Agricultural and Medical Biotechnology

Agricultural and medical biotechnology encompasses cellular and molecular approaches to the manipulation and improvement of agricultural plants, animals and microorganisms, and the control of agricultural pests and diseases. The primary purpose of the baccalaureate degree program in Agricultural and Medical Biotechnology is to train students in modern cellular and molecular biology and genetic engineering. Students will be provided with a firm foundation in the principles of genetics and molecular biology of both prokaryotic and eukaryotic organisms. Each student will then specialize in an area appropriate to his or her interest and career objectives, including: microbial, fungal, plant, insect and mammalian biotechnology.

Graduates will be prepared to assume government, university, and industry positions with research and technology applications to agriculture and food production. Employment opportunities include research scientists, laboratory technicians or managers in university, government, industrial, or clinical laboratories using biotechnological tools for research and production. Examples of research areas include: gene cloning, construction of novel pest and disease resistance genes, development of new immunological and nucleic acid types of diagnostic probes for plant and animal disease, genetic engineering of microorganisms for the production of important pharmaceutical agents, and development of new bioengineered strains of microorganisms for fermentation and food production services. Students will also be prepared to enter graduate programs in agriculture, molecular biology, and the biological sciences.

Graduation Requirements
To earn a Bachelor of Science in Agricultural and Medical Biotechnology the student must complete 125 semester hours with at least a 2.0 grade-point standing. A minimum of 45 credit hours must be from upper division courses (300 and above). Remedial courses may not be counted toward the total hours required for the degree. In addition to the UK Core requirements, students must complete college, premajor, major, and specialty support requirements, including an independent research project relevant to the student’s interest in biotechnology.

UK Core Requirements
See the UK Core section of the 2021-2022 Undergraduate Bulletin for the complete UK Core requirements. The courses listed below are (a) recommended by the college, or (b) required courses that also fulfill UK Core areas. Students should work closely with their advisor to complete the UK Core requirements.

I. Intellectual Inquiry in Arts and Creativity
Choose one course from approved list..........................................................3

II. Intellectual Inquiry in the Humanities
Choose one course from approved list.........................................................3

III. Intellectual Inquiry in the Social Sciences
Choose one course from approved list..........................................................3

IV. Intellectual Inquiry in the Natural, Physical, and Mathematical Sciences
CHE 105 General College Chemistry I .........................................................4
CHE 111 General Chemistry I Laboratory ....................................................1

V. Composition and Communication I
CIS/WRD 110 Composition and Communication I ...............................3

VI. Composition and Communication II
CIS/WRD 111 Composition and Communication II ...............................3

VII. Quantitative Foundations
MA 123 Elementary Calculus and Its Applications
    or
MA 113 Calculus I
    or
MA 137 Calculus I With Life Science Applications......................................4

VIII. Statistical Inference Reasoning
STA 296 Statistical Methods and Motivations
    or
BST 230 Statistical Thinking in Public Health.............................................3

IX. Community, Culture and Citizenship in the USA
GEN 100 Issues in Agriculture, Food and Environment ...........................3

X. Global Dynamics
Choose one course from approved list..........................................................3

UK Core hours .........................................................................................33

Graduation Composition and Communication Requirement (GCCR)

Graduation Composition and Communication Requirement (GCCR).............3

Premajor Requirements

Premajor Requirements Hours
BIO 148 Introductory Biology I .................................................................3
BIO 152 Principles of Biology II ...............................................................3
BIO 155 Laboratory for Introductory Biology I ..........................................1
CHE 105 General College Chemistry I .......................................................4
CHE 107 General College Chemistry II......................................................3
CHE 111 General Chemistry I Laboratory ...................................................1
CHE 113 General Chemistry II Laboratory ...............................................2
CHE 230 Organic Chemistry I .................................................................3
CHE 231 Organic Chemistry Laboratory I ..................................................1
CHE 232 Organic Chemistry II .................................................................3
CHE 233 Organic Chemistry Laboratory II .................................................1
MA 123 Elementary Calculus and Its Applications
    or
MA 113 Calculus I
    or
MA 137 Calculus I With Life Science Applications......................................4
PHY 211 General Physics ...........................................................................5
PHY 213 General Physics ...........................................................................5
(or equivalent with laboratory)

Subtotal: Premajor hours ..............................................................39-42

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<table>
<thead>
<tr>
<th>Major Requirements</th>
<th>Hours</th>
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<tbody>
<tr>
<td><strong>Biotechnology</strong></td>
<td></td>
</tr>
<tr>
<td>ABT 101 Introduction to Biotechnology</td>
<td>1</td>
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<tr>
<td>ABT 201 Scientific Method in Biotechnology</td>
<td>1</td>
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<tr>
<td>ABT 301 Writing and Presentations in the Life Sciences</td>
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<tr>
<td><strong>Microbiology</strong></td>
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<tr>
<td>BIO 208 Principles of Microbiology</td>
<td>3</td>
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<tr>
<td>or BIO 308 General Microbiology</td>
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</tr>
<tr>
<td>BIO 209 Introductory Microbiology Laboratory</td>
<td>2</td>
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<tr>
<td>or BIO 309 Microbiology Laboratory</td>
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<tr>
<td><strong>Biochemistry</strong></td>
<td></td>
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<tr>
<td>BCH 401G Fundamentals of Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td><strong>Genetics</strong></td>
<td></td>
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<tr>
<td>ABT 120 Genetics and Society</td>
<td>3</td>
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<tr>
<td>ABT/ENT 360 Genetics</td>
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<tr>
<td>or BIO 304 Principles of Genetics</td>
<td>3-4</td>
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<tr>
<td>ABT 460 Introduction to Molecular Genetics</td>
<td>3</td>
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<tr>
<td>ABT 461G Introduction to Population Genetics</td>
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<tr>
<td><strong>Statistics</strong></td>
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<tr>
<td>STA 296 Statistical Methods and Motivations</td>
<td>3</td>
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<tr>
<td>or BST 230 Statistical Thinking in Public Health</td>
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<tr>
<td><strong>Advanced Practical Skills</strong></td>
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<tr>
<td>ABT 495 Experimental Methods in Biotechnology</td>
<td>4</td>
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<td>or BIO 510 Recombinant DNA Techniques Laboratory</td>
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<tr>
<td><strong>Independent Study</strong></td>
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<tr>
<td>ABT 395 Independent Study in Biotechnology</td>
<td>3</td>
</tr>
<tr>
<td>or ABT 399 Experiential Learning in Biotechnology</td>
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All students are expected to undertake an independent study project in an area of their interest for a minimum of 3 credit hours. This requirement can be met by a research project or an internship that is agreed upon by a student’s advisor and approved by the Biotechnology Coordinating Committee prior to initiation of the project. Both written and oral reports are required when the project is completed.

**Specialty Support**

Students must take a minimum of 21 credit hours of specialty support courses that will be selected according to the student’s area of interest with the approval of the academic advisor. Of these 21 credits, a maximum of 9 credits may be ABT prefixed courses. Of the 21 credits, a maximum of 6 credits may be research credits. The remaining 15 credits must be in regularly scheduled courses.

**Subtotal: Specialty Support hours** ............................................. 21

**Electives**

Electives should be selected to complete the 125 hours required for graduation.

**Subtotal: Electives** ............................................................. 7-10

**TOTAL HOURS:** ........................................................................ 125