STEP I. THE CURRICULAR CONTEXT
Throughout this self-study, please add any explanatory notes you believe will help us understand the situation.

A. Degrees, Minors, and Certificates offered by your program, individually or jointly

1. List all undergraduate and graduate degrees offered by your program (i.e. BA majors, Master’s degrees, doctoral degrees) and all joint degrees for which your program is responsible.

   Bachelor of Arts in...
   1. Biology
   2. Biology with Specialization in Ecology and Conservation Biology
   3. Biology with Specialization in Neurobiology
   4. Biology with Specialization in Quantitative Biology
   5. Biology with Specialization in Cell Biology, Molecular Biology and Genetics
   6. Biology with Specialization in Behavioral Biology

   Master of Arts in Biology
   Doctor of Philosophy in Biology

2. List all undergraduate minors offered by your program.

   Minor in Biology

3. List all certificate programs for which your program is responsible or shares responsibility.

   Certificate in Terrestrial Biogeosciences (PhD)

B. Undergraduate majors offered by other departments and programs that depend on coursework in your program

1. Undergraduate Majors in CAS: Using the listing of BA programs at http://www.bu.edu/academics/cas/programs/ to ensure completeness, list all CAS majors other than those administered individually or jointly in your department whose requirements (as spelled out in departmental sections of the bulletin) include coursework in your department.

   Anthropology (Biological Anthropology)
   Biochemistry and Molecular Biology (BMB)
   Chemistry: Biochemistry
   Earth & Environment: Environmental Analysis and Policy
   Earth & Environment: Environmental Science
   Earth & Environment: Physical Geography
   Marine Science
   Neuroscience
   Seven Year Liberal Arts / Medical Education Program
   Seven Year Liberal Arts / Dental Education Program
   Women’s, Gender & Sexuality Studies
2. Undergraduate majors and degrees outside CAS: Using the list of BU Schools and Colleges at http://www.bu.edu/academics/ to ensure completeness, list all non-CAS undergraduate degree programs whose requirements include coursework in your department.

   College of Engineering: Biomedical Engineering
   Sargent College
      Athletic Training
      Athletic Training/Physical Therapy
      Speech, Language and Hearing Sciences
      Exercise Science
      Health Science
      Human Physiology
      Nutritional Science
      Occupational Therapy
      Physical Therapy

3. Undergraduate minors: Using the listing of minors at http://www.bu.edu/academics/cas/programs/, list all (CAS and other) minors whose requirements can be fulfilled by required or elective coursework in your department.

   Earth & Environment: Environmental Science
   Marine Science

C. Graduate programs offered by other departments and schools that depend on coursework in your program

1. GRS Master’s Programs outside your department. Using the list at http://www.bu.edu/academics/grs/programs/, list all Master’s degree programs whose requirements (as spelled out in departmental sections of the bulletin) include coursework in your department.

   Program in Bioinformatics
   Molecular Biology, Cell Biology and Biochemistry (MCBB)
   Graduate Program in Neuroscience
   Earth & Environment
      Earth & Environment/CEES: Energy & Environmental Analysis
      Earth & Environment/CEES: Environmental Remote Sensing & GIS

2. GRS Doctoral Programs. Using the list at http://www.bu.edu/academics/grs/programs/, list all doctoral programs whose requirements (as spelled out in departmental sections of the bulletin) include coursework in your department.

   Program in Bioinformatics
   Molecular Biology, Cell Biology and Biochemistry (MCBB)
   Graduate Program in Neuroscience
   Certificate in Terrestrial Biogeosciences
   Earth & Environment

3. Non-GRS Graduate Degrees. Using the list of Schools and Colleges at http://www.bu.edu/academics/, list any non-GRS graduate programs whose requirements include coursework in your department.

   College of Engineering: Biomedical Engineering
   School of Medicine: Anatomy and Neurobiology
   School of Education: Certificate in Global Ecology Education {future status uncertain}
D. College Requirements and Programs: Writing, Foreign Language, Math, Core Curriculum, Divisional Studies

In general, all departments and programs have responsibilities for selected aspects of the CAS curriculum that go beyond the major. Describe your department’s typical role in any of the following in which it has participated. (In what ways has your department contributed? To what extent?) For any aspect in which your department (including through individual faculty) has not played a recent role, enter “None.”

1. Core Curriculum
   Biology faculty members have for many years participated in teaching CC 106 during spring semester. Recent participants include Profs. Atema, Finnerty, Mullen, Schneider, Warkentin, and Lecturer Nathan Stewart. A new Core course on “Origins” will be offered in Spring 2015 and we expect Prof. Bradham to contribute to that course beginning in AY 15/16.

2. Kilachand Honors College
   Profs. Primack and Kaufman have offered and/or participated in courses for KHC, including KHC BI 101, KHC BI 102, and KHC HC 301.

3. Teaching seminars toward fulfillment of the College Writing requirement None.

4. Implementation of the foreign language requirement None.

5. Offering Divisional Studies courses that also serve as gateways to your major(s)
   BI 107 Biology I
   BI 108 Biology II (Note that BI118 has been phased out.)

6. Offering Divisional Studies courses that do not also count toward majors in your department or division
   BI 111 Brain, Hormones & Behavior (no definite plan to staff this course after Fall 2014)
   BI 114 Human Infectious Diseases: Aids to TB
   BI 117 Intro Global Ecology (not currently offered)
   BI 119 Sociobiology

7. Offering selected courses that are not important for fulfilling requirements for your major(s) or minor(s), but are in very high demand by students because of their interests
   BI 105 Introductory Biology for Health Sciences
   BI 106 Human Anatomy
   BI 114 Human Infectious Diseases: Aids to TB
   BI 119 Sociobiology
   BI 211 Human Physiology
   BI 281 Fundamentals of Biology I (7-Year Med)
   BI 282 Fundamentals of Biology II (7-Year Med)

8. Any other aspects of the CAS/GRS curriculum you want to mention
   • Prof. Warkentin is a member of the team teaching WS 101 Gender and Sexuality I: An Interdisciplinary Introduction
   • We provide the lecture portion of NE 203 Principles of Neuroscience for the Undergraduate Neuroscience Program

BME, MET, BU Academy
   • We provide BI 107AC and BI 108AC for the BU Academy
   • BE 209 is a required BME course, with the laboratory portion coordinated by Biology and staffed in part by Biology teaching fellows
   • Prof. Wasserman teaches MET BI 407 and helps coordinates their science curriculum
STEP II. ASSESSMENT OF CURRICULAR OBLIGATIONS AND NEEDS

In updating this assessment, you should be guided in large part by past enrollment patterns — both high and low demand — and what these imply about patterns of demand over time. Point to evidence from past enrollments to make predictions about projected demand for courses. In this step of the self-study, you will identify the courses your department or program ought to offer regularly for curricular reasons and determine how often they should be offered.

Please note that CAS undergraduate courses need minimum enrollments of 10 and graduate courses need minimum enrollments of 8 in order to be considered sufficiently in demand to be offered; courses that have attracted fewer students will be considered for possible cancellation.

A. OBLIGATIONS TOWARD UNDERGRADUATE EDUCATION. For any degrees or minors we offer (listed in STEP I), their list of required courses implies an obligation to offer these courses on a regular enough basis to allow students to complete their degrees in a timely way. In addition, every department and program also ought to offer a wider set of courses that enrich the educational program, take advantage of faculty expertise, etc. Taking into account your department’s obligations in undergraduate education as specified in Step I above, indicate the frequency with which your faculty should offer specific courses (number and name) and course types (e.g., 2 Core sections, 2 upper-level electives in subfield X) in order to serve students well in allowing them to finish their degrees in a timely way:

1. Which courses and course types should be offered every semester?

All Biology students are required to take one course in each of three major areas to satisfy a distributional requirement for the major; this includes BI 203 (213) or 206 (216) for the CM requirement; BI 260, 303, 306, 309, or 407 for the EBE requirement; and BI 315 or 325 for the physiology/neurobiology requirement. Many students take 203/206 (both discussion courses) in a two-course sequence during sophomore year. Student demand is particularly high for BI 315, a laboratory course that also serves SAR and BME students, and demand has steadily increased for BI 325, which shares a single lecture section with NE 203 during Fall semester. Both courses had record high enrollments during AY13/14. To provide flexibility for students and to facilitate the scheduling of laboratory sections for BI 315, it is important that these two courses are offered every semester. It would be beneficial to offer more than one section of Systems Physiology per semester, but we do not currently have faculty members available to teach additional sections.

<table>
<thead>
<tr>
<th>Course</th>
<th>Enrollments (2009-present)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BI 315 Systems Physiology</td>
<td>193-311 (455-565 annually)</td>
</tr>
<tr>
<td>BI 325 Principles of Neuroscience</td>
<td>44-141 (103-211 annually)</td>
</tr>
<tr>
<td><em>(shares lecture session with NE 203 during Fall semester)</em></td>
<td></td>
</tr>
</tbody>
</table>

The following set of four courses, comprising the Tropical Ecology Program in Ecuador, is also offered every semester. While enrollments are small, this unique, international program provides a high quality field-based learning experience for our students and is the highpoint of the undergraduate experience for many of our students.

<table>
<thead>
<tr>
<th>Course</th>
<th>Enrollments (2009-present)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BI 438 Tropical Montane Ecology</td>
<td>6-20 (15 – 33 annually)</td>
</tr>
<tr>
<td>BI 439 Tropical Rain Forest Ecology</td>
<td>6-20 (15 – 33 annually)</td>
</tr>
<tr>
<td>BI 440 Tropical Coastal Ecology</td>
<td>6-20 (15 – 33 annually)</td>
</tr>
<tr>
<td>BI 441 Studies in Tropical Ecology</td>
<td>6-20 (15 – 33 annually)</td>
</tr>
</tbody>
</table>

Additional Comments:
2. Which courses and course types should be offered annually?
3. Which courses and course types should be offered every other academic year or every third year?

Based on the above list of courses that satisfy distributional requirements for the Biology major and adding in our introductory courses, the following courses must be offered annually. BI 107 and 108 also satisfy CAS divisional requirements and many of these courses contribute to curricula for BMB, Neuroscience, or Earth & Environment. These courses have consistently strong enrollments:

<table>
<thead>
<tr>
<th>Course</th>
<th>Enrollments (2009-present)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BI 107 Biology I (2 sections)</td>
<td>456-530</td>
</tr>
<tr>
<td>BI 108 Biology II (3 sections)</td>
<td>610-759 (including BI118)</td>
</tr>
<tr>
<td>BI 203 Cell Biology (incl. BI281)</td>
<td>254-344</td>
</tr>
<tr>
<td>BI 213 Intensive Cell Biology</td>
<td>57-130</td>
</tr>
<tr>
<td>BI 206 Genetics (incl. BI282)</td>
<td>131-166</td>
</tr>
<tr>
<td>BI 216 Intensive Genetics</td>
<td>56-121</td>
</tr>
<tr>
<td>BI 260 Marine Biology</td>
<td>88-120</td>
</tr>
<tr>
<td>BI 303 Ecology</td>
<td>105-130 (2 semesters in prev. yrs)</td>
</tr>
<tr>
<td>BI 309 Evolution</td>
<td>43-99</td>
</tr>
<tr>
<td>BI 407 Animal Behavior</td>
<td>64-71</td>
</tr>
</tbody>
</table>

†Increased enrollment in BI 306 is due to lack of a BI 303 offering in same semester.

**Biology Electives**
Undergraduate majors in Biology take at least 7 courses after BI 107/108 and many students take up to 10 courses to complete a major in Biology with specialization in a given sub-field. Thus, we need to offer a range of electives every semester in each of three major subject areas (see below). Many of these courses are offered annually, others in alternate years, with the precise mix of advanced electives varying, particularly in EBE (see below for more information). Students are also required to complete 3 laboratory courses after BI 107/108, two of which are typically BI 303/306 and BI 315 (listed above). Thus, students need at least 1 and as many as 3 additional lab courses among their advanced electives; given relatively few lab courses among our advanced electives, it is important that these courses are offered annually. *Lab courses are marked with an asterisk below.

**Neurobiology**
In addition to BI 325 (listed above), we offer the following Neurobiology courses. Median, aggregate enrollment in these courses has grown from ~60 students per semester in AY 09/10 to 100+ per semester (including 122 in Fall 2012) due in part to the cross listing of many of these courses as Neuroscience electives. If enrollments continue at the higher level of ~100, we should offer at least 5 neurobiology electives per semester and 10 per year. Thus, most or all of these courses should be offered annually.

BI 230 Behavioral Endocrinology
*BI/NE 445 Cellular and Molecular Neurophysiology
*BI/NE 449 Neuro Design Lab (new for Fall 2014)
BI/NE 455 Developmental Neurobiology
BI/NE 481 Molecular Biology of the Neuron
BI/NE 520 Sensory Neurobiology
BI/NE 525 Biology of Neurodegenerative Diseases (Dr. Lucia Pastorino, added for Spring 2014, effectively replaces BI 594)
BI/NE 542 Neuroethology (reactivated as lecture/discussion course for Spring 2015)
BI/NE 545 Neurobiology of Motivated Behavior
BI 594 Topics in Neurobiology: Channelopathies (offered for last time in Spring 2015)
BI 599 Neurobiology of Synapses
BI 502 Theory of Biological Networks (currently inactive)
BI/NE 554 Neuroendocrinology (currently inactive)
*BI 575 Tech Cell Molec Neurobiol (currently inactive)

**Cell and Molecular Biology (including courses in physiology, endocrinology & development)**

In addition to Cell Biology (BI 203/216) and Genetics (BI 206/216), we offer the following CM electives, many of which also support the undergraduate BMB major. Of these, four courses have large enrollments and must be offered *annually*. Two sections of BI/CH 421 during Fall semester are generally staffed by one Biology faculty member and one Chemistry faculty member.

<table>
<thead>
<tr>
<th>Course</th>
<th>Enrollments (2009-present)</th>
</tr>
</thead>
<tbody>
<tr>
<td>*BI 311 Microbiology</td>
<td>77-89</td>
</tr>
<tr>
<td>*BI/CH 421 Biochemistry I</td>
<td>154-183 (total for 2 sections)</td>
</tr>
<tr>
<td>*BI/CH 422 Biochemistry II</td>
<td>65-92</td>
</tr>
<tr>
<td>BI 552 Molecular Biology I</td>
<td>96-136 (new high in Fall 2014)</td>
</tr>
</tbody>
</table>

Since 2009, the remaining CM electives (listed below) have had aggregate enrollments of 86-110 in Fall and 104-175 in Spring. The greater demand in Spring is a function of the larger number of students taking the “core” courses listed above in the Fall (BI 203/213/281, 421, and 552) than in the Spring (BI 206/216/282, 311, and 422). Thus, we should ideally offer at least 4 CM electives in Fall and 5-7 electives in Spring and therefore almost all of these courses should be offered *annually*. Recent retirements have had a negative impact on the range of CM electives for undergraduates. Prof. Siggers has taken on BI 385 and is also offering a new course in systems biology (BI 560) and Prof. Frydman is introducing a new microbiomes course, partially offsetting these losses. At present, there are ten active CM courses listed below but they are not all offered in a given year due to sabbaticals and course release provided by grant funding.

- BI 385 Immunology
- BI 410 Cellular Aspects of Develop. & Differentiation
- BI 411 Microbiome (new in Spring 2015)
- *BI 513 Genetics Laboratory
- BI 551 Stem Cells
- *BB 522 Molecular Biology Lab
- BI 553 Molecular Biology II
- BI 560 Systems Biology (new in Spring 2013)
- BI 572 Advanced Genetics (alt years)
- BI 576 Carcinogenesis (alt years)

*BI 304 Morphogenesis (currently inactive)
*BI 425 General Endocrinology (currently inactive)
BI 442 Physiology & Biochemistry of Reprod. (currently inactive)
BI 446 Biology of the Cell Cycle (currently inactive)
BI 556 Membrane Biochem & Cell Signaling (currently inactive)

**Ecology, Behavior & Evolution**

In addition to BI 260, 303, 306, 309 and 407 (listed above), we offer the following EBE electives. Aggregate enrollment in these courses over the past four years has been 153-224 students **per year**. Given these aggregate enrollments, we should offer at least 4 additional EBE electives per semester and 8-10 per year. Most of the courses listed below are offered in alternate years due to competing demands on faculty time. Only BI 225 (now a 4-credit version of the previous 2-credit BI 224), BI 302 (a lab course), BI 448 (required for the Ecology and Conservation Biology specialization), and BI/GE
530 are currently being offered **annually**. Some of these courses are also available as electives for majors in Earth & Environment. Some new EBE electives are planned for AY 15/16.

**In AY14/15, due to the combination of other commitments involving EBE faculty (KHC, Marine Semester, Core Curriculum, Women’s Studies) and likely loss of courses taught by Doug Zook (SED), we currently have plans in place for only 2 of these courses in Fall 2014 (BI 515, 5xx), but will have an appropriate lineup of 6 courses in Spring 2015 (BI 302, 414, 448, 504, 506, 530).**

- BI 225 Behavioral Biology
- *BI 302 Vertebrate Zoology (lab)
- BI 448 Conservation Biology
- BI/GE 530 Forest Ecology

**BI 3xx Principles of Ecosystem Science (new course planned for Spring 2016)**

- *BI 414 Ornithology (alternate years)
- *BI 416 Herpetology (added for Spring 2014, alternate years)
- BI/ES 443 Terrestrial Biogeochemistry (currently offered in alternate years)
- BI 4xx Community Ecology (new course planned for Spring 2016)
- BI 486 Sustainability (reactivated for Spring 2015)
- BI 504 Advanced Evolution (now offered each year)
- BI 506 Phenotypic Plasticity (currently offered in alternate years)
- BI 508 Behavioral Ecology (currently offered in alternate years)
- BI 515 Population Genetics (currently offered in alternate years)
- BI 519 Theoretical Evolutionary Ecology (currently offered in alternate years)

- BI 543 Global Ecology (uncertain for AY15/16)

- BI 305 Plant Biology (currently inactive due to Primack’s participation in KHC)
- *BI 310 Comparative Vertebrate Anatomy (currently inactive)
- *BI 415 Biology of Mammals (currently inactive)
- BI 503 Symbiosis (currently inactive)
- BI 505 Evolution & Development (currently inactive)
- BI 549 Molecular Phylogenetics & Evolution (currently inactive)

**Marine Semester**

**These annual courses are offered each Fall as part of the Marine Semester, which offers at least 12 courses (3+ courses in each of 4 blocks) in Biology, Geography and Earth Sciences. The marine program is seeking to increase the number of course offerings to 14 or 15 for Fall 2015.** Enrollments in these intensive block-format courses typically range from 10 to 20 students. While there are a number of cross-listed courses, the following are taught by the Biology faculty.

- BI 531 Ichthyology I
- BI 536 Molecular Ecology (to be reactivated in Fall 2015)
- BI/ES 539 Coral Reef Dynamics
- BI 546 Marine Megafaunal Ecology
- BI 550 Marine Genomics
- BI 563 Chemosensory Biology
- BI 569 Tropical Invertebrates
- BI 541 Coral Reef Restoration (new course added for Fall 2014)
- MR 533 Scientific Diving (new course added in Fall 2013)

- BI 532 Ichthyology II (no longer offered as of 2012)
- BI 547 Marine Invertebrates (replaced by BI 569)
**Service Courses**

These *annual* courses are provided as a *service* to Sargent College, the Core Curriculum, the Neuroscience program, BME, and the Seven-Year Liberal Arts/Medical Education Program. Many of these courses have had growing enrollments in recent years.

<table>
<thead>
<tr>
<th>Course</th>
<th>Enrollments (2009-present)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BI 105 Introductory Biology for Health Sciences</td>
<td>101-179</td>
</tr>
<tr>
<td>BI 106 Human Anatomy</td>
<td>155-234</td>
</tr>
<tr>
<td>BI 114 Human Infectious Diseases: Aids to TB</td>
<td>91-135</td>
</tr>
<tr>
<td>BI 211 Human Physiology</td>
<td>123-183</td>
</tr>
<tr>
<td>NE 203 Principles of Neuroscience (shares lecture with BI 325, separate lab sections run by Neuro)</td>
<td>71-92 (2011-14)</td>
</tr>
<tr>
<td>BI 281 Fundamentals of Biology I (meets w/ BI 203)</td>
<td>16-25</td>
</tr>
<tr>
<td>BI 282 Fundamentals of Biology II (meets w/ BI 206)</td>
<td>18-24</td>
</tr>
<tr>
<td>CC 106 Core Natural Sciences II: Origins (new version of course for Spring 2015, to be offered as CC 111 in Fall 2015, replacing CC 106)</td>
<td></td>
</tr>
<tr>
<td>BE 209 Principles of Biology (lab sections coordinated by Biology)</td>
<td></td>
</tr>
</tbody>
</table>

**Non-majors Courses for Divisional Credit**

These courses are offered to *non-majors for divisional credit* (Note that BI 105, 106, and 114 are listed above and serve a dual purpose). While the specific courses can change, we should ideally have (in addition to BI 105/106) at least one non-majors course per semester and ideally two to provide options for students.

<table>
<thead>
<tr>
<th>Course</th>
<th>Enrollments (2009-present)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BI 105 Introductory Biology for Health Sciences</td>
<td>101-179</td>
</tr>
<tr>
<td>BI 106 Human Anatomy</td>
<td>155-234</td>
</tr>
<tr>
<td>BI 114 Human Infectious Diseases: Aids to TB</td>
<td>91-135</td>
</tr>
<tr>
<td>BI 119 Sociobiology</td>
<td>33-40</td>
</tr>
<tr>
<td>BI 111 Brains, Hormones &amp; Behavior</td>
<td>12-25</td>
</tr>
<tr>
<td>(Prof. Callard teaching for last time during Fall 2014)</td>
<td></td>
</tr>
<tr>
<td>BI 117 Intro Global Ecology (currently inactive)</td>
<td>24-52</td>
</tr>
</tbody>
</table>

B. **OBLIGATIONS TOWARD GRADUATE EDUCATION.** Taking into account your department’s obligations in graduate education *as specified in Step I above*, list specific courses (number and name) and course types that your faculty *should offer* in order to serve students well in allowing them to finish their degrees in a timely way. Every department and program also ought to offer a wider set of courses that enrich the educational program, take advantage of faculty expertise, etc.

1. Which courses and course types should be offered *every semester?*

Two fall/spring seminar series (2 credits per semester) provide our graduate students an opportunity to present their work to their peers at least once each year. BI 579/580 is for EBE and Marine Biology students; BI 583/584 is for CM and MCBB graduate students.

<table>
<thead>
<tr>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>BI 579/580 Progress EBE &amp; Marine Biol (2 cr each semester)</td>
</tr>
<tr>
<td>BI 583/584 Progress in Cell &amp; Molecular Biol (2 cr each semester)</td>
</tr>
</tbody>
</table>
2. Which courses and course types should be offered annually?

3. Which courses and course types should be offered every other academic year or every third year?

Most of the 400- and 500-level courses listed above serve a dual purpose as required or elective courses in our graduate programs. Driven in part by undergraduate enrollments, most of these courses should be offered annually. Many of these courses also support interdisciplinary graduate programs (including GPN, Bioinformatics, MCBB, Terrestrial Biogeoscience). Courses at the 700-level are for graduate students/programs only.

**Neurobiology:** also supports GPN (all) and MCBB (e.g., 502, 645, 655, 681, 755)

- BI/NE 520 Sensory Neurobiology
- BI/NE 525 Biology of Neurodegenerative Diseases (Dr. Lucia Pastorino, added for Spring 2014, effectively replaces BI 594)
- BI/NE 545 Neurobiology of Motivated Behavior
- BI 594 Topics in Neurobiology: Channelopathies (offered for last time in Spring 2015)
- BI 599 Neurobiology of Synapses
- BI/NE 644 Neuroethology (reactivated as lecture/discussion course for Spring 2015)
- *BI/NE 645 Cellular and Molecular Neurophysiology
- *BI/NE 649 Neuro Design Lab (new for Fall 2014)
- BI/NE 655 Developmental Neurobiology
- BI/NE 681 Molecular Biology of the Neuron
- BI 755 Cellular & Systems Neuroscience
- BI 756 Systems & Behavioral Neuroscience (taught by GPN faculty outside Biology)

- BI 502 Theory of Biological Networks (currently inactive)
- BI/NE 554 Neuroendocrinology (currently inactive)
- BI 575 Tech Cell Molec Neurobiol (currently inactive)

**Cell and Molecular Biology:** also supports MCBB (most courses) and other programs as indicated

- *BI 513 Genetics Laboratory (BA/MA Biotech)
- *BB 522 Molecular Biology Lab (BA/MA Biotech)
- BI 527 Biochemistry Laboratory (2 cr) (7-year Med program, Bioinformatics)
- BI 528 Biochemistry Laboratory (2 cr) (7-year Med program, Bioinformatics)
- BI 551 Stem Cells
- BI 552 Molecular Biology I (MS in Bioinformatics)
- BI 553 Molecular Biology II (Bioinformatics)
- BI 560 Systems Biology (new in Spring 2013)
- BI 572 Advanced Genetics (alt years) (Bioinformatics)
- BI 576 Carcinogenesis
- BI 610 Cellular Aspects of Develop. & Differentiation
- BI 621 Biochemistry I
- BI 622 Biochemistry II
- MB 721 Grad Biochemistry
- MB 722 Advanced Biochemistry
- BI 735 Advanced Cell Biology
- BI 753 Advanced Molecular Biology

- BI 556 Membrane Biochem & Cell Signaling (currently inactive)
- BI 625 General Endocrinology (currently inactive)
- BI 642 Physiology & Biochemistry of Reproduction (currently inactive)
- BI 646 Biology of the Cell Cycle (currently inactive)
- BI 708 Biochem & Molecular Develop (currently inactive)
Ecology, Behavior & Evolution: supports other programs as indicated
BI 504 Advanced Evolution
BI 506 Phenotypic Plasticity
BI 508 Behavioral Ecology
BI 515 Population Genetics
BI 519 Theoretical Evolutionary Ecology
BI/GE 530 Forest Ecology (GE/ES, Terr. Biogeo.)
BI 607 Animal Behavior
BI 614 Ornithology
BI 616 Herpetology (new in Spring 2014)
BI/ES 643 Terrestrial Biogeochemistry (GE/ES, Terr. Biogeo.)
BI 648 Conservation Biology
BI 686 Sustainability (reactivated for Spring 2015)
BI 671 Surv EBE & Marine Biol (new in Fall 2012, 2 cr, alt years)
BI 719 Colloquium in Terrestrial Biogeoscience (2 cr) (Terr. Biogeosciences)
BI 720 Practicum in Terrestrial Biogeoscience (2 cr) (Terr. Biogeosciences)
(teaching responsibility for 719/720 alternates between Biology and E&E)

BI 503 Symbiosis (uncertain for AY 15/16)
BI 543 Global Ecology (uncertain for AY 15/16)

BI 505 Evolution & Development (currently inactive)
BI 549 Molecular Phylogenetics & Evolution (currently inactive)
BI 615 Biology of Mammals (currently inactive)
**STEP III. PLANNING FOR EFFECTIVE, EFFICIENT, EQUITABLE, AND SUSTAINABLE COURSE STAFFING**

The core of the process of developing a course roster requires starting with the course rotation needs identified in Step II of this document. Although we develop course rosters from one year to the next, the exercise really requires curricular planning over a longer time period that takes account of the shifting availability of specific faculty and other constraints.

This section of the self-study asks you to devise a plan for staffing your core course rotation needs over the upcoming three-year period. The most straightforward way to do it is to list each course (or type of course, where multiple courses could cover the requirement) for which your department or program has indicated a core need and indicate how your department proposes to cover the obligation over the next three-years (2014/2015, 2015/2016, 2016/2017).

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Teaching Arrangements</th>
</tr>
</thead>
<tbody>
<tr>
<td>BI 105</td>
<td>Will be taught annually by Dr. Elizabeth Co</td>
</tr>
<tr>
<td>BI 108 AC</td>
<td>Will be taught annually by Dr. Elizabeth Co as an overbase teaching assignment</td>
</tr>
<tr>
<td>BI 106</td>
<td>Will be taught annually by Dr. Elizabeth Co</td>
</tr>
<tr>
<td>BI 107</td>
<td>Will be taught annually by Profs. Schneider, Sorenson, Wasserman, and Dr. K. Spilios, possibly with rotation by other EBE faculty</td>
</tr>
<tr>
<td>BI 108</td>
<td>Will be taught annually; by Profs. Monette, Leochler and Eldred in Spring 2015; plans are uncertain for 2016 and 2017, but Profs. Loechler and Eldred will likely continue in BI 108 with additional CM faculty participation</td>
</tr>
<tr>
<td>BI 111</td>
<td>Offered by Prof. G. Callard in Fall 2014; future plans for this or an alternative non-majors course are uncertain</td>
</tr>
<tr>
<td>BI 114</td>
<td>Will be taught annually by Dr. Elizabeth Co</td>
</tr>
<tr>
<td>BI 119</td>
<td>Will be taught annually by Prof. Traniello</td>
</tr>
<tr>
<td>BI 203, 281</td>
<td>Two sections of this course are being taught by Prof. Monnete and Dr. Uwe Beffert in Fall 2014; Dr. Beffert will teach both sections of the course in Fall 2015 and Fall 2016.</td>
</tr>
<tr>
<td>BI 213</td>
<td>Will be taught annually by Prof. Naya (subject to grant-supported teaching buy-out)</td>
</tr>
<tr>
<td>BI 206, 282</td>
<td>Will be taught annually by Prof. Celenza.</td>
</tr>
<tr>
<td>BE 209</td>
<td>This course is offered specifically for BME majors, with the Biology instructional labs staff and graduate teaching fellows responsible for the laboratories only.</td>
</tr>
<tr>
<td>BI 216</td>
<td>Will be taught annually by Prof. Loechler (class meets with BI 206 for half of semester)</td>
</tr>
<tr>
<td>BI 211</td>
<td>Will be taught annually by Dr. Elizabeth Co</td>
</tr>
<tr>
<td>BI 225</td>
<td>Will be taught annually by Prof. Traniello</td>
</tr>
<tr>
<td>BI 230</td>
<td>Will be taught annually by Prof. Baum</td>
</tr>
<tr>
<td>BI 260</td>
<td>Will be taught annually by Prof. Buston</td>
</tr>
<tr>
<td>BI 302</td>
<td>Will be taught annually by Prof. Wasserman</td>
</tr>
<tr>
<td>BI 303</td>
<td>Will be taught annually by Dr. Nathan Stewart</td>
</tr>
<tr>
<td>BI 305</td>
<td>Will be taught in years when Prof. Primack is not teaching in KHC</td>
</tr>
<tr>
<td>BI 306</td>
<td>Will be taught annually by Prof. Templer</td>
</tr>
<tr>
<td>BI 309</td>
<td>Will be taught annually by Prof. Mullen or Prof. Schneider</td>
</tr>
<tr>
<td>BI 311</td>
<td>Will be taught annually by Prof. Talbot</td>
</tr>
<tr>
<td>BI 315</td>
<td>Will be taught every semester by Prof. Widmaier</td>
</tr>
<tr>
<td>BI 325 (NE 203 lecture)</td>
<td>Will be taught every semester: by Prof. Cruz-Martin and Prof. Gavornik in Fall semester and by Prof. Ho and Prof. Gavornik in Spring semester (beginning Spring 2015)</td>
</tr>
<tr>
<td>BI 385</td>
<td>Will be taught annually by Prof. Siggers</td>
</tr>
<tr>
<td>BI 407/607</td>
<td>Will be taught annually by Prof. Wasserman</td>
</tr>
<tr>
<td>BI 410/610</td>
<td>Will be taught annually by Prof. Bradham</td>
</tr>
<tr>
<td>BI 414/614</td>
<td>Will be taught in alternate years by Prof. Wasserman</td>
</tr>
<tr>
<td>BI 416/616</td>
<td>Will be taught in alternate years by Profs. Schneider and/or Warkentin</td>
</tr>
<tr>
<td>BI 421/621</td>
<td>Will be taught annually by Prof. Tolan</td>
</tr>
<tr>
<td>BI 422/622</td>
<td>Will be taught annually by Prof. Kornberg</td>
</tr>
<tr>
<td>BI 438, 439, 440, 441</td>
<td>Tropical Ecology Program in Ecuador – all courses by Dr. Kelly Swing</td>
</tr>
</tbody>
</table>
BI 443/643: Will be taught in alternate years by Prof. Finzi
BI 445/645: Will be taught annually by Prof. Lin
BI 448/648: Will be taught annually by Prof. Primack
BI 449/649: Will be taught annually by Prof. Gardner
BI 455/655: Will be taught annually by Prof. Man
BI 481/681: Will be taught annually by Prof. Ho
BI 486/686: Will be taught annually or in alternate years by Dr. Stewart.
BI 502: Will be taught in alternate years by by Prof. Gardner (subject to grant-supported teaching buy-out)
BI 504: Will be taught in alternate years by Prof. Mullen or Prof. Schneider.
BI 506: Will be taught in alternate years by Prof. Warkentin
BI 508: Will be taught in alternate years by Prof. Sorenson or Prof. Buston
BI 513: Will be taught annually by Prof. Celenza
BI 515: Will be taught in alternate years by Prof. Sorenson
BI 519: Will be taught in alternate years by Prof. Buston
BI 520: Will be taught annually by Prof. Davison
BI 527: Will be taught annually by Prof. Tolan
BI 528: Will be taught annually by Prof. Kornberg
BI 530: Will be taught annually by Prof. Templer
BI 531: Will be taught annually by Prof. Lobel
BI 536: Will be taught in alternate years by Prof. Schneider
BI 539: Will be taught annually by Prof. Kaufman or Dr. Stewart or Dr. Rotjan
BI 542: Will be taught annually by Prof. Atema
BI 543: Will be taught annually by Prof. Zook (SED) – uncertain for AY15/16 and beyond
BI 545: Will be taught annually by Prof. Baum
BI 546: Will be taught annually by Prof. Kaufman or Dr. Stewart
BI 550: Will be taught annually by Prof. Finnerty
BI 551: Will be taught annually by Prof. Frydman
BI 552: Will be taught annually by Prof. Loechler
BI 553: Will be taught annually by Prof. Naya
BI 560: Will be taught annually by Prof. Siggers
BI 563: Will be taught annually by Prof. Atema
BI 569: Will be taught annually by Prof. Finnerty or Dr. Stewart
BI 572: Will be taught in alternate years by Prof. McCall
BI 576: Will be taught in alternate years by Profs. McCall and/or Gilmore
BI 579/580: Will be taught annually by EBE faculty
BI 583/584: Will be taught annually by CM faculty
BI 594: Offered for last time in Spring 2015; effectively replaced by BI/NE 525
BI 599: Will be taught annually by Prof. Man or Prof. Cruz-Martin
BI 671: Will be taught in alternate years by Prof. Buston or other EBE faculty
BI 719: Will be taught annually by Prof. Finzi or Templer in rotation with E&E faculty in alt years
BI 720: Will be taught annually by Prof. Finzi or Templer in rotation with E&E faculty in alt years
BI 735: Will be taught annually by CM Faculty (Prof. Waxman & Prof. McCall in Spring 2016)
BI 753: Will be taught annually by Prof. Hansen
BI 755: Will be taught annually by Prof. Eldred w/ possible rotation by other neurobiology faculty
BI 756: Will be taught annually, currently by neuroscience faculty outside of Biology.

BB 522: Will be taught annually by Prof. Gilmore

MB 721: Will be taught annually by Prof. Kornberg
MB 722: Will be taught annually by Prof. Tolan

MR 533: Will be taught annually by Prof. Lobel
MR 541: Will be taught in alternate years by Prof. Kaufman
CC 106/111: CC 106 has been substantially revised for Spring 2015 and will be offered in Fall 2015 as CC 111. As a result, the longstanding participation of EBE faculty in this course has concluded and Prof. Bradham (CM) will participate in CC 111 beginning in Fall 2015.

WS 101: Prof. Warkentin participates in this Women’s, Gender & Sexuality Studies course on an annual basis.

KHC BI 101, BI 102, HC 301: Profs. Primack and Kaufman will continue teaching for KHC.

STEP IV: EXECUTIVE SUMMARY OF UPDATES AND TEN-YEAR PLANNING

1. UPDATES: Please list all major updates that you made to this document this year.

New courses for AY 2014/15:
• BI 224 (2 credits) has transitioned to BI225 (4 credits) and is instructed by Prof. Traniello
• Prof. Frydman is developing a new course BI 411 Microbiome for Spring 2015
• Prof. Gardner is teaching a lab-only course (BI 449 Neuro Design Lab) during Fall 2014, he plans to offer this course on an annual basis
• Prof. Atema has revised BI 444/644 Neuroethology and will be offering the course as a 500-level lecture/discussion course (BI/NE 542) in Spring 2015 and continuing in future years
• Dr. Stewart has revised and reactivated BI 486 Sustainability for Spring 2015
• Prof. Kaufman has developed MR 541 Coral Reef Restoration as a new block format course for the marine semester

New courses for AY 2015/16:
• CC 106 has been revised and will be offered as CC 111 in AY 15/16 with Prof. Bradham participating
• Prof. Finzi plans to offer a new 300-level course in Principles of Ecosystem Science during AY 15/16
• Prof. Schneider plans to reactivate BI 536 Molecular Ecology, a block course for the marine semester in Fall 2015
• Prof. Talbot plans to offer a new 400-level course in Community Ecology during AY 15/16

Other changes to existing courses:
• Due to faculty retirements and improvements in the laboratory experience for students in BI 108, BI 118 has been dropped from the curriculum in AY 14/15
• Given high demand, BI 203 Cell Biology was increased to two sections for Fall 2014

Changes in staffing: the above list of teaching assignments includes a number of changes, including a few changes to important introductory courses. These include:
• Prof. Loechler has joined a team of three faculty members teaching BI 108, providing a stable plan through Spring 2016, after which other faculty members will need to join the course
• BI 203 (281) was increased to two sections for Fall 2014; Dr. Uwe Beffert will teach both sections in Fall 2015 and Fall 2016, after which plans are uncertain
• Incoming neurobiology faculty (Gavornik and Cruz-Martin) will team teach this course with Prof. Ho, providing a stable plan for this course over the next several years

Courses that have been discontinued in recent years and that would ideally be included in the curriculum or replaced with comparable courses (courses marked with an asterisk are new to this list):
• * BI 111 Brains, Hormones & Behavior (G. Callard – offered for last time in Fall 2014)
• * BI 502 Theory of Biological Networks (Gardner)
• * BI/NE 554 Neuroendocrinology (G. Callard – offered for last time in Spring 2014)
• BI 117 Intro to Global Ecology (Zook)
• BI 304 Morphogenesis (Patt)
• BI 305 Plant Biology (Primack)
• BI 403/603 Cell Physiology and Structure (Hausman)
• BI 415/615 Biology of Mammals (Kunz)
• BI 425/625 General Endocrinology (IP Callard)
• BI 442/642 Physiology & Biochemistry of Reproduction (IP Callard)
• BI 446/646 Cell Cycle (Monette)
• BI 503 Symbiosis (Zook)
• BI 505 Evolution & Development (Finnerty)
• BI 543 Global Ecology (Zook – status uncertain for AY 15/16)
• BI 549 Molecular Phylogenetics & Evolution (Schneider, Sorenson)
• BI 556 Membrane Biochem & Cell Signaling (Waxman)
• BI 575 Techniques in Cell Molec Neurobiol (Lin, Wachowiak)
• BI 594 Topics in Neurobiology (Dionne), effectively replace by BI/NE 525
• BI 708 Biochem & Molecular Develop (Hausman)

2. GOALS AND PLANNING: With continuing reference to the three preceding sections of this Self-Study, please discuss significant changes, beyond those already documented above, that your unit is planning or that you foresee occurring over the next three years, and assess the potential impact of those changes on the scope and quality of academic programs.

A. The Curricular Context: How will your unit’s set of commitments and priorities in undergraduate and graduate education evolve (include enrollment projections in cases where you foresee a substantial change in student numbers)?

The Biology faculty supports a broad range of courses that serve both undergraduate and graduate students in Biology as well as students in a variety of interdisciplinary programs and students in other colleges. Despite BU’s gradual reduction in the size of the freshman class over the past few years, we are seeing little evidence of declining enrollments, as student interest in Biology and related fields remains strong. Indeed, enrollments in some of our larger courses (e.g., BI 213, 216, 315, 352, 552) reached record highs in 2014. The diversity of programs we serve can generate competing demands on faculty time and present challenges to updating and expanding our course offerings, but we anticipate the need to maintain a robust curriculum in each of the major areas currently represented in the department.

In each of our three major subject areas, we face a somewhat different set of factors that will influence curricular planning in the coming years:

The primary challenge for the cell and molecular biology curriculum, which also serves interdisciplinary programs at both the undergraduate (BMB, Biotechnology) and graduate (MCBB, Bioinformatics) level, will be to develop new staffing plans for two of our large introductory courses (BI 108, BI 203/213) while also maintaining a full range of intermediate and advanced electives following recent and planned faculty retirements.

For the EBE/MB faculty, a reduced commitment to the Core Curriculum, the addition of a full-time lecturer (Dr. Stewart) and a new tenure-track faculty member (Prof. Talbot) are providing an opportunity to add new courses, while also contributing to a planned expansion of course offerings during the marine semester. The group continues to be involved in a broad range of teaching responsibilities, including Marine Science, Kilachand Honors College, the Terrestrial Biogeosciences program, and Women’s, Gender & Sexuality Studies.
A robust curriculum in neurobiology, which serves both Biology students and Neuroscience students, is increasingly important as student interest in this field grows. With two new neurobiologists joining the department in Spring 2015, we have developed a new staffing plan for NE 203/BI 325 that should serve the department well for the next several years.

List any academic programs that you are currently proposing/developing/reviewing/revising or planning to propose/develop/review/revise, either within your department or in collaboration with other units of the College and University.

**Biology Department LA Program:** As part of the Department's focus on both enhancing the undergraduate student learning experience, we have continued to develop the Learning Assistant (LA) program under the leadership of Dr. Kathryn Spilios. The department supports a current proposal submitted by Prof. Bennett Goldberg (Director of Stem Education) to centralize and expand this program.

**Biogeosciences:** Biology faculty members involved in the interdisciplinary Biogeosciences PhD certificate program are continuing to explore the possibility of developing it into a PhD granting graduate program.

Please take advantage of this opportunity not only to think about new initiatives and growth areas, but also to assess the costs and benefits of any degree programs or minors currently offered or staffed by your unit that enroll fewer than 20 students.

*Note:* The future of low-enrollment programs will be a particular focus of our follow-up discussions with you this year.

**B. Specific Course Needs:** In what significant ways will the changes listed in “A” above affect the courses (kind, size, format, offering patterns) you will need to offer?

Given strong student interest in our programs, our primary challenge moving forward is to maintain an appropriate range of intermediate and advanced electives in modern biology while also staffing our required introductory courses, and continuing our contribution to interdisciplinary programs, as we continue through a period of faculty retirements (and hopefully continued hiring of new faculty members). This turnover in faculty will provide an opportunity to replace some upper level electives with new courses that reflect increasing interest and faculty expansion in neuroscience, systems/integrative biology, genomics, and quantitative biology (including theory), but it will also require some of our current faculty members to increase their contributions to introductory courses.

One specific challenge is the very large size of some of our “sophomore” level courses, including Cell Biology (BI 203/213/281) and Systems Physiology (BI 315). Ideally, additional sections of these courses would be offered to reduce class sizes to manageable levels. We have accomplished this for BI203 in Fall 2014 and the following two years, but still have one large section of BI 315 per semester.

Another challenge is related to the Marine Science program, and particularly the marine semester, which has drawn faculty away from teaching upper division courses and graduate courses in EBE; it will be important for the Marine Program to continue working towards a larger menu of course offerings across participating departments to allow some degree of rotation in and out of the marine semester. The addition of Dr. Nathan Stewart as a full time lecturer in AY 13/14 has helped fill part of this need.

Finally, a continuing challenge for the department, particularly as the size of our incoming graduate student cohorts has declined, is a shortage of dedicated courses for graduate students. Each of the three major groups now has at least one course specifically designed for incoming graduate students,
but the EBE/MB group still lacks important disciplinary courses dedicated to graduate student training. This was one of the key weaknesses of our graduate program emerging from the Academic Program Review process.

C. Course Staffing: How do you see the next ten years of turnover and renewal affecting the composition and profile of your faculty? Please think especially of how you will use replacement positions to build areas of new or continuing high priority in research and teaching. How will these changes affect your planning for the implementation of current and future curricula?

The most significant challenge for the department in the near term continues to be staffing of our current courses as additional faculty members retire. Six faculty members retired at the end of AY 2012/13 and at least six additional retirements are planned before the end of AY 16/17. Adding two full time lecturers (Elizabeth Co in AY12/13 and Nathan Stewart in AY 13/14), has allowed us to address some of the most critical needs, but additional changes in the staffing for some of our large undergraduate courses will be needed over the next 3 years. Recently hired tenure-track faculty members are covering some important needs (e.g., BI 311, Talbot; BI 325 Cruz-Martin, Gavornik; BI385, Siggers), but staffing plans for other important courses remain uncertain (e.g., BI 108, BI 203/213/281).

Over the longer term and as outlined in our Academic Program Review Self-Study, continued hiring of new faculty across the three major subject areas in the department will be necessary for us to maintain a curriculum that emphasizes instruction by research-active faculty and that allows us to maintain a range of advanced electives and courses dedicated to graduate education. Last year’s “cluster” search in neurobiology puts us in excellent position to meet these goals within that subfield of Biology. To the extent that we must wait for additional hiring, however, we will face continuing challenges in staffing courses, particularly in cell and molecular biology.

Thank you for taking the time to engage in this exercise. It will help us serve our students and faculty better. We will take account of the responses in responding to specific proposals, requests for temporary lecturers, and requests for new and replacement faculty positions. We will also use the self-study as one basis for continuing discussions in the College about strategic planning.