### UNIVERSITY CORE AND GRADUATION REQUIREMENTS

#### UNIVERSITY CORE REQUIREMENTS

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Classes</th>
<th>Hours</th>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctrinal Foundation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Book of Mormon</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>
<td>1</td>
<td>2.0</td>
<td>Rel C 324 or 325</td>
</tr>
<tr>
<td>The Individual and Society</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Citizenship</td>
<td>1–2</td>
<td>3–6.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Global &amp; Cultural Awareness</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Skills</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effective Communication</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
</tr>
<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>
</tr>
<tr>
<td>Arts, Letters, and Sciences</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Civilization 1 and 2</td>
<td>2</td>
<td>6.0</td>
<td>from approved list</td>
</tr>
<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</td>
<td>2</td>
<td>5.0</td>
<td>MMBio 240* and PDBio 120*</td>
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<tr>
<td>Biological Science</td>
<td></td>
<td></td>
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<tr>
<td>Physical Science</td>
<td>2</td>
<td>6–7.0</td>
<td>Chem 105* + one course from approved list</td>
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<tr>
<td>Social Science</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Core Enrichment: Electives</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Religion Electives</td>
<td>3–4</td>
<td>6.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Open Electives</td>
<td>Variable</td>
<td>Variable</td>
<td>personal choice</td>
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</tbody>
</table>

#### PROGRAM REQUIREMENTS (62 total hours)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bio 165</td>
<td>Introduction to Bioinformatics</td>
<td>3.0</td>
</tr>
<tr>
<td>Chem 105*</td>
<td>General College Chemistry</td>
<td>4.0</td>
</tr>
<tr>
<td>Chem 106</td>
<td>General College Chemistry</td>
<td>3.0</td>
</tr>
<tr>
<td>Chem 107</td>
<td>General College Chemistry Lab</td>
<td>1.0</td>
</tr>
<tr>
<td>Math 112</td>
<td>Calculus I</td>
<td>4.0</td>
</tr>
<tr>
<td>MMBio 240*</td>
<td>Molecular Biology</td>
<td>3.0</td>
</tr>
<tr>
<td>PDBio 120*</td>
<td>Science of Biology</td>
<td>2.0</td>
</tr>
<tr>
<td>PDBio 360</td>
<td>Cell Biology</td>
<td>3.0</td>
</tr>
<tr>
<td>PWS 198</td>
<td>Introduction to Genetics &amp; Biotechnology</td>
<td>2.0</td>
</tr>
<tr>
<td>PWS 288</td>
<td>Mentored Laboratory Techniques</td>
<td>2.0</td>
</tr>
<tr>
<td>PWS 340</td>
<td>Genetics</td>
<td>3.0</td>
</tr>
<tr>
<td>PWS 468</td>
<td>Genomics</td>
<td>3.0</td>
</tr>
<tr>
<td>PWS 488</td>
<td>Readings in Biotechnology</td>
<td>3.0</td>
</tr>
</tbody>
</table>

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

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

- Complete the following:
  - 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 3.0
  - PWS 100 Living with Plants 3.0
  - PWS 440 Plant Physiology 3.0
  - PWS 494R Mentored Learning Experience 6.0V

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

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

- Complete the following:
  - Bio 463 Genetics of Human Disease 3.0
  - PDBio 482 Developmental Biology 3.0

**Complete one of the following:**

- Bio 494R Mentored Research 6.0V
- PWS 494R Mentored Learning Experience 6.0V

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

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

- Complete the following:
  - Bio 420 Evolutionary Biology 2.0
  - Chem 351 Organic Chemistry 3.0
  - Chem 352 Organic Chemistry 3.0
  - Chem 481 Biochemistry 3.0
  - MMBio 151 Introduction to Microbiology 4.0
  - MMBio 360 Microbial Genetics 4.0

**Complete 2 hours from one of the following:**

- Bio 494R Mentored Research 6.0V
- PWS 494R Mentored Learning Experience 6.0V

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

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

- Complete the following:
  - Acc 200 Principles of Accounting 3.0
  - 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 one of the following:
  - 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 & ID 4.0
- Bio 450 Conservation Biology 3.0
- Bio 463 Genetics of Human Disease 3.0
- Bio 485 Bioinformatics & Proteomics 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 360 Microbial Genetics 4.0
- MMBio 363 Microbial Ecology 3.0
- MMBio 364 Bacterial Pathogenesis 4.0

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

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**FOR UNIVERSITY CORE QUESTIONS CONTACT THE ADVISEMENT CENTER • FOR PROGRAM QUESTIONS SEE YOUR FACULTY ADVISOR**
BS in GENETICS AND BIOTECHNOLOGY (285823)
2014–2015

MMBio 390R Readings in Molecular Biology 1.0
MMBio 430 Advanced Cell Biology 3.0
MMBio 441 Advanced Molecular Biology 3.0
MMBio 442 Advanced Molecular Biology Lab 2.0
MMBio 461 Advanced Bacterial Physiology 3.0
MMBio 463 Immunology 3.0
MMBio 465 Virology 3.0
MMBio 466 Virology Laboratory 1.0
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
PWS 199R Academic Internship 3.0
PWS 282 Introduction to Soil Science 3.0
PWS 283 Introduction to Soil Science Lab 1.0
PWS 301 Plant Growth and Reproduction 3.0
PWS 305 Soils and Water Quality 3.0
PWS 306 Soil & Water Quality Lab 1.0
PWS 331 Science of Plant Pest Control 3.0
PWS 431 Plant Health Diagnostic 3.0
PWS 494R Mentored Learning Experience 6.0
PWS 514 Soil Microbiology 2.0
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

Suggested Sequence of Courses:

FRESHMAN YEAR

1st Semester
PDBio 120 2.0
Rel A 121 2.0
Total Hours 14–15.0

2nd Semester
PDBio 120 2.0
Rel A 121 2.0
Total Hours 14–15.0

SOPHOMORE YEAR

3rd Semester
Math 112 (Languages of Learning) 4.0
Rel A 121 2.0
Total Hours 17.0

4th Semester
PWS 188 2.0
Rel A 122 2.0
Total Hours 14.0

JUNIOR YEAR

6th Semester
Chem 351 (Science track) 3.0
Civilization 2 elective 3.0
Rel C 324 or 325 2.0
Total Hours 14–18.0

7th Semester
Adv. Written & Oral Communication 3.0
PDBio 360 3.0
Chem 351 (Science track) 3.0
Civilization 2 elective 3.0
Total Hours 18–20.0

SENIOR YEAR

7th Semester
Bio 420 (Science track) 2.0
PWS 488 3.0
Chem 481 (Science track) 3.0
Global & Cultural Awareness elective 3.0
Total Hours 15.0

8th Semester
Bus M 489 (Bus. track) (3.0)
PWS 488 3.0
Chem 481 (Science track) 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, 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.

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

HANDS-ON LEARNING OPPORTUNITIES:
Every student in this major is encouraged to seek a mentorship or research opportunities with faculty within the program. Completing one or more of these approved research opportunities will set students apart and provide a scientific foundation 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 the active participation in professional societies, national honor societies; campus academic, service, and social clubs.

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

Students are encouraged to complete an average of 15 credit hours each semester or 30 credit hours each year, which could include spring and/or 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.

**Note:**

Students are encouraged to complete an average of 15 credit hours each semester or 30 credit hours each year, which could include spring and/or 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.

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