

The University of Texas at Tyler Department of Biology
Undergraduate Curriculum for the Major in Biology: A Developmental Perspective

Most new students majoring in biology and some who have been around awhile might not realize how a college curriculum is developed. Most see the list of courses that they have to take as just that, a list. The goal is to check off all the items on the list. While true in a practical sense of keeping an eye on their progress, it is far from the purpose and intent of the curriculum.

I will share with you the inside story of how our biology curriculum was developed, why it is the particular curriculum for a biology major at UT Tyler, and what the goals and objectives of this curriculum are.

How did the current curriculum for a major in biology at UT Tyler come to be? It might not really surprise you that the curriculum has changed over time. As research in the biological sciences progresses new and modified information and explanations become established in the “cultural thinking” of biologists. As it becomes apparent that students should have an opportunity to be exposed to those ideas and thoughts, new courses and/or modification of courses and/or the structure of course requirements change in response. Faculty members in the department meet often to discuss these issues and eventually if modifications are needed make those changes in requirements. Note that it is the faculty that determines the curriculum and that the curriculum determines how the student will be exposed to the current information, ideas and concepts in biology.

Why is the particular biology curriculum at UT Tyler structured the way it is? Just as it is true that the biology faculty at UT Tyler determined the curriculum here, university faculties all over the world do the very same thing in their departments. Since each departmental faculty is made up of individuals with expertise in a variety of disciplines, no two departments are made up of faculty members with exactly the same backgrounds, research experiences and teaching interests. The curriculum that is developed in a department on the one hand shares essential elements that all curricula in biology must have but on the other hand is unique and builds on the strengths of the particular faculty members in a department. That is precisely why you will find a different set of courses from one university to another leading to the same major, biology.

So, what are the goals and objectives of the biology curriculum at UT Tyler? The faculty in the Department of Biology at UT Tyler believe that they can present to students the fundamental ideas, explanations and information of biology by an assemblage of courses and laboratories that can be divided into three basic groups. Note that the goals and objectives are organized into levels from basic to advanced in these groups as follows. First, the basic sciences and mathematics are necessary to prepare students for intermediate level learning. This fundamental level of the curriculum is composed of introductory level work in **biology, chemistry, physics and mathematics**. While the students are acquiring fundamental knowledge and skills in science they also will be developing fundamental knowledge and skills through the University’s core curriculum, another faculty designed curriculum. When biology majors complete the fundamentals

they move into the biology core that can be thought of as an intermediate level. Here students are exposed to the basic processes of the discipline in more detail than in general biology. The course in **genetics** develops the ideas of inheritance, variation, and expression of biological traits. The course in **cell biology** develops the ideas of cell structures and functions. And the course in **ecology** allows students to pursue learning about local and global interactions of microbes, plants and animals in the context of their environment. The next level of learning for the biology major is exposure to specific fields of biology that in their own way use the knowledge previously gained by the student. Evolutionary biology is a fundamental principle/theory that unites the biological sciences. Students learn about this explicitly in a course in **evolution** or **biogeography**. A major in biology at UT Tyler will be exposed to how biologists organize species into related groups. Students will have the opportunity to study and utilize these techniques in both plants (**plant morphology, plant taxonomy**) and animals (**vertebrate natural history, entomology, ornithology, herpetology, invertebrate zoology**). More detailed analysis of structure and function of life forms is acquired in **microbiology** or **cell and molecular biology**. Knowledge of vertebrate biology, structure, and development is gained in **physiology** or **comparative vertebrate biology**. All of the boldfaced words denote courses offered through the curriculum in biology at UT Tyler. The requirements at UT Tyler may be different in particulars from other biology curricula at other universities. But the strength of the biology curriculum here and at other universities is in how a faculty's unique biological specializations combine to establish a particular curriculum.

Students who complete the major in biology are prepared for a variety of "next steps." A student's goal may be to teach; this curriculum will enable the student to develop the knowledge to pursue this line of work. The goal may be to go to medical, dental, veterinary or pharmacy school; this curriculum paves the way. Should the students be interested in pursuing careers in industry, they will be ready to use the technical skills and knowledge such a career might require. And if a student wants to become a geneticist, biochemist, cell biologist, physiologist, parasitologist, etc., the biology curriculum at UT Tyler prepares the student for the next step in his/her education.

So there you have it. As you check off the list of courses you complete you now know why the list is as it is. Hopefully you see that the curriculum is so much more than just a bunch of courses you have to endure before you are graduated. You may also have a different perspective on just what the purpose of the biology curriculum is and how it was developed.