Winter</b>	<b>Spring</b>
BIOL 107A		4	
CBNS 101			4
BCH 100	4		
Major Elect. & Depth reqs (e.g. BIOL 121/MCBL 121, 121L; BIOL 107B, BIOL 128/CBNS 128)	8	4	8
Foreign Language	4	4	4
<b>Total Units</b>	<b>16</b>	<b>16</b>	<b>16</b>

<b>Junior Year</b>	<b>Fall</b>	<b>Winter</b>	<b>Spring</b>
BIOL 107A		4	
CBNS 101			4
BCH 100	4		
Major Elect. & Depth reqs (e.g. BIOL 121/MCBL 121, 121L; BIOL 107B, BIOL 128/CBNS 128)	8	4	8
<u>Human/Soc. Sci Elect.</u>		<u>4</u>	
Foreign Language	4	4	4
<b>Total Units</b>	<b>16</b>	<b>16</b>	<b>16</b>

<b>Senior Year</b>	<b>Fall</b>	<b>Winter</b>	<b>Spring</b>
ENGL 001C		4	
CBNS 108			4
STAT 100A	5		
Major Elect. & Depth reqs (e.g. BIOL 113, 168; BIOL 132/BPSC	8	8	4

<b>Senior Year</b>	<b>Fall</b>	<b>Winter</b>	<b>Spring</b>
ENGL 001C		4	
CBNS 108			4
STAT 100A	5		
Major Elect. & Depth reqs (e.g. BIOL 113, 168; BIOL 132/BPSC	8	8	4



132; BPSC 135;  
CBNS 120/PSYC  
120; CBNS 169)

Human/Soc. Sci  
Elect. 4

XXX 190, 197, 198, 2 3 3  
199

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Total Units 15 15 15

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132; BPSC 135;  
CBNS 120/PSYC  
120; CBNS 169)

Human/Soc. Sci  
Elect. 4

XXX 190, 197, 198, 2 3 3  
199

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Total Units 15 15 15

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**3. Bachelor of Arts Degree (Disciplinary or Health Science tracks)**

The sample program for B.A. students provides a broad-based education that builds on the strong foundation in science, with emphasis in humanities, social sciences, and foreign language.

**3. Bachelor of Arts Degree (Disciplinary or Health Science tracks)**

The sample program for B.A. students provides a broad-based education that builds on the strong foundation in science, with emphasis in humanities, social sciences, and foreign language.

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<b>Freshman Year</b>	<b>Fall</b>	<b>Winter</b>	<b>Spring</b>
NASC 093	2		
ENGL 001A, 001B	4		4
CHEM 001A, 001B, 001C, 01LA, 01B, 01C	5	5	5
BIOL 005A, 05LA or BIOL 020, 005B		5	4
MATH 007A or MATH 009A, MATH 007B or MATH 009B	4	4	
<b>Total Units</b>	<b>15</b>	<b>14</b>	<b>13</b>

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<b>Freshman Year</b>	<b>Fall</b>	<b>Winter</b>	<b>Spring</b>
NASC 093	2		
ENGL 001A, 001B	4		4
CHEM 001A, 001B, 001C, 01LA, 01B, 01C	5	5	5
BIOL 005A, 05LA or BIOL 020, 005B		5	4
MATH 007A or MATH 009A, MATH 007B or MATH 009B	4	4	
<b>Total Units</b>	<b>15</b>	<b>14</b>	<b>13</b>

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<b>Sophomore Year</b>	<b>Fall</b>	<b>Winter</b>	<b>Spring</b>
ENGL 001C		4	

<b>Sophomore Year</b>	<b>Fall</b>	<b>Winter</b>	<b>Spring</b>
ENGL 001C		4	

PHYS 002A, 002B, 002C, 02LA, 02LB, 02LC	5	5	5	PHYS 002A, 002B, 002C, 02LA, 02LB, 02LC	5	5	5
BIOL 005C, 102	4		4	BIOL 005C, <u>BIOL</u> 102	4		4
CHEM 008A, 008B, 008C, 008LA, 08LB, 008LC	4	4	4	CHEM 008A, 008B, 008C, 008LA, 08LB, 008LC	4	4	4
Foreign Language			4	Foreign Language			4
Human/Soc. Sci Elect.	4			Human/Soc. Sci Elect.	4		
<b>Total Units</b>	<b>17</b>	<b>13</b>	<b>17</b>	<b>Total Units</b>	<b>17</b>	<b>13</b>	<b>17</b>

<b>Junior Year</b>	<b>Fall</b>	<b>Winter</b>	<b>Spring</b>	<b>Junior Year</b>	<b>Fall</b>	<b>Winter</b>	<b>Spring</b>
BIOL 107A		4		BIOL 107A		4	
CBNS 101			4	CBNS 101			4
BCH 100	4			BCH 100	4		
Major Elect. & Depth reqs (e.g. BIOL 121/MCBL 121, 121L; BIOL 107B, BIOL 128/CBNS 128)	4	4	4	Major Elect. & Depth reqs (e.g. BIOL 121/MCBL 121, 121L; BIOL 107B, BIOL 128/CBNS 128)	4	4	4
Human/Soc. Sci Elect. (e.g. PSYC 002, 178, 179, PHIL 167)	4	4	8	Human/Soc. Sci Elect. (e.g. PSYC 002, 178, 179, PHIL 167)	4	4	8
Foreign Language	4	4		Foreign Language	4	4	
<b>Total Units</b>	<b>16</b>	<b>16</b>	<b>16</b>	<b>Total Units</b>	<b>16</b>	<b>16</b>	<b>16</b>

<b>Senior Year</b>	<b>Fall</b>	<b>Winter</b>	<b>Spring</b>	<b>Senior Year</b>	<b>Fall</b>	<b>Winter</b>	<b>Spring</b>
CBNS 108			4	CBNS 108			4

Major Elect. & Depth reqs (e.g. BIOL 113, 168; BIOL 132/BPSC 132; BPSC 135; CBNS 120/PSYC 120; CBNS 169)	8	4	4	Major Elect. & Depth reqs (e.g. BIOL 113, 168; BIOL 132/BPSC 132; BPSC 135; CBNS 120/PSYC 120; CBNS 169)	8	4	4
STAT 100A		5		STAT 100A		5	
Human/Soc. Sci Elect.		4	8	Human/Soc. Sci Elect.		4	8
XXX 190, 197, 198, 199	4	2		XXX 190, 197, 198, 199	4	2	
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Total Units	12	15	16	Total Units	12	15	16

**Justification:**

Corrections listed above are editorial changes to add equivalent courses. For example, adding BIOL 020 wherever BIOL 05LA appears, a junior year correction to add 4 units of humanities credits as it was previously missing, etc.

The change in the catalog copy from 48 to 40 units of upper-division is simply to correct a technical error in the catalog copy. In 2016, the CMDB faculty voted to reduce the upper division requirements from 48 to 40 units; this involved keeping the "a) Major Core" requirement at 16 units and reducing the "b) Major Elective" requirements from 32 to 24; 16+24 equals 40. This change was approved by campus. However, when we prepared the catalog copy we accidentally didn't change all of the necessary wording; the erroneous wording said that we required 48 upper division units, comprised of 16 "a) Major Core" and 24 "b) Major Elective" units. But 48 does not equal 16 + 24. So the revised wording corrects this.

**Approvals:**

Approved by the faculty of the CMDB Program:  
 Approved by the Executive Committee of the College of Natural and Agricultural Sciences:  
 Approved by the Committee on Educational Policy:

November 21, 2017  
 January 9, 2018  
 May 7, 2018