

# GUIDELINES FOR STUDENT SUCCESS IN BIOLOGY CORE COURSES

## 1. PLANNING AN EFFECTIVE COURSE SCHEDULE

**1.1) Prerequisite courses and course sequence-** Biology Core Courses have required prerequisite courses. Earning a grade of “C” or better in prerequisite courses is required to advance to more advanced courses. The Biology Department publishes degree plans for the sequence that Core Courses should be taken. Students have no flexibility on prerequisites and little flexibility on core course sequence because these issues are governed by departmental regulations. Nonetheless, students can use prerequisite courses as a guide to review and prepare for subsequent core courses before they begin, because prerequisites and course sequences are carefully planned according to what you are expected to know when you begin a new class. For example, success in Biology 1225 requires that you have learned and remember the curriculum that you were taught in Biology 1204. Therefore, reviewing the text book and your class notes from Biology 1204 ahead of time is good practice to enhance your success in Biology 1225.

**1.2) Advisement from faculty** - Faculty who teach the courses that you intend to take are the best source of advice about the study time demands and expectations for success in those courses. Meeting with faculty when you are planning your future course schedule, therefore, is a very useful way to effectively plan enough study time to be successful. Once you begin a new class, it is very useful to pay close attention to the advice that most instructors give during the first week of classes about study approaches that will be successful, and those that will not be

successful. Students should also take advantage of the regular office hours that Biology Department faculty keep to learn effective study techniques from their instructors.

**1.3) *Balancing study with employment and other demands on time*** – Many students begin biology courses not appreciating the large amount of study time that is required to achieve success. Although requirements will vary individually, a good general rule is that for each course students will need to study at least two times the number of hours spent in class for sufficient and effective outside study. For example, 4 credit hour courses meet 3 hours per week for lecture, and 3 hours per week for laboratory, for a total of 6 hours of class time per week, and a total of 12 hours per week of outside study time. It is extremely important to budget adequate study time into the other time demands of your schedule, particularly employment.

## **2. EFFECTIVE STUDY AND BEHAVIOR INSIDE THE CLASSROOM**

**2.1) *Effective use of the syllabus*** – The syllabus has information you need to understand the course in general, has a schedule of topics you will cover, and sometimes includes assignments and projects you will complete during the semester. It is a contract between you and the professor. You will need to refer to it throughout the semester, so put it in an accessible place – perhaps in front of the notes you are taking for that class. (Having a system for organizing papers for each class is also an important skill – a binder is good if there are many handouts, or a notebook and folder for each class if it is mostly based on notetaking.) If there are deadlines in the syllabus, record them in your planner/calendar/etc. so you have a single place where you can find all deadlines for all classes. This can be electronic (there are several free options) or paper. Although some professors put all of their deadlines on D2L, and you can refer to the

calendar in that case, you cannot be sure this will occur for every class. Deadlines can change during the semester, so as soon as the professor announces a change, you should change it in your planner/calendar.

**2.2) Attendance, pre-class preparation, arriving on time, and seat choice** – Instructors plan their course curricula assuming that students will attend every class period. Material in most courses is also usually cumulative; each lesson builds upon the concepts and principles that were covered previously. Therefore, maximum success requires that students attend every class period. Missing even a single class period deprives you not only of learning material presented on that day, but it also places you at a disadvantage for understanding future material. Should very serious circumstances require that you miss a class period, you are still responsible for the material covered in class. You should acquire a thorough set of notes from a classmate that takes notes well (see below), study those notes and assigned readings as soon as possible, and visit your instructor during office hours to clarify questions.

If you find it difficult to get up on time or to stop doing other work to make it to class on time, repeating alarms can be helpful. Set an alarm for the time you would need to stop your work and head to class (with enough time to get a drink, use the restroom, etc.). Many smartphones have the ability to set alarms for particular days of the week.

Effective pre-class preparation begins the day before each class period by recopying and studying your class notes, completing assigned readings, and completing assignments that are due to be handed in during class. Arriving 5-10 minutes early for your classes is also an important key for success. Arriving early will give you time to review your latest notes as a reminder of where the instructor ended during the previous class session. It is also important to

be ready to begin working when the instructor begins, because they often begin by giving a brief review of the material covered during the previous class period, pass out handouts at the beginning of the class period that will be important for the coming lecture, and/or give an overview of the teaching/learning objectives for that day. Arriving late to class will cause students to miss this important information. Should serious circumstances cause you to arrive late, enter the classroom (whether or not the classroom door is closed), take a seat, and begin working quietly with minimal disturbance.

***Upon entering the classroom, turn off your cellular telephones, and place them inside of your backpacks. Attention to these devices during class is a distraction from your being attentive to the material being presented. Interruptions of class caused by cellular telephones ringing are a disrespectful distraction to both your instructor and classmates.*** Sit as close to the front of the classroom as possible. Doing so promotes success for several reasons. Almost all instructors structure their lectures around visual aids that are projected on a screen, written on a chalk or white-board, or both. Sitting at the front of the classroom gives the best view of these visual aids. It also promotes your ability to hear, remain engaged by the instructor's verbal presentation, and ask questions. It is very easy to become inattentive during the course of lectures, but doing so will reduce your performance. Instructors read student faces to assess progress in how students are understanding the material. Successful students learn how to become good listeners by asking meaningful questions that instructors will use to improve communication with you and others. Becoming an attentive listener is a key to successful learning.

**2.3) Effective note-taking as a study tool** – Most instructors prepare their examination questions based on the material that they present during lectures. . Therefore, effective note-taking during lectures is the most effective method for learning the material that will be tested because it requires you to engage your brain throughout the entire class period, and then translate that into activity which results in a physical record to use as study tool. A strong set of notes consists of an accurate and complete record of all of the material that is covered in each class period. Your notes should contain all of the diagrams and labels that your instructor draws on the board, provides as handouts, or power point images that your instructor references as visual instruction aids. The latter are usually from your textbook, have been made available on D2L, or can be accessed on-line at sites that your instructor has identified. Recording a thorough set of notes requires that you pay close attention to what the instructor is saying and write quickly. Students sometimes make the mistake of thinking that they need to write down each word that instructors speak. It is important to record all new and specialized terms that your instructor uses, defines, and emphasizes. However, it is not effective to write every word without understanding the content of those words. The key is to think critically to understand the content and relationships that the instructor is explaining, and to make an accurate record of that in your notes.

Develop shorthand and symbols that will save time. For example: the statement “oxygen use in animals increases in response to increased activity rate” could be shortened to “O<sub>2</sub> use ↑ due to ↑Act”, but this will require that you remember the meaning of your notation. To ensure that you remember accurately and completely, re-copy your notes as soon as possible following class when the topic is fresh in your mind to make them neat and complete.

Such a thorough set of notes is your best study tool to prepare for examinations, but learning the material in them requires repetitive study. Some students choose to record their classroom notes on laptop computers. The results of many studies indicate that doing so is not as effective as note-taking by hand, and then recopying for neatness. Most instructors do not object to students tape-recording their lectures (although students should always ask permission first), but advise students to also take thorough written notes during lectures, and supplement their study by listening to the recordings.

**2.4) Effective preparation for, and taking of examinations** - Effective preparation for examinations requires steady, repetitive study of the course material which should be recorded in your class notes. Being prepared is also the best strategy to combat test anxiety. However, it is also important for students to realize that most instructors routinely provide very helpful guidelines about how to best prepare for their examinations. These include explaining the format of questions (e.g. multiple choice, matching, other short answer questions, essay questions), the number of questions, and the material covered by each examination. They may point you to resources available from your text book or available free online. They may also provide study guides as a different way to summarize the material that will be tested – this is an effective way to look at your notes differently, so that you are more likely to retain the material and be able to use it on the exam. Successful students pay close attention to these guidelines and incorporate them into examination preparation. Another useful tool is to work with others to study (discussed below) – group members will ask questions in a way that is different that you would ask yourself, and this is a good way to test if you know the material at a depth needed for success on the exam.

It is very important to read examination questions carefully, and more than once prior to answering. The stress of examinations sometimes causes students to misinterpret questions. It is appropriate to ask instructors for clarification about questions during the examination, but realize that instructors will not provide information that you should already know.

**2.5) *Effective use of returned examinations and assignments*** – Instructors work hard to grade examinations and assignments to return them to students promptly. This is because graded exams and assignments are important study tools that students should use to improve. Take advantage of these tools by carefully studying the items that you missed relative to the correct answers, and determine how you arrived at answers that were not correct. Do this as soon as possible, and visit your instructor promptly should you require clarification. Missing class periods following examinations is a completely ineffective approach. Most classes have a comprehensive element, for which past examinations/assignments are an effective study tool, so keep all of them. Many instructors do not allow students to keep examinations to maintain academic security. However, you can study your past examinations by visiting your instructors offices.

### **3. EFFECTIVE STUDY OUTSIDE THE CLASSROOM**

**3.1) *Budgeting sufficient study time*** – A common mistake is for students to not budget sufficient study time into other time demands, most usually employment. It is wise to seek the advice about study time from instructors when you are planning your course schedule (see above). It is also good practice to discuss your educational goals and your study requirements with your work supervisor to explore options that can meet the time demands of both. Once you are committed to courses, carefully evaluate the requirements of each one given your

particular abilities. Students sometime tend to short-change study time for courses that are particularly difficult for them and/or that they find less interesting. This approach is usually not successful for core courses because at least C-level work is required for advancement. Students must establish a balanced schedule for their entire class schedule to be effective.

It is especially common to underestimate the time needed to read assigned pages before class. A good practice is to time how long it takes for you to read five pages of each text, then calculate your average time per page. This way you can estimate how long it will take to read an assigned chapter.

**3.2) Using instructor office hours effectively** – Faculty in the Biology Department keep regular office hours that are listed in the course syllabus. Office hours are times that instructors set aside to answer student questions about course material. Students should feel free to visit instructor offices without an appointment during scheduled office hours. Instructors are also available by appointment to answer questions about course material and study techniques. Making the best use of office hours requires preparation. Before visiting your instructor's office, develop a written list of questions to bring to your meeting along with your class notes. Then work through the list systematically with your instructor. These questions can include topics that you need to have explained a second time. It is not effective to simply tell instructors that you do not understand anything, and then expect a complete repeat of class presentations. Instructors are willing to help students that are working hard to improve, but you must demonstrate that hard work.

**3.3) Effective individual study** – A very important key to success in biology courses is regular cumulative study throughout the semester. Intermittent, infrequent study, especially postponing study until a few days prior to examinations is not an effective approach.

***“Failing to prepare is preparing to fail”***

***John Wooden, Head Basketball Coach, Ten-time National Champion UCLA Bruins.***

The regular practice regimen used by athletes and musicians are instructive examples. Three-point specialists in basketball can sink their shots under time and defender pressure because they have taken hundreds of practice shots daily throughout the season. Such practice leads to the formation and strengthening of nerve-muscle interactions that allow effective performance of physical tasks even in pressure situations. Effective learning of new material is very similar. Repetitive study over time actually causes formation of increased nerve cell interconnections in your brain similar to the nerve-muscle connections that results from practice of physical tasks. New material is similar to a foreign language at the beginning, but with repetition it becomes increasingly familiar to the point that it enters one’s long-term memory. It is at this point that you can think clearly and critically about the material which is required to answer examination questions. The true test of your knowing material is being able to explain important concepts and terminology completely on your own, both in writing and verbally. When you can do this, you are well prepared for examinations.

**3.4) Effective group study** – Studying together with classmates can be a very effective approach so long as all involved are serious and disciplined. Classmates may understand material that is difficult for you, and vice versa. The act of explaining material to others also reinforces understanding for those students that are explaining. However, effective study in groups

requires discipline. All involved in study groups must guard against the natural tendency of people to socialize, which does not enhance learning the material. Surrounding yourself with other highly motivated students is an effective tactic for success.

**3.5) Supplemental instruction and tutoring** – The Biology Department offers Supplemental Instructors in some of our core courses. Supplemental instructors are students that have successfully completed these courses, and who hold scheduled sessions outside of class hours to review the material. Students are encouraged to attend SI sessions to improve. The UCO Tutoring Central Office also offers tutoring for some core courses. Interested students are encouraged to visit the following link (<https://sites.uco.edu/academic-Affairs/students/tutoring-central/index.asp>) for more information about tutoring.

**3.6) Effective assignment preparation, hand-in and academic honesty** – Some biology courses include graded assignments/reports that are based on class experiments and exercises that involve students working in groups. Instructors clearly announce due dates for these assignments. Students should understand that there is a penalty in most classes for handing in assignments late, and some instructors do not accept late papers at all. Make back-up electronic files and hard copies of all assignments in case they are lost or destroyed. Students should also understand that even for exercises that involve working in groups, they are expected to do their own work preparing assignments/reports. ***Sharing work on assignments with classmates is a form of academic dishonesty which is prohibited by the student handbook.***

## **4. SPECIAL REQUIREMENTS OF BIOLOGY COURSES WITH LABORATORIES**

**4.1) Introduction** – Many biology courses include a laboratory which is a new experience for many students that requires developing different skills to be successful. In most biology courses the laboratory work takes place during class periods that meet separately from the lecture class periods, but the laboratory material re-enforces and illustrates the lecture material. Study of laboratory material is guided by exercises in manual-style textbooks, or in many courses, laboratory exercises that instructors have written for their classes. Sometimes these required references must be purchased at the bookstore, other times they are made available via D2L. These resources usually include visual aids that are essential for learning the laboratory material.

**4.2) Objectives of laboratory curricula** – Science is built upon observation of natural phenomena. The overall objectives of the laboratory curriculum is to train students in making observations to illustrate important concepts and to learn techniques that have practical application or are necessary to test scientific hypotheses. Success in both of these objectives involves learning through hands-on activity via direct student participation. In most cases the laboratory material is taught using activities that students complete either individually or working with a laboratory partner while following written and/or verbal instructions from the instructor. Therefore, the active preparation for and participation in discovery-based laboratory exercises is the only effective way to master the laboratory curriculum. Choosing not to participate actively is not effective.

**4.3) Laboratory techniques** – Instructors teach and demonstrate all of the techniques that are necessary to complete the laboratory curriculum. However, because techniques are necessarily

activity-based, students must participate and practice in order to learn the proper use of equipment (e.g. microscopes), or techniques (e.g. dissection, making measurements, etc). Early mastery of techniques is an effective approach, delaying mastering important techniques is not.

**4.4) Effective laboratory study** – The activity-based nature of laboratory study makes it time consuming. Faculty plan their laboratories carefully so that students will have sufficient time for study during the scheduled period. Learning the laboratory material effectively requires that students read the assigned exercises before the laboratory period, and then following the written guidelines, making careful observations of the material on display using an organized and systematic approach. Instructors are always present to help and answer questions, but they cannot do the work for students. Successful students embrace this approach. Because effective laboratory study is time-consuming, the Biology Department works hard to make additional time available for independent study of the laboratory material. An important key to success in laboratory courses is for students to plan a schedule that allows not only working effectively throughout scheduled laboratory sessions (instead of leaving early), but to also take advantage of open-study hours for review.

**4.5) Laboratory practical examinations** – Most biology courses having a laboratory component examine this material using laboratory practical examinations. The laboratory practical examination format is unfamiliar and initially challenging for many students. Success on “laboratory practicals” first requires understanding the format, and then heeding advice about study techniques that are effective preparation for such examinations. These are described below.

- *Examination format* – Laboratory practical examinations are short-answer tests about the material that students have studied during their laboratory sessions and assignments. Examinations consist of numbered stations that each student will be given a specified amount of time to visit, observe the displayed material, and answer the questions (1-3 min/station is typical). At each station, there will be written questions (1-5 questions is typical) about displayed specimens. Instructors will have pre-arranged the specimens for easy observation of the features that are necessary to answer exam questions.
- *Examination specimens* – Instructors use for their laboratory practical examinations the same (or similar) specimens that have been used during laboratory exercises and demonstrations (no surprise specimens). Specimens will include both those that must be observed under microscopes, and those that can be observed directly.
- *Question Content* – Questions may involve identification/description of taxonomic classification, specific structures, adaptive functions of structures, selection pressures, or ecological information. Examined specimens/features will be clearly labeled, indicated by microscope pointers, and numbered. Students will not be asked to locate examined structures on practical examinations. Questions will involve short answers (a few words; a phrase at most), and a numbered answer sheet will be provided. Students are responsible for placement of their answers in the correctly numbered spaces on the answer sheet. Students are given a limited amount of time at each station, and most instructors do not allow returning to test stations.

- *Effective Preparation for Laboratory Practical Examinations* – Effective preparation for laboratory practical examinations is achieved by students taking a highly active and repetitive study approach. Laboratories require students to make careful observations and records of biological material that instructors choose specifically to illustrate important concepts which are described in assigned laboratory exercises. Learning this material involves independent observation and study. The amount of time required for each student to learn varies. Instructors are available throughout the laboratory periods to answer student questions. However, it is not the responsibility of instructors to individually supervise students to ensure that each learns the laboratory material. Each student bears this responsibility. A common mistake is for students to underestimate the amount of time required for effective study of laboratory material, and to overestimate their understanding of the material without such significant study. An effective initial strategy is to be conservative by studying more than enough to perform well on practical examinations.

**4.6) *Diagramming as an effective study tool instead of photography*** – Images are highly effective learning tools, photographs and diagrams of biological specimens are more widely available now than any time in history, and nearly all students have cameras capable of photographing laboratory specimens. Nevertheless, studies of learning outcomes clearly show that making diagrammatic drawings of laboratory demonstration specimens and carefully labeling them is a far more effective learning tool than simply photographing these same specimens. Making a diagram requires careful observation of important physical attributes of

specimens (e.g. shape, size, dimensions). Labeling the structures that instructors indicate are important requires study of written instructions while diagramming. When prepared carefully, these diagrams become important study tools. Students can use these diagrams to prepare for laboratory practical examinations at home. In marked contrast, taking photographs of specimens does not require making careful observations, and does not require the observation and learning of important structures to label them. For these reasons, learning to make accurate diagrams is a very useful study approach in biology courses with a laboratory component.

## **5. ACADEMIC EXTRACURRICULAR ACTIVITIES AND OPPORTUNITIES**

The Biology Department offers a number of activities/opportunities outside of the course curriculum that are designed to help students grow academically.

**5.1) Clubs** – The Biology Departmental chapter of the Tri-Beta Society, the Wildlife Society, and the Horticultural Society hold regular meetings throughout the academic year where they host speakers who give presentations on various biological topics. Attending these is an excellent way to learn about research being conducted by UCO faculty and students as well opportunities for employment and volunteer activities. Similarly, the Health Professions Club hosts speakers specifically targeted for students interested in the medically oriented careers. Be attentive to public announcements of club meetings or ask in the Biology Department Office to learn about club participation and meetings.

**5.2) Internships** – The Biology Department has an internship program that is directed by a faculty advisor. Internships consist of structured participation off-campus in conjunction with government agencies, employers, or organizations having an interface with biology related

activities. Working under the guidance of faculty and an external mentor, students participate in activities that develop skills that promote securing future employment and/or admission into post-graduate programs. Interested students should inquire at the Biology Department Office for further information.

**5.3) Career services** – The Office of Career Services offers advisement on resume writing, making connections with employers, interviewing skills, and internships. Interested students should explore these services further at [careers@uco.edu](mailto:careers@uco.edu).

**5.4) Scholarships** – A number of scholarships are available through the Department of Biology and the College of Mathematics and Science through the UCO Foundation (Endowed Scholarships) to help students defray costs. Awards are based on academic merit and related criteria. To be considered for all scholarships, students need to submit one application to the Office of the Dean, Mathematics and Science (<http://sites.uco.edu/cms/development/scholarship.asp>).

**5.5) Tuition waivers** – The Biology Department is allotted funds to award a limited number of tuition waivers to Biology majors who are recognized “in-state residents”. Tuition waivers are based on academic merit and related criteria. Interested students should apply for these online via the Biology Department web page early during each spring semester for the following year.

**5.6) Faculty research programs** – Most Biology Department Faculty have active research programs in their areas of specialty, and may have opportunities to involve students which is an excellent way to grow academically. Interested students can learn about faculty research interests and possible opportunities by visiting faculty web pages (<http://sites.uco.edu/cms/biology/>), and/or contacting faculty members directly.