

**AGRICULTURAL SCIENCES, CONCENTRATION—BIOTECHNOLOGY**  
**ACADEMIC MAP: DEGREE BS (120 CREDIT HOURS)**

This degree map is a semester-by-semester sample course schedule for students majoring in **Agricultural Sciences with a concentration in Biotechnology**. The milestones listed to the right of each semester are designed to keep a student on track to graduate in four years. The schedule serves as a general guideline to help build a full schedule each semester. Milestones are courses and special requirements necessary for timely progress to complete a major. When one or more milestones are missed, students should consult with an academic advisor to determine if another degree path would be more suitable.

The concentration in Biotechnology provides training in the foundation, principles and practice of using modern technologies in life sciences in agriculture, health and the environment. Biotechnology can be applied in areas such as genetic engineering, drug discovery, product development, use of DNA, RNA and protein technologies to develop disease resistant and improve production in plants and animals, developing crops that are drought resistant, and ensuring food security and food safety. Students in Biotechnology concentration must gain upper division status before enrolling in upper division courses (3000 & 4000 levels). Students may be admitted to the upper division after completing at least 60 degree level lower division credits (as set out in the curriculum) with a minimum cumulative grade point average (GPA) of 2.0. It is the responsibility of the student to submit a formal petition to the department. Such petition will be reviewed by a departmental committee to ensure that all criteria have been met. Minimum grade of C is required for upper division courses. Students who incur a probationary status are to repeat failed courses, or courses in which 'D' or worse grades were earned, during the semester immediately following that in which the grades were earned. The College has a special program to assist students who are on probation. Please contact the Academic Coordinator for details.

Tennessee State University recognizes that students have diverse learning, life, and professional experiences. The University provides opportunities for students to earn college credit toward the degree through a number of assessment options that evaluate their learning experiences. These paths are grouped under the category "Prior Learning Assessment" (PLA). Various means of earning PLA credit at TSU are the following: Advanced Placement Program, American Council of Education (ACE) Military Credit, College Level Exam Program (CLEP), DSST Credit by Examination Program (includes DANTE Examination), Institutional Course Challenge Exams (Departmental Exams), International Baccalaureate Credit, Other Military Service, Portfolio Assessment. To learn more about PLA contact your academic advisor or the Office of Student Support Services for Adult and Distance Learners at (615) 963-7001 or [adultstudentsupport@tnstate.edu](mailto:adultstudentsupport@tnstate.edu).

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**Department Web Address:** <http://www.tnstate.edu/agriculturalprograms/degrees/biotechnology.aspx>

Fall Schedule		Milestones
<b>Semester 1</b>	<b>Hrs.</b>	<b>Semester 1</b>
ENGL 1010 – Composition I	3	Pre-Requisite Course: Must be taken before ENGL 1020, and HIST 2010, HIST 2020, HIST 2030, HIST 2060, HIST 2070, or HIST 2700; Minimum Grade "C" Required
BIOL 1110/1111 – Gen Biology + Lab	4	Minimum Grade of "C" required
MATH 1110 or Equivalent	3	Minimum Grade of "C" required
UNIV 1000* - Service to Leadership	1	
AGSC 1410 – Introductory Animal Science	3	Pre-Requisite Course: Required for all Animal Science Courses; Minimum Grade of "C" Required
AGSC 2010 – Introduction to Economics for Agribusiness	3	Pre-Requisite Course: Required for all Agribusiness Courses; Minimum Grade of "C" Required
<b>Total Hours</b>	<b>17</b>	

\*Orientation course taken at another University does **NOT** meet this requirement. Students with less than 60 credit hours must take UNIV 1000 at TSU.

<b>Semester 2</b>	<b>Hrs.</b>	<b>Semester 2</b>
ENGL 1020 – Composition II	3	Pre-Requisite Course: Must be taken before taking HIST 2010, HIST 2020, HIST 2030, HIST 2060, HIST 2070, or HIST 2700; Minimum Grade “C” Required
CHEM 1110/1111 – Gen Chemistry + Lab	4	Minimum Grade of “C” Required
Humanities Elective 1*	3	General education requirement
AGSC 1200 – Introductory Plant Science	3	Pre-Requisite Course: Required for all Plant Science Courses; Minimum Grade of “C” Required
AGSC 1600 - Introductory Biotechnology	3	Required for all in Biotech Concentration. Minimum Grade of “C” Required
<b>Total Hours</b>	<b>16</b>	

\*Students must take a 3 credit hour course from the following list of approved general education Humanities courses:  
AREN 2310, ART, 1010, HIST 1000, THTR 1020, MUSC 1010, PHIL 1030, or RELS 2010. A total of 9 credits are required.

<b>Fall Schedule</b>		<b>Milestones</b>
<b>Semester 3</b>	<b>Hrs.</b>	<b>Semester 3</b>
Humanities Elective 2*	3	General education requirement
Social Behavioral Science Elective 1**	3	General education requirement
HIST 2010***	3	General education requirement
AGSC 2040 – Research and Business Writing in Agricultural Sciences	3	Minimum Grade of “C” Required
CHEM 1120/1121 – Gen Chemistry II + Lab	4	Minimum Grade of “C” Required
<b>Total Hours</b>	<b>16</b>	Petition for Admission to Upper Division Courses

\*Students must take a credit hour course from the following list of approved general education Humanities courses:  
AREN 2310, ART, 1010, HIST 1000, THTR 1020, MUSC 1010, PHIL 1030, or RELS 2010. Students must remember **NOT** to duplicate a course option from a previous semester.

\*\*The following courses can meet the Social Behavioral Science elective: AFAS 2010, ANTH 2300, ECON, 2010, GEOG 1010, HPSS 1510, POLI 1010 PSYC 2010, WMST 2000, and URBS 2010. A total of six credits are required

\*\*\*The Department recommends HIST 2010; however, HIST 2030, HIST 2060, HIST 2070 or HIST 2700 satisfy this requirement. Students must remember **NOT** to duplicate course option from a previous semester. A total of 6 credits of History are required.

<b>Spring Schedule</b>		<b>Milestones</b>
<b>Semester 4</b>	<b>Hrs.</b>	<b>Semester 4</b>
Humanities Elective 3 (ENGL LIT)*	3	General education requirement
COMM 2200 – Public Speaking	3	General education requirement
HIST 2020 **	3	General education requirement
CHEM 2010/2011- Organic Chem. + Lab	4	Minimum Grade of “C” Required
AGSC 2200 – Fundamentals of Soil Science	3	Minimum Grade of “C” Required
<b>Total Hours</b>	<b>16</b>	

\*Courses within the range of ENGL 2012- ENGL 2322 will meet this requirement.

\*\*The Department recommends HIST 2020; however, HIST 2030, HIST 2060, HIST 2070 or HIST 2700 satisfy this requirement. Students must remember **NOT** to duplicate course option from a previous semester. total of 6 credits of History are required.

\*\*\*\* This must be a course in Plant or Animal Improvement or Genetics

Fall Schedule		Milestones
<b>Semester 5</b>	<b>Hrs.</b>	<b>Semester 5</b>
		<b>Student should meet with an academic advisor to discuss the research assignment required for AGSC 4500-Senior Project</b>
AGSC 4340 – Cell and Tissue Culture	4	Minimum Grade of “C” Required
AGSC 312 – Introduction to Applied Statistics	3	Minimum Grade of “C” Required
AGSC 3500 – Principles of Food Science and Technology	3	Minimum Grade of “C” Required
AGSC 3109 Principles and Methods of Biotech *	4	Required for all in Biotech Concentration; Minimum Grade of “C” Required
<b>Total Hours</b>	<b>14</b>	

\*AGSC 1600 Introductory Biotechnology is required for this course.

\*Discuss with an academic advisor course options. The choice should be based on admission requirements to desired professional school.

Spring Schedule		Milestones
<b>Semester 6</b>	<b>Hrs.</b>	<b>Semester 6</b>
Social Behavioral Science Elective 2*	3	General education requirement
CHEM 341 - Gen Biochem I	3	Minimum Grade of “C” Required
AGSC 311 - Leadership	3	Minimum Grade of “C” Required
AGSC 311 - Principles and Methods of Biotech II**	4	Required for all in Biotech Concentration.; Minimum Grade of “C” Required
Guided Elective***	3	Minimum Grade of “C” Required
<b>Total Hours</b>	<b>16</b>	

\*The following courses can meet the Social Science elective: AFAS 2010, ANTH 2300, ECON, 2010, GEOG 1010, HPSS 1510, POLI 1010 PSYC 2010, WMST 2000, and URBS 2010.

\*\*AGSC 3109 (Principles and Methods of Biotech I) is required for this course.

\*\*\* PreMed students should use these to meet additional Med School requirements including PHYS 2110/2111 General Physics I and PHYS 2120/2121 General Physics II. Discuss with an academic advisor course options. The choice should be based on admission requirements to desired professional school.

Fall Schedule		Milestones
<b>Semester 7</b>	<b>Hrs.</b>	<b>Semester 7</b>
AGSC 450 - Senior Project	3	Presentation of Senior Project Research; Minimum Grade of “C” Required
BIOL 4110/4111- Molecular Genet + Lab	4	Minimum Grade of “C” Required
BIOL 4112 - Bioinformatics	4	Minimum Grade of “C” Required
Guided Elective*	3	Minimum Grade of “C” Required
<b>Total Hours</b>	<b>14</b>	

PreMed students should use these to meet additional Med School requirements including PHYS 2110/2111 General Physics I and PHYS 2120/2121 General Physics II.

Spring Schedule		Milestones
<b>Semester 8</b>	<b>Hrs.</b>	<b>Semester 8</b>
		Take Senior Exit Exam and Apply for Graduation
AGSC 4710/20 - Seminar	1	Minimum Grade of "C" Required
BIOL 3410/11 Gen Bacteriology + Lab OR BIOL 3400/3401 - Microbial Physiol. + Lab	4	Minimum Grade of "C" Required
AGSC 3400 - Animal Breeding & Genetics, or AGSC 4310 - Plant Breeding	3	Minimum Grade of "C" Required
Guided Elective*	3	Minimum Grade of "C" Required
<b>Total Hours</b>	<b>11</b>	

\* PreMed students should use these to meet additional Med School requirements including PHYS 2110/2111 General Physics I and PHYS 2120/2121 General Physics II.

**Employment Information:**

Modern biotechnology provides breakthrough products and technologies to combat debilitating and rare diseases, reduce our environmental footprint, feed the hungry, and use less and cleaner energy, and have safer, cleaner and more efficient industrial manufacturing processes for improving human life. Thus wide variety of employers in academia, public service institutes as well as research and development industries require graduates with skills in biotechnology disciplines.

**Representative Job Titles Related to this Major:**

Health related industries technologists in industries such as Bio-Pharmaceuticals, Therapeutic Proteins, Drug Delivery, Biocatalysts and Gene Therapy. Also research or analytical positions at various levels in, Manufacturers with Bio-Products, Food Industry, Bioinformatics facilities, Bioremediation and Bioleaching units, Bio-Economics and Bio-Refinery, Molecular Synthetic Biology institutes, Genomics and Proteomics facilities, as well as Academic Research Laboratories can be filled by biotechnology graduates.

**Representative Employers:**

All employers in public or private setting who apply scientific and engineering principles to living organisms to produce products and services of value to society. This includes Educational institutes, Major Corporations, Small Businesses, Local, State, Federal Government Agencies, and Non-Profit Organizations.

**International study is available for all TSU students and may include opportunities for internships or taking course work towards various minors.** International study may have an impact on the academic map; therefore, it is important to consult with the academic advisor for this major before participating in an international Program opportunity. Students interested in study abroad opportunities should contact the Office of International Programs and consult with their academic advisors.

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This map is not intended to be a contract; either expressed or implied, between the University and the students, but represents a flexible program of the current curriculum which may be altered from time to time to carry out the academic objectives of the University. TSU specifically reserves the right to change, delete or add to any MAP at any time within the student's period of study at the University.