

# BS BIOMEDICAL SCIENCES

## Overview

The degree program in Biomedical Sciences at A&M-SA prepares students for careers in the biomedical sciences specifically those associated with hospitals, health systems, and biomedical and environmental research agencies. This will be accomplished by providing students with a strong background in biology and chemistry, while also offering targeted coursework that provides appropriate skill-based and applied knowledge for the biomedical sciences, such as Medical Microbial, Pharmacology, Introduction to Forensic Science, Seminar in Bioscience, Medical Ethics, Biology of Cancer, Introduction to Biomedical Science, Medical Informatics, Endocrinology, and Introduction to Neuroscience. Students will have opportunities for undergraduate research and a required Internship in Biomedical Sciences as we partner with newly developed hospitals and already established health science entities.

## Requirements

### General Requirements

- 36 upper-division credit hours required for degree
- 25% of courses must be taken at A&M-SA for degree
- CIP Code: 26.0102

All students must complete the University's Core Curriculum (<https://catalog.tamusa.edu/undergraduate/academic-policies-procedures/core-curriculum/>) and the specific requirements of the major. In some cases, a course that is required for a major may also be counted towards the Core Curriculum.

| Code                                | Title                           | Credits |
|-------------------------------------|---------------------------------|---------|
| <b>Core Curriculum <sup>1</sup></b> |                                 |         |
| ENGL 1301                           | Composition I                   | 3       |
| ENGL 2311                           | Technical Writing               | 3       |
| or ENGL 1302                        | Composition II                  |         |
| MATH 2313                           | Calculus I                      | 3       |
| BIOL 1306                           | Gen Biology I-Attr Living Sys   | 3       |
| BIOL 1307                           | Gen Biology II-Biol Organisms   | 3       |
| Lang/Phil/Culture                   |                                 | 3       |
| Creative Arts                       |                                 | 3       |
| American History                    |                                 | 3       |
| American History                    |                                 | 3       |
| Government/Political Science        |                                 | 3       |
| Government/Political Science        |                                 | 3       |
| PSYC 2301                           | General Psychology              | 3       |
| or COMM 1315                        | Fundamentals of Public Speaking |         |
| CHEM 1311                           | General Chemistry I             | 3       |
| CHEM 1312                           | General Chemistry II            | 3       |
| Subtotal:                           |                                 | 42      |
| <b>Required Support Courses</b>     |                                 |         |
| UNIV 1301                           | First Year Seminar              | 3       |
| MATH 2113                           | Calculus I Lab                  | 1       |
| CHEM 1111                           | General Chemistry Lab I         | 1       |
| CHEM 1112                           | General Chemistry Lab II        | 1       |

|             |                              |    |
|-------------|------------------------------|----|
| CHEM 2323   | Organic Chemistry I          | 4  |
| & CHEM 2123 | and Organic Chemistry I Lab  |    |
| CHEM 2325   | Organic Chemistry II         | 4  |
| & CHEM 2125 | and Organic Chemistry II Lab |    |
| CHEM 4341   | Biochemistry I               | 4  |
| & CHEM 4141 | and Biochemistry Laboratory  |    |
| PHYS 1301   | General Physics I            | 4  |
| & PHYS 1101 | and General Physics Lab I    |    |
| PHYS 1302   | General Physics II           | 4  |
| & PHYS 1102 | and General Physics Lab II   |    |
| Subtotal:   |                              | 26 |

### Major Required Courses

|                                                 |                                             |   |
|-------------------------------------------------|---------------------------------------------|---|
| BIOL 1106                                       | General Biology I Lab                       | 1 |
| BIOL 1107                                       | General Biology II Lab                      | 1 |
| BIOL 2316                                       | Genetics                                    | 4 |
| & BIOL 2116                                     | and Genetics Laboratory                     |   |
| Select one of the following:                    |                                             | 4 |
| BIOL 2321                                       | Introduction to Microbiology                |   |
| & BIOL 2121                                     | and Introduction to Microbiology Laboratory |   |
| BIOL 2331                                       | Cellular Biology                            |   |
| & BIOL 2131                                     | and Cellular Biology Laboratory             |   |
| BIOM 3101                                       | Biomedical Ethics                           | 1 |
| Select one of the following physiology courses: |                                             | 4 |

|                              |                                                   |       |
|------------------------------|---------------------------------------------------|-------|
| BIOM 3402                    | Human Physiology                                  |       |
| BIOL 3308                    | Animal Physiology                                 |       |
| & BIOL 3108                  | and Animal Physiology Laboratory                  |       |
| BIOL 3309                    | Cellular Physiology                               |       |
| & BIOL 3108                  | and Animal Physiology Laboratory                  |       |
| BIOL 3304                    | Biotechniques                                     | 4     |
| & BIOL 3115                  | and Statistics In Biology and Medicine Laboratory |       |
| BIOL 3315                    | Statistics in Biology & Medicine                  | 4     |
| & BIOL 3115                  | and Statistics In Biology and Medicine Laboratory |       |
| Select one of the following: |                                                   | 3-4   |
| BIOM 3410                    | Biomedical Sciences Internship                    |       |
| BIOL 4304                    | Undergrad Research in Biology                     |       |
| BIOM 4101                    | Seminar in Biomedical Science                     | 1     |
| Subtotal:                    |                                                   | 27-28 |

### Advanced Electives in Major

|             |                                                 |  |
|-------------|-------------------------------------------------|--|
| BIOM 3401   | Histology                                       |  |
| BIOM 3301   | Toxicology                                      |  |
| BIOM 3402   | Human Physiology <sup>2</sup>                   |  |
| BIOL 3308   | Animal Physiology                               |  |
| & BIOL 3108 | and Animal Physiology Laboratory <sup>2</sup>   |  |
| BIOL 3309   | Cellular Physiology                             |  |
| & BIOL 3109 | and Cellular Physiology Laboratory <sup>2</sup> |  |
| BIOL 3303   | Animal Nutrition                                |  |
| & BIOL 3109 | and Cellular Physiology Laboratory <sup>2</sup> |  |
| BIOL 3305   | Evolution                                       |  |
| BIOL 3306   | Microbial Pathogenesis                          |  |
| BIOL 3317   | Ecology                                         |  |
| & BIOL 3117 | and Ecology Laboratory                          |  |
| BIOL 4304   | Undergrad Research in Biology <sup>2</sup>      |  |
| BIOL 4358   | Bioinformatics                                  |  |
| BIOL 4340   | Molecular Biology                               |  |
| & BIOL 4140 | and Molecular Biology Laboratory                |  |

|                          |                                                           |
|--------------------------|-----------------------------------------------------------|
| BIOL 4342<br>& BIOL 4140 | Developmental Biology<br>and Molecular Biology Laboratory |
| BIOL 4344<br>& BIOL 4144 | Bacteriology<br>and Bacteriology Laboratory               |
| BIOL 4346<br>& BIOL 4144 | Virology<br>and Bacteriology Laboratory                   |
| BIOL 4348<br>& BIOL 4148 | Immunology<br>and Immunology Laboratory                   |
| BIOL 4409<br>& BIOL 4148 | Biology of Disease Vectors<br>and Immunology Laboratory   |
| BIOL 4330<br>& BIOL 4130 | Parasitology<br>and Parasitology Laboratory               |
| Subtotal:                | 16-25                                                     |
| <b>Other Electives</b>   |                                                           |
| PSYC 3315                | Health Psychology                                         |
| PSYC 3316                | Physiological Psychology                                  |
| PSYC 3324                | Cross-Cultural Psychology                                 |
| PSYC 3325                | Abnormal Psychology                                       |
| PSYC 3337                | Drugs, Addiction, & Behavior                              |
| CHEM 3331<br>& CHEM 3131 | Quantitative Analysis<br>and Quantitative Analysis Lab    |
| CHEM 3451                | Environmental Chemistry                                   |
| CHEM 4331<br>& CHEM 4131 | Instrumental Analysis<br>and Instrumental Analysis Lab    |
| CHEM 4342                | Biochemistry II                                           |
| CHEM 4360                | Separation Science                                        |
| CHEM 4370                | Enzymology                                                |
| CHEM 4379                | Selected Topics-Environ/Toxic                             |
| CHEM 4359                | Selected Topics-Computational                             |
| HLTH 3325                | Environmental Health                                      |
| HLTH 3330                | The Science of Health Disparities                         |
| HLTH 4325                | Global Health                                             |
| HLTH 4340                | Health Policy and Advocacy                                |
| WATR 3312                | Water Laws, Rules & Policy                                |
| WATR 3317                | Water Sust Use & Conserv Polcy                            |
| WATR 3320                | Pollutants in Environmental System                        |
| WATR 4340                | Environmental Impact Assessment                           |
| WATR 3331                | Hydrology                                                 |
| WATR 4330                | Water Management and Field Investigations                 |
| EDKN 3315                | Functional Anatomy                                        |
| EDKN 3316                | Medical Terminology                                       |
| EDKN 4325                | Biomechanics                                              |
| EDKN 4344                | Health and Aging                                          |
| Subtotal:                | 9-0                                                       |
| <b>Total Credits</b>     | <b>120</b>                                                |

<sup>1</sup> Other courses may satisfy core curriculum requirements. Courses listed under the core curriculum above are also specific degree requirements, and are recommended in the core to expedite degree completion.

<sup>2</sup> If not already taken to fulfill major requirement.

## Plan of Study

### First Year

| First Semester |                               | Credits   |
|----------------|-------------------------------|-----------|
| BIOL 1306      | Gen Biology I-Attr Living Sys | 3         |
| BIOL 1106      | General Biology I Lab         | 1         |
| CHEM 1311      | General Chemistry I           | 3         |
| CHEM 1111      | General Chemistry Lab I       | 1         |
| ENGL 1301      | Composition I                 | 3         |
| HIST 1301      | US History to 1865            | 3         |
| <b>Credits</b> |                               | <b>14</b> |

### Second Semester

|                |                               |           |
|----------------|-------------------------------|-----------|
| BIOL 1307      | Gen Biology II-Biol Organisms | 3         |
| BIOL 1107      | General Biology II Lab        | 1         |
| CHEM 1312      | General Chemistry II          | 3         |
| CHEM 1112      | General Chemistry Lab II      | 1         |
| HIST 1302      | US History from 1865          | 3         |
| ENGL 2311      | Technical Writing             | 3         |
| <b>Credits</b> |                               | <b>14</b> |

### Second Year

#### First Semester

|                |                         |           |
|----------------|-------------------------|-----------|
| BIOL 2316      | Genetics                | 3         |
| BIOL 2116      | Genetics Laboratory     | 1         |
| CHEM 2323      | Organic Chemistry I     | 3         |
| CHEM 2123      | Organic Chemistry I Lab | 1         |
| MATH 2313      | Calculus I              | 3         |
| MATH 2113      | Calculus I Lab          | 1         |
| GOVT 2305      | Federal Government      | 3         |
| <b>Credits</b> |                         | <b>15</b> |

#### Second Semester

|                           |                                                                                          |           |
|---------------------------|------------------------------------------------------------------------------------------|-----------|
| BIOL 2321<br>or BIOL 2331 | Introduction to Microbiology<br>or Cellular Biology                                      | 3         |
| BIOL 2121<br>or BIOL 2131 | Introduction to Microbiology Laboratory<br>or Cellular Biology Laboratory                | 1         |
| BIOL 3315<br>& BIOL 3115  | Statistics in Biology & Medicine<br>and Statistics In Biology and Medicine<br>Laboratory | 4         |
| CHEM 2325                 | Organic Chemistry II                                                                     | 3         |
| CHEM 2125                 | Organic Chemistry II Lab                                                                 | 1         |
| GOVT 2306                 | Texas Government                                                                         | 3         |
| <b>Credits</b>            |                                                                                          | <b>15</b> |

### Third Year

#### First Semester

|                                           |                                                                                 |           |
|-------------------------------------------|---------------------------------------------------------------------------------|-----------|
| BIOM 3101                                 | Biomedical Ethics                                                               | 1         |
| BIOM 3402<br>or BIOL 3308<br>or BIOL 3309 | Human Physiology Lab Required<br>or Animal Physiology<br>or Cellular Physiology | 4         |
| BIOL 3304                                 | Biotechniques                                                                   | 3         |
| PHYS 1301                                 | General Physics I                                                               | 3         |
| PHYS 1101                                 | General Physics Lab I                                                           | 1         |
| Language/Philosophy/Cultural Studies      |                                                                                 | 3         |
| <b>Credits</b>                            |                                                                                 | <b>15</b> |

**Second Semester**

|                               |                                |   |
|-------------------------------|--------------------------------|---|
| BIOM 3410                     | Biomedical Sciences Internship | 4 |
| PHYS 1302                     | General Physics II             | 3 |
| PHYS 1102                     | General Physics Lab II         | 1 |
| BIOL Advanced Elective w/ Lab |                                | 4 |
| Creative Arts                 |                                | 3 |

---

|                |           |
|----------------|-----------|
| <b>Credits</b> | <b>15</b> |
|----------------|-----------|

**Fourth Year****First Semester**

|                                          |                               |   |
|------------------------------------------|-------------------------------|---|
| BIOM 4101                                | Seminar in Biomedical Science | 1 |
| CHEM 4341                                | Biochemistry I                | 3 |
| CHEM 4141                                | Biochemistry Laboratory       | 1 |
| BIOM Advanced Elective                   |                               | 4 |
| Advanced Elective (BIOL, BIOM, or Other) |                               | 3 |
| Social/Behavioral Sciences               |                               | 3 |

---

|                |           |
|----------------|-----------|
| <b>Credits</b> | <b>15</b> |
|----------------|-----------|

**Second Semester**

|                                                   |                    |   |
|---------------------------------------------------|--------------------|---|
| BIOL or BIOM Advanced Elective (w/ Lab suggested) |                    | 4 |
| BIOL or BIOM Advanced Elective (w/ Lab suggested) |                    | 4 |
| Advanced Elective                                 |                    | 3 |
| Advanced Elective                                 |                    | 3 |
| PSYC 2301                                         | General Psychology | 3 |

---

|                |           |
|----------------|-----------|
| <b>Credits</b> | <b>17</b> |
|----------------|-----------|

---

|                      |            |
|----------------------|------------|
| <b>Total Credits</b> | <b>120</b> |
|----------------------|------------|