

## B. S. BIOLOGICAL SCIENCES / M.S. BIOENGINEERING ROADMAP 2022-2023

### FRESHMAN YEAR

| <u>First Semester</u>                               | <u>Second Semester</u>                               |
|-----------------------------------------------------|------------------------------------------------------|
| BIOL 1010 Frontiers in Biol. I .....1(1,0)          | BIOL 1110 Prin. of Biol. II <sup>1</sup> .....4(3,3) |
| BIOL 1100 Prin. of Biol. I <sup>1</sup> .....4(3,3) | CH 1020 General Chemistry .....4(3,3)                |
| CH 1010 General Chemistry .....4(3,3)               | ENGL 1030 Composition and Rhetoric.....3(3,1)        |
| MATH 1060 Calculus of One Var. I .....4(4,0)        | MATH 1080 Calculus of One Var. II .....4             |
| SC REACH Act Requirement <sup>2</sup> .....3        | 15                                                   |
| 16                                                  |                                                      |

### SOPHOMORE YEAR

|                                                          |                                                                |
|----------------------------------------------------------|----------------------------------------------------------------|
| CH 2230 Organic Chemistry .....3(3,0)                    | BCHM 3050 Essential Elements of Bioch <sup>7</sup> .....3(3,0) |
| CH 2270 Organic Chemistry Lab <sup>3,4</sup> .....1(0,3) | BIOL 3350 Evolutionary Biology .....3(3,0)                     |
| GEN 3000 Fundamental Genetics <sup>5</sup> .....3(3,0)   | MATH 2080 Intro. Ordin. Differ. Equ .....4(4,0)                |
| MATH 2060 Calculus of Several Var. ....4(4,0)            | Social Science Requirement <sup>8</sup> .....3                 |
| Organismal Diversity Requirement <sup>6</sup> .....4     | Major Requirement <sup>9</sup> .....3                          |
| 15                                                       | 16                                                             |

### JUNIOR YEAR

|                                                               |                                                              |
|---------------------------------------------------------------|--------------------------------------------------------------|
| BIOL 4610 Cell Biology.....3(3,0)                             | BIOE 3200 Biomechanics <sup>10</sup> or .....3(3,0)          |
| CE 2010 Statics.....3(3,0)                                    | BIOE 3700 Bioinstr. and Bioimaging <sup>11</sup> .....3(2,3) |
| MSE 2100 Intro. Material Science <sup>10</sup> or .....3(3,0) | PHYS 2210 Physics with Calculus II and.....3(3,0)            |
| ECE 2070 Basic Elect Engineer <sup>11</sup> and.....2(2,0)    | PHYS 2230 Physics Laboratory II.....1(0,3)                   |
| ECE 2080 Elect Engineering Lab I.....1(0,2)                   | Arts and Humanities (Literature) Req. <sup>8</sup> .....3    |
| PHYS 1220 Physics with Calculus I and.....3(3,0)              | Functional Biol. Requirement <sup>12</sup> .....3            |
| PHYS 1240 Physics Laboratory I.....1(0,3)                     | Global Challenges Course Requirement <sup>8</sup> .....3     |
| Oral Communication Requirement <sup>8</sup> .....3            | 16                                                           |
| 16                                                            |                                                              |

### SENIOR YEAR

|                                                 |                                                          |
|-------------------------------------------------|----------------------------------------------------------|
| BIOE 6400 Biopharmaceutical Engineer.....3(3,0) | Arts and Humanities (Non-Lit) Req. <sup>8</sup> .....3   |
| BIOL 3150 Functional Human Anatomy .....4(3,3)  | BIOE, BIOL OR BCHM 6xxx.....3                            |
| BIOL 4930 Senior Seminar or                     | Ecology Requirement <sup>14</sup> .....3                 |
| MICR 4930 Senior Seminar .....2(2,0)            | Global Challenges Course Requirement <sup>8</sup> .....3 |
| Advanced Lab Requirement <sup>13</sup> .....2   | Major Requirement <sup>9, 15</sup> .....3                |
| Major Requirement <sup>9</sup> .....3           | 15                                                       |
| Social Science Requirement <sup>8</sup> .....3  |                                                          |
| 17                                              |                                                          |

**Total Semester Hours = 126**

<sup>1</sup> BIOL 1100 and BIOL 1110 are strongly recommended; however, BIOL 1030/1050 may substitute for BIOL 1100 and BIOL 1040/1060 may substitute for BIOL 1110.

<sup>2</sup> See South Carolina REACH Act Requirements in the Academic Regulations section in the Undergraduate Catalog.

<sup>3</sup> Most professional health sciences schools require the second semester of organic chemistry with laboratory, CH 2240/2280.

<sup>4</sup> CH 2010 and CH 2020 may substitute.

<sup>5</sup> GEN 3020 may substitute.

<sup>6</sup> At least one lecture and associated laboratory selected from BIOL 3010/3011, 3020/3060, 3030/3070, 3040/3080, 3200/3201, 4060/4070, 4250/4260

<sup>7</sup> BCHM 3010 may substitute.

<sup>8</sup> See General Education Requirements. The Medical Colleges Admissions Test (MCAT) includes questions on psychology and sociology.

<sup>9</sup> Credit hours must come from BIOL or MICR courses at the 3000-level or above, three classes of which must be laboratory. Two semesters of BIOL 4910 are recommended for BIOE MS thesis option.

<sup>10</sup> Biomaterials track

<sup>11</sup> Bioinstrumentation track

<sup>12</sup> At least one course selected from selected from BIOL 4040, 4080, 4200, 4400, 4530, 4590, 4750, 4800, 4830, 4840, MICR 4140, or 4170

<sup>13</sup> At least one course selected from BIOL 4020, BIOL 4030, BIOL 4090, BIOL 4110, BIOL 4240, BIOL 4280, BIOL 4330, BIOL 4440, BIOL 4450, BIOL 4470, BIOL 4500, BIOL 4570, BIOL 4600, BIOL 4620, BIOL 4710, BIOL 4760, or BIOL 4820.

<sup>14</sup> At least one course selected from BIOL 4100, 4410, 4420, 4430, 4460, 4480, 4700, MICR 4030, or MICR 4040.

<sup>15</sup> Students may take additional graduate courses during this semester. Total graduate courses completed as an undergraduate may not exceed twelve credit hours. See advisor.

## 2022/2023 B.S. BIOLOGICAL SCIENCES/M.S. BIOENGINEERING WORKSHEET

| <b>BIOL Core Requirement: (29 cr.)</b>                                                           | <b>SEM/Yr</b>                | <b>_Grade</b> |
|--------------------------------------------------------------------------------------------------|------------------------------|---------------|
| BIOL 1010                                                                                        | 1(1,0)                       | _____         |
| BIOL 1100/1101                                                                                   | 4(3,3) <sup>1</sup>          | _____         |
| BIOL 1110/1111                                                                                   | 4(3,3) <sup>1</sup>          | _____         |
| BIOL 3350                                                                                        | 3(3,0)                       | _____         |
| BIOL 4610                                                                                        | 3(3,0)                       | _____         |
| BIOL 4930 <b>OR</b> MICR 4930                                                                    | 2(2,0)                       | _____         |
| <i>Organismal Diversity Requirement (4 cr.)</i>                                                  |                              |               |
| BIOL 3010/3011, 3020/3060, 3030/3070,<br>3040/3080, 3200/3201, 4060/4070, <b>OR</b><br>4250/4260 | _____                        | _____         |
| <i>Ecology (3 cr.)</i>                                                                           |                              |               |
| BIOL 4410, 4420, 4430, 4460,<br>4480, <b>OR</b> 4700                                             | _____                        | _____         |
| <i>Functional Biology Requirement (3 cr.)</i>                                                    |                              |               |
| BIOL 3160, 4040, 4080, 4590,<br>4750, <b>OR</b> 4800                                             | _____                        | _____         |
| <i>Advanced Lab Requirement (2 cr.)<sup>2</sup></i>                                              |                              |               |
| <hr/>                                                                                            |                              |               |
| <b>Major Requirement: (21 cr.)<sup>3</sup></b>                                                   |                              |               |
| Laboratory course req. BIOL 3151 (0)                                                             | _____                        | _____         |
| Laboratory Course req.                                                                           | _____                        | _____         |
| Laboratory Course req.                                                                           | _____                        | _____         |
| BIOL 3150 (4)                                                                                    | _____                        | _____         |
| MATH 2060 (4) <sup>4</sup>                                                                       | _____                        | _____         |
| MATH 2080 (4) <sup>4</sup>                                                                       | _____                        | _____         |
| _____                                                                                            | _____                        | _____         |
| _____                                                                                            | _____                        | _____         |
| _____                                                                                            | _____                        | _____         |
| _____                                                                                            | _____                        | _____         |
| <hr/>                                                                                            |                              |               |
| <b>Required Science Courses (34 cr.)</b>                                                         |                              |               |
| BCHM 3050                                                                                        | 3(3,0)                       | _____         |
| CH 1010/1011                                                                                     | 4(3,3)                       | _____         |
| CH 1020/1021                                                                                     | 4(3,3)                       | _____         |
| CH 2230, 2270 <b>OR</b><br>CH 2010, CH 2020                                                      | 3(3,0) & 1(0,3) <sup>5</sup> | _____         |
| GEN 3000                                                                                         | 3(3,0)                       | _____         |
| MATH 1060                                                                                        | 4(4,0)                       | _____         |
| MATH 1080                                                                                        | 4(4,0)                       | _____         |
| PHYS 1220, 1240                                                                                  | 3(3,0) & 1(0,2)              | _____         |
| PHYS 2210, 2230                                                                                  | 3(3,0) & 1(0,2)              | _____         |
| <b>Required Non-Science Courses (21 cr.)</b>                                                     |                              |               |
| ENGL 1030/1031                                                                                   | 3(3,1)                       | _____         |
| Arts & Humanities – Literature                                                                   | 3(3,0) <sup>6</sup>          | _____         |
| Arts & Humanities – Non-Literature                                                               | 3(3,0) <sup>6</sup>          | _____         |
| Oral Communication Requirement                                                                   | 3(3,0) <sup>6</sup>          | _____         |
| SC REACH Act                                                                                     | 3(3,0) <sup>7</sup>          | _____         |
| Social Sciences                                                                                  | _____                        | _____         |
| _____                                                                                            | 3(3,0) <sup>6</sup>          | _____         |
| _____                                                                                            | 3(3,0) <sup>6</sup>          | _____         |

- <sup>1</sup> BIOL 1100 and BIOL 1110 are strongly recommended; however, BIOL 1030/1050 may substitute for BIOL 1100 and BIOL 1040/1060 may substitute for BIOL 1110.
- <sup>2</sup> One course selected from BIOL 4020, BIOL 4030, BIOL 4090, BIOL 4110, BIOL 4240, BIOL 4280, BIOL 4330, BIOL 4440, BIOL 4450, BIOL 4470, BIOL 4500, BIOL 4570, BIOL 4600, BIOL 4620, BIOL 4710, BIOL 4760, or BIOL 4820.
- <sup>3</sup> Twenty-one credit hours from 3000-level or higher BIOL, ETOX, or MICR courses (except MICR 3000) or from CH 2240/CH 2280, ENR 4130, WFB 3130, WFB 4720, or WFB 4770. Selections must include at least three laboratory courses. **Any combination of BIOL or MICR 3940, 4910, 4920, 4940, and 4950 may not exceed eight credits.** Two semesters of BIOL 4910 are recommended for the Bioengineering M.S. Thesis Option.
- <sup>4</sup> Requires course substitution.
- <sup>5</sup> Most medical and dental schools require two semesters of organic chemistry with laboratory (CH 2230, 2270 and 2240, 2280), rather than a one semester survey of organic chemistry (CH 2010/2020)
- <sup>6</sup> See General Education Requirements.
- <sup>7</sup> HIST 1010, POSC 1010, or POSC 1030
- <sup>8</sup> Biomaterials track. See advisor if this course is not available.
- <sup>9</sup> Bioinstrumentation track
- <sup>10</sup> Used to satisfy both the BS and MS requirements (6 credits total).
- <sup>11</sup> Requires prerequisite override from Civil Engineering

| <b>Other Courses</b> | <b>SEM/Yr</b> | <b>Grade</b> |
|----------------------|---------------|--------------|
| CU 1000 _____        | _____         | _____        |
| GCC _____            | _____         | _____        |
| GCC _____            | _____         | _____        |

| <b>Electives (10 cr.)</b>                                                                         |       |       |
|---------------------------------------------------------------------------------------------------|-------|-------|
| BIOE 3200 (3) <sup>8</sup> <b>OR</b><br>BIOE 3700 (3) <sup>9</sup>                                | _____ | _____ |
| BIOE 6400 (3) <sup>10</sup>                                                                       | _____ | _____ |
| CE 2010 (3) <sup>11</sup>                                                                         | _____ | _____ |
| MSE 2100 (3) <sup>7</sup> <b>OR</b><br>ECE 2070 (2) <sup>9</sup> and<br>ECE 2080 (1) <sup>9</sup> | _____ | _____ |
| BIOE, BIOL <b>OR</b><br>BCHM 6xxx (3) <sup>10</sup>                                               | _____ | _____ |
| _____                                                                                             | _____ | _____ |