### UNIVERSITY CORE AND GRADUATION REQUIREMENTS

#### UNIVERSITY CORE REQUIREMENTS

<table>
<thead>
<tr>
<th>Requirements</th>
<th>#Classes</th>
<th>Hours</th>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctrinal Foundation</td>
<td>2</td>
<td>4.0</td>
<td>Rel A 121 and 122</td>
</tr>
<tr>
<td>New Testament</td>
<td>1</td>
<td>2.0</td>
<td>Rel A 211 or 212</td>
</tr>
<tr>
<td>Doctrine and Covenants</td>
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<td>2.0</td>
<td>Rel C 324 or 325</td>
</tr>
</tbody>
</table>

#### The Individual and Society

<table>
<thead>
<tr>
<th>Citizenship</th>
<th>1–2</th>
<th>3–6.0</th>
<th>from approved list</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Heritage</td>
<td></td>
<td></td>
<td>from approved list</td>
</tr>
<tr>
<td>Global &amp; Cultural Awareness</td>
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<td>3.0</td>
<td>from approved list</td>
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#### Skills

<table>
<thead>
<tr>
<th>Effective Communication</th>
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<th>3.0</th>
<th>from approved list</th>
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<tbody>
<tr>
<td>Adv Written &amp; Oral Communication</td>
<td>1</td>
<td>3.0</td>
<td>Engl 316 recommended</td>
</tr>
<tr>
<td>Quantitative Reasoning</td>
<td>1</td>
<td>4.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Languages of Learning (Math or Language)</td>
<td>1</td>
<td>4.0</td>
<td>Math 112* or 119*</td>
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</table>

#### Arts, Letters, and Sciences

<table>
<thead>
<tr>
<th>Civilization 1 and 2</th>
<th>2</th>
<th>6.0</th>
<th>from approved list</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arts</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Letters</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Scientific Principles &amp; Reasoning Biological Science</td>
<td>2</td>
<td>5.0</td>
<td>MMBio 240* and PDBio 120*</td>
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<tr>
<td>Physical Science</td>
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<td>6–7.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Social Science</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
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</table>

#### Core Enrichment: Electives

<table>
<thead>
<tr>
<th>Religion Electives</th>
<th>3–4</th>
<th>6.0</th>
<th>from approved list</th>
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<tbody>
<tr>
<td>Open Electives</td>
<td>Variable</td>
<td>Variable</td>
<td>personal choice</td>
</tr>
</tbody>
</table>

#### GRADUATION REQUIREMENTS: Minimum residence hours required: 30.0 Minimum hours needed to graduate: 120.0

*THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (13 hours overlap)

### PROGRAM REQUIREMENTS (61 total hours)

#### Complete the following core courses:

- **Bio 165**: Introduction to Bioinformatics 3.0
- **Chem 105**: General College Chemistry 4.0
- **Chem 106**: General College Chemistry 3.0
- **Chem 107**: General College Chemistry Lab 1.0
- **Math 112**: Calculus 1 4.0
- **MMBio 240**: Molecular Biology 3.0
- **PDBio 120**: Science of Biology 2.0
- **PDBio 360**: Cell Biology 3.0
- **PWS 106**: Introduction to Genetics & Biotechnology 2.0
- **PWS 288**: Mentored Laboratory Techniques 2.0
- **PWS 340**: Genetics 2.0
- **PWS 486**: Genomics 3.0
- **PWS 488**: Readings in Biotechnology 2.0

#### Complete 26 hours from one of the following tracks:

**A. Plant Genetics and biotechnology core track:**

- **Bio 220B**: Biological Diversity: Plants 4.0
- **Bio 420**: Evolutionary Biology 2.0
- **Chem 351**: Organic Chemistry 3.0
- **Chem 352**: Organic Chemistry 3.0
- **Chem 481**: Biochemistry 1 3.0
- **PWS 100**: Living with Plants 3.0
- **PWS 440**: Plant Physiology 3.0
- **PWS 494R**: Mentored Learning Experience 6.0

  Complete an additional 3 hours from the general major electives list below.

**B. Animal genetics and biotechnology core track:**

- **Bio 420**: Evolutionary Biology 2.0
- **PDBio 482**: Developmental Biology 3.0
- **PWS 494R**: Mentored Learning Experience 6.0

  Complete an additional two hours from the general major electives list below.

**C. Microbial genetics and biotechnology core track:**

- **Bio 420**: Evolutionary Biology 2.0
- **Chem 351**: Organic Chemistry 3.0
- **Chem 352**: Organic Chemistry 3.0
- **Chem 481**: Biochemistry 1 3.0
- **MMBio 151**: Introduction to Microbiology 4.0
- **MMBio 360**: Microbial Genetics 4.0
- **MMBio 481**: Advanced Bacterial Physiology 3.0

  Complete 2 hours from one of the following:
- **MMBio 494R**: Mentored Research 3.0
- **PWS 494R**: Mentored Learning Experience 6.0

  Complete an additional two hours from the general major electives list below.

**D. Bio-business core track:**

- **Bus M 201**: Financial Management 3.0
- **Bus M 488**: Agribusiness Management 1 3.0
- **Chem 285**: Introductory Bio-organic Chemistry 4.0
- **Org B 320**: Organizational Effectiveness 3.0

  Complete 2 hours required:
- **Bus M 241**: Marketing Management 3.0
- **Bus M 489**: Agribusiness Management 2 3.0

  Complete one of the following:
- **Bus M 371R**: Entrepreneurship Lecture Series 1.0
- **Bus M 380**: Executive Lectures 1.0

  Complete an additional 6 hours from the general major electives list below.

#### General Major Electives

| Bio 220A: Biological Diversity: Animals 4.0 |
| Bio 220B: Biological Diversity: Plants 4.0 |
| Bio 350: Ecology 3.0 |
| Bio 365: Computational Biology 3.0 |
| Bio 370: Bioethics 2.0 |
| Bio 420: Evolutionary Biology 2.0 |
| Bio 421: Evolutionary Biology Laboratory 1.0 |
| Bio 430: Plant Classification 3.0 |
| Bio 450: Conservation Biology 3.0 |
| Bio 463: Genetics of Human Disease 3.0 |
| Bio 465: Bioinformatics 3.0 |
| Bio 560: Population Genetics 4.0 |
| Chem 353: Organic Chemistry Lab–Nonmajors 2.0V |
| MMBio 221: General Microbiology 3.0 |
| MMBio 241: Molecular & Cellular Biology Lab 1.0 |
| MMBio 261: Infection and Immunity 3.0 |
| MMBio 390R: Readings in Molecular Biology 1.0 |
| MMBio 430: Advanced Cell Biology 3.0 |

(continued on back of this page)
BS in GENETICS AND BIOTECHNOLOGY (285823)
2013–2014

Suggested Sequence of Courses:

FRESHMAN YEAR

1st Semester
- MMBio 441 Advanced Molecular Biology 3.0
- MMBio 442 Advanced Molecular Biology Lab 2.0
- MMBio 460 Microbial Genetics 4.0
- MMBio 461 Advanced Bacterial Pathogenesis 4.0
- MMBio 465 Virology 3.0
- MMBio 466 Virology Laboratory 1.0
- Total Hours 15.0

2nd Semester
- MMBio 467 Immunology Lab 1.0
- MMBio 490R Molecular Biology Seminar 1.0
- MMBio 557 Genes and Cancer 2.0
- NDFS 330 Comparative Animal Nutrition 3.0
- PDbio 325 Tissue Biology (with Lab) 3.0
- PDbio 363 Advanced Physiology Laboratory 1.0
- PDbio 482 Developmental Biology 3.0
- PDbio 562 Reproductive Physiology 3.0
- PDbio 582 Developmental Genetics 3.0
- PWS 100 Living with Plants 3.0
- Total Hours 15.0

SOPHOMORE YEAR

1st Semester
- MMBio 360 Microbial Genetics 3.0
- MMBio 365 Physiology (Science track) 4.0
- PWS 288 (Bus. track) (2.0)
- Major elective 3.0
- General electives 3.0
- Total Hours 15.0

2nd Semester
- MMBio 361 Advanced Bacterial Physiology 3.0
- MMBio 366 Soil Fertility & Plant Nutrition Lab 1.0
- MMBio 331 Science of Plant Pest Control 3.0
- MMBio 431 Integrated Management of 3.0
- PWS 494R Mentored Learning Experience 6.0V
- PWS 514 Soil Microbiology 3.0
- PWS 559 Molecular Plant Breeding 3.0
- PWS 575 Plant Pathology 3.0
- PWS 586 Plant Cell Biology 3.0
- Stat 121 Principles of Statistics 3.0
- Total Hours 15.0

JUNIOR YEAR

3rd Semester
- MMBio 420 (Science track) 2.0
- MMBio 482 (Animal track) (4.0)
- MMBio 485 (Plant track) (2.0)
- PWS 488 3.0
- PWS 468 3.0
- Major elective 2.0
- General electives 3.0
- Total Hours 15.0

4th Semester
- MMBio 489 (Bus. track) (3.0)
- MMBio 489 (Science track) 3.0
- Global & Cultural Awareness elective 3.0
- General electives 6.0
- Total Hours 15.0

Note: The above course of study provides a guide in planning. However, to meet special needs and interests of each student, the courses taken and the order in which they are taken may require alteration. Study the requirements, plan a course of study, and consult with an advisor early in the program. This will save considerable time and minimize frustration.

**Careers in Genetics & Biotechnology, Fall of Sophomore year for all non-premed/predent students**

Note 1: Students are encouraged to complete an average of 15 credit hours each semester or 30 credit hours each year, which could include spring and/summer terms. Taking fewer credits substantially increases the cost and the number of semesters to graduate.

Note 2: Business majors should do PWS 199R (Academic Internship) during summer between Junior and Senior years.

**Recommended courses**

For preprofessional students in tracks A, B, or C above:
- Acc 200
- Bus M 201
- PWS 105
- PWS 106
- PWS 107
- PWS 108

For graduate school preparation in biotechnology:
- PWS 105, 106, 107, 108

For students seeking employment in the biotech industry:
- PWS 199R

**GE courses for bio-business students seeking a Marriott School of Management minor:**
- Stat 121
- Econ 110

**THE DISCIPLINE:**
This unique degree is for students who desire combined training in biotechnology and plant genetics. It is a relatively new discipline representing one of the most exciting developments in biological sciences in the 21st century. Students completing this degree will find themselves in the very forefront of biology in the 21st century.

**CAREER OPPORTUNITIES:**
The major is designed to provide a broad range of skills, including the following: quantitative reasoning; interpretation of scientific literature; recognition of historical and current scientific trends; principles of scientific data collection, interpretation, and assimilation; and critical writing.

Graduates enter directly into industry, medical schools, or graduate programs in any of the many biological science disciplines.

**HANDS-ON LEARNING OPPORTUNITIES:**
Every student in this major is encouraged to seek mentored research opportunities with faculty within the program. Completing one or more of these mentored research opportunities will set students apart and provide experience and credentials valuable in being admitted into the best graduate programs in the U.S.

**FINANCING:**
Scholarships are available for qualified students from the department, college, and university.

**HONORARY SOCIETIES AND CLUBS:**
The Department of Plant and Wildlife Sciences encourages student participation in active clubs within the department. Students are active participants in professional societies; national honor societies; campus academic, service, and social clubs.

Department of Plant and Wildlife Science
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Brigham Young University, Provo, UT 84602
Telephone: (801) 422-2760