Program Coordinator: V. Fitsanakis

Biology is the study of life, in all of its forms. Students interested in a broad understanding and appreciation of botany and zoology are encouraged to consider the General Biology track provided by the department. Students desiring to pursue a career in medicine, pharmacy, biotechnology or biomedical research are encouraged to consider the Cell and Molecular Biology track. The Bioinformatics track will prepare students for graduate school and/or careers in the fields of genomics, informatics, and biostatistics; this track requires that students minor in Mathematics.

A major in biology prepares one for a variety of careers. Most students interested in biomedical or health science careers often major in biology because many employers, and graduate and professional programs, require significant course work in biology. Thus, students with a BS in Biology are well-suited for careers in environmental research, conservation biology, forensic biology, botany or zoology. Additionally, the course work for the Cell and Molecular Biology track is designed to provide students with pre-requisites required for many medical, pharmacy, and graduate programs, including microbiology, veterinary sciences, toxicology, optometry and dentistry.

Students are required to take Calculus I to fulfill their requirement in “Quantitative Literacy.” Finally, although not explicitly required, students are strongly encouraged to complete a summer internship their junior year in their anticipated area of study in order to gain experience and verify their suitability for their vocation.

Core Curriculum Requirement
Biology majors should fulfill specified categories of the King Core Curriculum by taking the courses indicated below. See the “The Core Curriculum” section of the catalog for additional details.

**Science**
CHEM 1110
General Chemistry I .................................................................4 s.h.

**Quantitative Literacy**
MATH 2350
Calculus I ..................................................................................4 s.h.

**BS in Biology Major Requirements**
BIOL 2110
General Biology I.................................................................4 s.h.
BIOL 2120
   General Biology II ................................................................. 4 s.h.
BIOL 3150
   Genetics .................................................................................. 4 s.h.
BIOL 3300
   Cell Biology ............................................................................... 4 s.h.
BIOL 4010
   Comprehensive Assessment ...................................................... 0 s.h.
CHEM 1120
   General Chemistry II ............................................................... 4 s.h.
CHEM 2110
   Organic Chemistry I .................................................................... 4 s.h.
CHEM 2120
   Organic Chemistry II ................................................................... 4 s.h.
PHYS 2210
   General Physics I ......................................................................... 4 s.h.
PHYS 2220
   General Physics II ........................................................................ 4 s.h.
IDST 4500 (0.5 credits, repeated for a total of four semesters)
   Interdepartmental Science and Mathematics Seminar ............... 2 s.h.

Track Requirements for a BS in Biology
Students will choose a track in General Biology, Cell and Molecular Biology, or Bioinformatics.

General Biology Track (B.S.)

   BIOL 3100
      Plant Biology ............................................................... 4 s.h.
   BIOL 3130
      Ecology ............................................................... 4.s.h.

Choose from the following courses .............................................. 4 s.h.
   BIOL 3210
      Human and Vertebrate Comparative Anatomy (4 s.h.)
   BIOL 3500
      Histology (4 s.h.)
   BIOL 3560
      Clinical Neuroanatomy (4 s.h.)

Choose from the following courses .............................................. 4 s.h.
   BIOL 3540
      Neurophysiology (4 s.h.)
   BIOL 3600
      Human and Mammalian Physiology (4 s.h.)
   BIOL 4670
      Mammalian Toxicology (4 s.h.)

   Biology Electives ............................................................... 8 s.h.
   (Two additional 3100-level or higher biology electives)
Cell and Molecular Biology Track (B.S.)

BIOL 3100
Plant Biology ................................................. 4 s.h.
BIOL 3130
Ecology .......................................................... 4 s.h.
BIOL 3170
Molecular Biology ............................................. 4 s.h.

Choose from the following courses ................................ 4 s.h.
- BIOL 3700
  Biochemistry (4 s.h.)
- BIOL 4670
  Mammalian Toxicology (4 s.h.)

Biology Electives ................................................... 8 s.h.
(Two additional 3100-level or higher biology electives)

Bioinformatics Track (B.S.)
(Minor in Mathematics also required)

BIOL 3450
Bioinformatics .................................................... 4 s.h.
BIOL 3170
Molecular Biology ............................................. 4 s.h.
BIOL 3700
Biochemistry ..................................................... 4 s.h.
ITEC 2010
Introduction to Programming ................................ 4 s.h.

Choose from the following courses ................................ 8 s.h.
- ITEC 3450
  Database Management (4 s.h.)
- BIOL 4690
  Systems Biology (4 s.h.)
- PHYS 3500
  Computational Physics (4 s.h.)

Summary of Total Credits
Core Curriculum .................................................. 46 s.h.
Major Requirements:
  Common Requirements .................................... (38 s.h.)
  Track Requirements ........................................ (24 s.h.)
Total Major Requirements .................................... 62 s.h.
Electives/Second Minor/Second Major ....................... 16 s.h.
Minimum to Earn Bachelor of Science ....................... 124 s.h.
Bachelor of Arts Degree in Biology
The Bachelor of Arts in General Biology is designed for individuals seeking employment not requiring an advanced degree in science or medicine, but where a strong technical background is desirable. This would include such professional career options as scientific or pharmaceutical sales, lab technician, scientific writing, public education, law, etc. This curriculum includes 50 s.h. of science and math, but has more flexibility than the Bachelor of Science.

The Bachelor of Arts in Human Biology is designed for students who are interested in pursuing an advanced degree in graduate programs related to human health, such as a doctorate in physical therapy (DPT), or graduate degrees in physician’s assistant (PA) or occupational health programs such as occupational therapy (OT). This track is not designed or intended to meet the needs of students who are pursuing medical, pharmacy, or graduate school in an area of biology or biomedical research. Students interested in those career paths should follow the requirements for a BS in Biology in either General Biology or the Cell and Molecular Biology tracks.

Students who complete the Bachelor of Arts degree in Biology are required to have a minor; students should choose their minor program in consultation with their academic advisor, taking into account their career goals.

The Bachelor of Arts with secondary education licensure prepares a student for teaching science. Licensed teachers are in great demand nationwide in all areas of science, particularly biology and chemistry. Students obtaining their secondary education licensure will minor in Education. Due to the number of semester hours required for completion of the B.A. in Biology with secondary licensure, students should meet regularly with advisors from both Biology and Education departments.

Clinical Experiences
During completion of course work, it is anticipated that students interested in physical therapy, occupational health, or physician’s assistant programs would participate in clinical rotations or internships. Students should be aware that many of these specific graduate programs require up to 1500 hours of patient contact before admission to the respective programs. Thus, students ideally will start accumulating hours the summer after their sophomore year.

Core Curriculum Requirements
Biology majors should fulfill specified categories of the King Core Curriculum by taking the courses indicated below. See the “The Core Curriculum” section of the catalog for additional details.

Science
CHEM 1110
   General Chemistry I ..........................................................4 s.h.
Quantitative Literacy
MATH 2350
   Calculus I .................................................................4 s.h.
BA in Biology Major Requirements

BIOL 2110  
General Biology I ................................................................. 4 s.h.
BIOL 2120  
General Biology II ............................................................... 4 s.h.
BIOL 4010  
Comprehensive Assessment ................................................. 0 s.h.
CHEM 1120  
General Chemistry II ........................................................... 4 s.h.
CHEM 2110  
Organic Chemistry I ............................................................ 4 s.h.
PHYS 2210  
General Physics I ................................................................. 4 s.h.
IDST 4500 (0.5 s.h. repeated for a total of four semesters)  
Interdepartmental Science and Mathematics Seminar ............. 2 s.h.

Track Requirements for a BA in Biology

Students will choose a track in either General Biology or Human Biology.

General Biology Track (BA)

BIOL 3100  
Plant Biology ........................................................................... 4 s.h.
BIOL 3130  
Ecology .................................................................................. 4 s.h.
BIOL 3150  
Genetics .................................................................................. 4 s.h.

Choose from the following courses .............................................. 4 s.h.

BIOL 3210 (4 s.h.)  
Human and Vertebrate Comparative Anatomy
BIOL 3500 (4 s.h.)  
Histology
BIOL 3560 (4 s.h.)  
Clinical Neuroanatomy

Choose from the following courses .............................................. 4 s.h.

BIOL 3300  
Cell Biology (4 s.h.)
BIOL 3540  
Neurophysiology (4 s.h.)
BIOL 3600  
Human and Mammalian Physiology (4 s.h.)

Choose from the following courses .............................................. 8 s.h.

Any BIOL course(s) at 3000 level or higher (4 s.h.)
PHYS 2030 (4 s.h.)  
Survey of Astronomy
MATH 1560 (4 s.h.)  
Introduction to Statistics
MATH 2360 (4 s.h.)
Calculus II

**Human Biology Track (B.A.)**

BIOL 1010
Human Anatomy and Physiology I ........................................ 4 s.h.
BIOL 1020
Human Anatomy and Physiology II ........................................ 4 s.h.
ATEP 2510
Care and Prevention of Athletic Injuries ............................... 4 s.h.
ATEP 3680
Kinesiology ........................................................................... 4 s.h.
ATEP 3690
Exercise Physiology ............................................................. 4 s.h.
PHED 3550
Nutrition and Conditioning ................................................... 4 s.h.
PHYS 2220
General Physics II .................................................................. 4 s.h.

*Choose from the following courses* ........................................ 8 s.h.

BIOL 3150
Genetics (4 s.h.)
BIOL 3300
Cell Biology (4 s.h.)
BIOL 3400
Microbiology (4 s.h.)
BIOL 3500
Histology (4 s.h.)
BIOL 3540
Neurophysiology (4 s.h.)
BIOL 3560
Clinical Neuroanatomy (4 s.h.)
BIOL 4670
Mammalian Toxicology (4 s.h.)

**Summary of Total Credits**

*General Biology Track*
Core Curriculum ....................................................................... 42 s.h.
Major Common Requirements .................................................. 22 s.h.
Track Requirements .................................................................. 28 s.h.
Electives/Minor/Second Major ................................................ 32 s.h.
*Minimum to Earn Bachelor of Arts* ..................................... 124 s.h.
**Human Biology Track**

Core Curriculum ........................................................................................................ 42 s.h.

Major Common Requirements ................................................................. 22 s.h.

Track Requirements ...................................................................................... 36 s.h.

Electives/Minor/Second Major ................................................................. 24 s.h.

**Minimum to Earn Bachelor of Arts** ................................................... 124 s.h.

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**Pharmacy Dual Degree Program**

King offers students interested in pursuing a doctoral degree at Pharmacy School (PharmD) the opportunity to apply after only three years at the undergraduate level. It is anticipated that most students would complete their requirements in three years. It is important that the student realize that following the Pharmacy Dual Degree Program does not automatically guarantee his or her entrance into pharmacy school. Students must still successfully take the PCAT and competitively apply to their intended graduate program(s). Students should also verify lists of required courses for each PharmD program of interest; many pharmacy schools require courses in economics, statistics, and communications, in addition to the courses listed below.

A student completing the requirements in three years and who follows the outlined curriculum will be awarded a Bachelor of Science with a major in Biology from King only after satisfactorily completing the first year of an accredited professional school of pharmacy program. Typically students will apply to schools of pharmacy during the summer before their third year or during the fall of their third year. Transfer students must complete at least 50 hours at King, including 20 hours of required Biology courses.

**Core Curriculum Requirements**

Pharmacy Dual Degree majors should fulfill specified categories of the King Core Curriculum by taking the courses indicated below. See the “The Core Curriculum” section of the catalog for additional details.

**Science**

CHEM 1110
General Chemistry I .................................................................................. 4 s.h.

**Quantitative Literacy**

MATH 2350
Calculus I ....................................................................................................... 4 s.h.

**Pharmacy Dual Degree Requirements**

BIOL 2110, 2120
General Biology ............................................................................................ 8 s.h.

BIOL 3150
Genetics ......................................................................................................... 4 s.h.

BIOL 3700
Biochemistry ................................................................................................ 4 s.h.

BIOL 4010
Comprehensive Assessment ......................................................................... 0 s.h.
CHEM 1120
  General Chemistry II ................................................................. 4 s.h.
CHEM 2110, 2120
  Organic Chemistry ........................................................................ 8 s.h.
MATH 2360
  Calculus II ..................................................................................... 4 s.h.
PHYS 2210, 2220
  General Physics ................................................................................ 8 s.h.
IDST 4500 (0.5 s.h. repeated for a total of four semesters)
  Interdepartmental Science and Mathematics Seminar .................. 2 s.h.

Choose from the following courses ................................................... 8 s.h.
BIOL 3300
  Cell Biology (4 s.h.)
BIOL 3350
  Immunology (4 s.h.)
BIOL 3400
  Microbiology (4 s.h.)
BIOL 3540
  Neurophysiology (4 s.h.)
BIOL 3600
  Human & Mammalian Physiology (4 s.h.)
BIOL 4670
  Mammalian Toxicology (4 s.h.)

Summary of Total Credits
Core Curriculum .................................................................................. 42 s.h.
Major Requirements ............................................................................ 50 s.h.
Transferred Hours from PharmD program ........................................ 32 s.h.
Minimum to Earn Bachelor of Science .............................................. 124 s.h.

Teacher Education - BIOLOGY
Tennessee teaching licensure (Grades 6-12) is available with modifications to the Biology major and the King Core, and successful completion of the Secondary Education minor. Licensed teachers in secondary education are in great demand in all fifty states, and the areas of science, mathematics, English as a second language, and foreign languages are considered a critical need areas in K-12 public education by all states.

Declaration of the minor and early and frequent advisement is essential to timely completion of degree and licensure requirements. Students seeking teacher licensure will be assigned a secondary education advisor in the Department of Teacher Education, in addition to their major advisor. See the “Admission to the Teacher Education Program” section of this catalog or contact the Certification Advisor in the School of Education for eligibility criteria, admissions procedures, and timelines.
Core Curriculum Requirements
Biology majors seeking teaching licensure should fulfill specified categories of the King Core Curriculum by taking the courses indicated below. See the “The Core Curriculum” section of the catalog for additional details.

Science
CHEM 1110
General Chemistry I .................................................4 s.h.

Quantitative Literacy
MATH 2350
Calculus I .................................................................4 s.h.

Human Culture
In addition to satisfying the language requirement:
PSCI 2120
Cultural Diversity in America ....................................4 s.h.

General Science and Physical Science Core
CHEM 1120
General Chemistry II ....................................................4 s.h.
CHEM 2110
Organic Chemistry I ....................................................4 s.h.
GEOG 2010
Physical Geography ....................................................3 s.h.
PHYS 2210
General Physics I .......................................................4 s.h.

BA In Biology Major Requirements for Teaching Licensure
BIOL 2110
General Biology I .......................................................4 s.h.
BIOL 2120
General Biology II ......................................................4 s.h.
BIOL 3150
Genetics ......................................................................4 s.h.
BIOL 3130
Ecology .......................................................................4 s.h.
BIOL 3100
Plant Biology ...............................................................4 s.h. BIOL 4010
Comprehensive Assessment .........................................0 s.h.

IDST 4500 (0.5 s.h. repeated for a total of four semesters)
Interdepartmental Science and Mathematics Seminar ........2 s.h.

Choose from the following courses ..................................4 s.h.
BIOL 3300
Cell Biology (4 s.h.)
BIOL 3540  
Neurophysiology (4 s.h.)

BIOL 3600  
Human and Mammalian Physiology (4 s.h.)

*Choose from the following courses*  ..................................................4 s.h.

BIOL 3210  
Human and Vertebrate Comparative Anatomy (4 s.h.)

BIOL 3500  
Histology (4 s.h.)

BIOL 3560  
Clinical Neuroanatomy (4 s.h.)

*Choose from the following courses*  ..................................................4 s.h.

- Any BIOL course at 3000 level or higher
- PHYS 2030 (4 s.h.)  
  Survey of Astronomy
- MATH 1560 (4 s.h.)  
  Introduction to Statistics
- MATH 2360 (4 s.h.)  
  Calculus II

**Secondary Education Minor**

EDUC 2030  
Introduction to Teaching: K-Grade 12  ........................................2 s.h.

EDUC 2031  
Introduction to Teaching Practicum, Grades PreK-12  ..............1 s.h.

EDUC 2370  
Reflective Teaching K-12 ..........................................................3 s.h.

EDUC 2100  
Survey of Exceptional Children ..................................................4 s.h.

EDUC 2900  
Foundations of Education..........................................................3 s.h.

EDUC 2950  
Computer Technology for Classroom Teachers ...................... 2 s.h.

EDUC 3390*  
Secondary Curriculum and Methods ........................................3 s.h.

EDUC 3590*  
Content Area Reading ...............................................................3 s.h.

EDUC 3600*  
Assessment and Evaluation .......................................................3 s.h.

EDUC 4490*  
Student Teaching, Grades 6-10 ...............................................5 s.h.

EDUC 4500*  
Student Teaching, Grades 9-12 ...............................................5 s.h.

EDUC 4950*  
Capstone Seminar, Grades K-12 ...............................................2 s.h.

PSCI 2120  
Cultural Diversity in America...................................................4 s.h.
PSYC 3320
Adolescent Development ........................................4 s.h.

*Requires admittance to the Teacher Education Program

Summary of Total Credits
Core Curriculum ..........................................................42 s.h.
Major Requirements .......................................................49 s.h.
Secondary Education Minor ............................................44 s.h.
Minimum to Complete Licensure Program ..................... 135 s.h.