



Agricultural Biotechnology

College of
Agriculture

Agricultural 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 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 Biotechnology the student must complete 132 semester hours with at least a 2.0 grade-point standing. A minimum of 48 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 University Studies requirements, students must complete college, premajor, major, and specialty support requirements, including an independent research project relevant to the student's interest in biotechnology.

Plan of Study

As an agricultural biotechnology major you are required to develop an acceptable **Plan of Study** during your sophomore year for your junior and senior years. The plan must be signed by your advisor and returned to the Associate Dean for Instruction's office.

If you are an upper division transfer student (from another university or from another UK college or department) then you will submit your plan during the first semester you are enrolled in the program.

Consult your academic advisor in developing your Plan of Study.

College Required Hours

| | |
|--|---|
| ABT 101 Introduction to Biotechnology and | |
| ABT 201 Scientific Method in Biotechnology and | |
| ABT 301 Writing and Presentations in the Life Sciences | 4 |
| or | |
| ENG 203 Business Writing | 3 |
| or | |
| ENG 204 Technical Writing | 3 |
| †GEN 100 Issues in Agriculture: | |
| The Development of Modern Agriculture | 3 |
| †GEN 200 Issues in Agriculture: Contemporary | |
| Problems in Agriculture and Natural Resources | 3 |

†These courses also satisfy the University Studies Oral Communication requirement.

Note: Students transferring into the college with 30 or more hours take only GEN 200 plus one communications course from the approved sequence in University Studies.

Subtotal: College Required Hours 6-10

University Studies Requirements **Hours**

See "University Studies Program" on pages 68-72 of the 2003-2004 UK Bulletin for the complete University Studies requirements. The courses listed below are (a) recommended by the college, or (b) required courses that also fulfill University Studies areas. Students should work closely with their advisor to complete the University Studies Program requirements.

Courses marked with an asterisk (*) may also be used to satisfy University Studies requirements.

Inference-Logic

| | |
|---|---|
| MA 123 Elementary Calculus and Its Applications | 3 |
| or | |
| MA 113 Calculus I | 4 |

Natural Sciences

| | |
|--|---|
| CHE 105 General College Chemistry I | 3 |
| CHE 107 General College Chemistry II | 3 |

USP Electives

| | |
|--|---|
| BIO 150 Principles of Biology I | 3 |
| BIO 152 Principles of Biology II | 3 |

Premajor Requirements **Hours**

| | |
|--|---|
| *BIO 150 Principles of Biology I | 3 |
| *BIO 151 Principles of Biology Laboratory I | 2 |
| *BIO 152 Principles of Biology II | 3 |
| *BIO 153 Principles of Biology Laboratory II | 2 |
| *CHE 105 General College Chemistry I | 3 |
| *CHE 107 General College Chemistry II | 3 |
| *CHE 115 General Chemistry Laboratory | 3 |
| CHE 230 Organic Chemistry I | 3 |
| CHE 231 Organic Chemistry Laboratory I | 2 |
| CHE 232 Organic Chemistry II | 3 |
| CHE 233 Organic Chemistry Laboratory II | 2 |
| *MA 123 Elementary Calculus and Its Applications | 3 |
| *MA 132 Calculus for the Life Sciences | 3 |
| or | |
| *MA 113 Calculus I | 4 |
| PHY 211 General Physics | 5 |
| PHY 213 General Physics | 5 |
| (or equivalent with laboratory) | |

Subtotal: Premajor Hours 45-46

Major Requirements **Hours**

Biotechnology

| | |
|--|---|
| ABT 101 Introduction to Biotechnology | 1 |
| ABT 201 Scientific Method in Biotechnology | 1 |
| ABT 301 Writing and Presentations in the Life Sciences | 2 |

Microbiology

| | |
|---|---|
| BIO 208 Principles of Microbiology | 3 |
| BIO 209 Principles of Microbiology Laboratory | 2 |

Agricultural Biotechnology • 2

Biochemistry

| | |
|---|---|
| BCH 401G Fundamentals of Biochemistry | 3 |
| or | |
| BCH 501 General Biochemistry and | |
| BCH 502 General Biochemistry | 6 |

Genetics

| | |
|---|---|
| ABT/ASC/ENT 360 Genetics | 3 |
| or | |
| BIO 304 Principles of Genetics | 4 |
| ABT 460 Introduction to Molecular Genetics | 3 |
| ABT 461 Introduction to Population Genetics | 3 |

Statistics

| | |
|----------------------------------|---|
| STA 291 Statistical Method | 3 |
|----------------------------------|---|

Advanced Practical Skills

| | |
|---|---|
| ABT 495 Experimental Methods in Biotechnology | 4 |
| or | |
| BIO 510 Recombinant DNA Techniques Laboratory | 4 |

Independent Study

| | |
|--|---|
| ABT 395 Independent Study in Biotechnology | 3 |
| or | |
| ABT 399 Experiential Learning in Biotechnology | 3 |

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.

Subtotal: Major Hours **31-35**

Specialty Support

Hours

Students must take a minimum of 21 credit hours of specialty support courses including at least one of the courses listed below. A number of the courses listed here may have additional prerequisites. Additional specialty support courses will be selected according to the student's area of interest with approval of the academic advisor.

| | |
|---|---|
| ASC 364 Reproductive Physiology of Farm Animals | 3 |
| BIO 315 Introduction to Cell Biology | 3 |
| BIO 350 Animal Physiology | 4 |
| BIO 430G Plant Physiology | 3 |
| BIO 476G General Microbial Physiology | 4 |
| BIO/PGY 502 Principles of Systems, Cellular and Molecular Physiology | 5 |
| BIO 515 General Cell Biology | 3 |
| BIO 550 Comparative Physiology | 3 |
| BIO 580 Metabolism of Microorganisms | 4 |
| PGY/MI 590 Cellular and Molecular Physiology | 4 |

Subtotal: Specialty Support Hours **21**

Electives

Electives should be selected to complete the 132 hours required for graduation.

Subtotal: Electives **minimum of 9**

TOTAL HOURS: **132**