

# The Governor's School for Science and Technology New Horizons Regional Education Center

## Dual-Enrolled at Virginia Peninsula Community College

**Governor's School Course Information:** Advanced Biological Analysis (4371)

**Instructor:** Mary K. Patterson, Ph.D.  
Classroom & Office: A61

Phone: 766-1100 x3324  
email: [mary.patterson@nhrec.org](mailto:mary.patterson@nhrec.org)

**Communication with Instructor:** In addition to time in-class and the above contact information, the instructor can be reached via CANVAS [www.newhorizons.instructure.com](http://www.newhorizons.instructure.com), in which students are already enrolled. Use the **InBox** feature in Canvas.

**Advanced Biological Analysis (4371):** (2 weighted high school science credits) In the fall semester, topics in the field of cell and molecular biology will be addressed, some of which include the roles of biological macromolecules, cellular organization and metabolism, and cellular processes such as communication, reproduction, respiration, and photosynthesis. In addition, mechanisms of inheritance and control of gene expression will be examined, followed by a study of developments in biotechnology. In the spring semester, evolution, phylogeny, and the diversity of living things will be discussed, with a special focus on the anatomy and physiology of animals. The laboratory experience is a major component of the course, allowing students the opportunity to use technologies applied in research, medical, and forensic laboratories while designing their own experiments and analyzing and interpreting their results. The anatomy and physiology of various vertebrate organ systems will be compared while dissecting animals in the laboratory. *Advanced Biological Analysis is a college-level course that examines the topics typically studied during the first year of college by biology majors. Prerequisite Advanced Chemical Analysis.*

**College Credit:** Students **may** receive two semesters of college credit (8 credit hours) for this course by dual enrolling at Virginia Peninsula Community College. Details will be provided during the first week of school.

While GSST will do all in its power to secure dual enrollment (DE) status for its courses, dual enrolled course credits are not guaranteed. Since the Virginia Community College System (VCCS) and Virginia Peninsula Community College (VPCC) set the criteria for DE and must approve each course and instructor, unavoidable circumstances that are not within the control of GSST may change the DE eligibility of any given GSST course. Alternative pathways for meeting specialty program requirements (E.g. concurrent Associates Degree) should be discussed in advance with the home high school counselor.

### Implications of Dual-Enrollment

The decision to dual-enroll in a course requires careful consideration. You have options, as you can see from the [DE module](#) on Faculty Advising Canvas course. You may wish to contact your top choice colleges to ask what the impact of taking a dual-enrollment course might be for your goals, particularly if you do not perform to your expectations in the course. Please be aware that you are generating a permanent college transcript with all the courses for which you are dual-enrolled. You can also use the dual-enrollment student guide from [Transfer Virginia](#) to help you determine the potential impact.

If you choose to dual-enroll, you must monitor your course grade. If you find you are not earning grades you want to have on your permanent college transcript, you may consider dropping the dual-enrollment portion prior to the Add/Drop date for the term of the course, or to withdraw from the dual-enrollment portion prior to the Withdrawal date. If you choose to withdraw from dual enrollment for the class, you will still earn high school credit and can plan to be well-prepared for the class in college. Dropping will have no record on your transcript, while withdrawal will leave a note on your college transcript indicating you withdrew, but no grade will be recorded on your college transcript. You can request a decline or withdrawal form from me or from Mrs. Yee.

No matter what you choose to do, I will respect your wishes. I want to work with you to support your learning, but I cannot learn the information for you; you will have to invest effort in the course in order to succeed. This may require you to learn

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new learning strategies that you haven't used in the past. I will do my utmost to support your personal learning in the class and encourage you to pursue your goals.

Students must keep in mind that enrollment in a college class, including dual-enrollment while in high school, entails consequences that can be significant and permanent including, but not limited to, the following:

- Final course grades on college transcripts become a permanent part of a student's college record.
- Graduate-level education programs may consider DE grades equally with traditional college courses in calculating GPA for admission (E.g. graduate, medical, veterinary schools).
- Grades of D and F and course withdrawals can negatively affect scholarship and financial aid requests.
- Once the withdrawal date has passed, students cannot withdraw from a class, except in extraordinary circumstances such as a medical emergency.

**Textbook:** Biology, 11<sup>th</sup> Edition, Campbell and Reece, 2016. (Provided for student use)  
Access to [www.masteringbiology.com](http://www.masteringbiology.com) link provided via CANVAS

**Lab materials:** will be printed and distributed, or provided electronically via CANVAS, throughout the school year, as needed.

**Course Meetings:** AM Governor's School: M-Th, 8:50 – 10:25 a.m.; F 8:40 – 9:40 a.m.  
PM Governor's School: M-Th, 11:20 a.m. – 12:55 p.m.; F 11:20 a.m. – 12:20 p.m.

**Grading Scale:** A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%, F = less than 60%

### Quarterly Grades:

- Tests – 20%
- Quizzes – 20%
- Projects & Assignments – 20%
- Lab – 40%

**Semester Grade Determination:** S1 Grade = 50% Q1 + 50% Q2  
S2 Grade = 50% Q3 + 50% Q4  
Yearlong Grade = 50%S1 + 50%S2

**Instructional Methods:** The Advanced Biological Analysis course is a blended, flipped course. Students will take notes and interact with new instruction via videos, reading assignments and tutorials at home, submitting notes or other assignment work for a grade and instructor feedback. In-class sessions, which are 90 minutes or longer in length, will incorporate laboratory experimentation and analysis, class discussions, reading and discussing contemporary scientific literature, and projects. Safety in the laboratory is a priority and safety rules will be strictly enforced, including wearing covered shoes (students are encouraged to leave a spare pair of covered shoes in the laboratory), as well as tying back long hair, and wearing splash goggles. Laboratory coats will be supplied by GSST for those laboratory experiments necessitating this personal protective equipment.

At any point in the school year when students must learn virtually, there will be a combination of synchronous live sessions and asynchronous independent and group work. During \*Live\* sessions, students should expect mini-lectures, large- and small-group discussions, small-group projects, and presenting to the whole class. In addition, brief quizzes, in the form of polls or games may be expected. ATTENDANCE AND PARTICIPATION (in polls, games, discussions, and project work) IS

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**MANDATORY.** It is expected that students attending virtually via Zoom will have their camera turned ON and participate in the class activities and discussions. If there are difficulties fulfilling the camera on expectation, a parent-teacher conference is required to determine appropriate expectations.

**Homework & Assignments:** In addition to note-taking from videos or readings, students will be responsible for making progress on assignments. Often, much of the work will be completed in class where the student can get assistance from the instructor as well as peers.

**Tests & Quizzes:** All quizzes and tests may include free response questions in addition to multiple choice questions. Tests and quizzes will cover information covered in assigned videos/text readings as well as information discussed in class and content learned through class activities and lab experiments. *Students should expect to answer questions from previous units on any given test or quiz.*

**Laboratory:** Generally, three to four hours per week will be spent in class doing experiments and other lab activities that correspond with chapter/lecture topics. A lab report will be turned in for most lab activities. Some will be formal lab reports while others will be less formal or involve answering specific questions about the lab. In most cases, either a prelab quiz will be given or a prelab assignment will be due on lab day to show that the student is prepared for lab.

**Late Assignments:** Assignments will be submitted via Canvas LMS, except for some assignments and quizzes/tests that will be submitted on paper. Assignments should be submitted on or in advance of the due date and time. If a student is absent the day an assignment is due on paper, they may submit their work electronically on time, or on paper the first day of their return. *Once instructor feedback has been distributed for any assignment, submissions for that assignment will no longer be accepted. Depending upon whether the assignment is for credit or not, there may be grade reductions due to missing assignments.*

**Absences:** Missing class is strongly discouraged! A great deal of learning occurs during each class period, whether we are meeting face-to-face or virtually. In addition, the impact is not just to the absent student, but to laboratory partners and to the class as a whole who are deprived of the missing student's contributions to discussions.

- If an absence is unexpected (i.e., due to illness, family emergency, etc.) **parent/guardian communication is expected within a day of the absence to explain the absence.** Subsequent communication between the instructor and student will allow for mutual agreement for the terms of make-up work.
- In the event of a long-term absence, alternate assignments will be made to accommodate student needs. In support of optimal learning potential, the instructor will determine a reasonable timeframe for make-up work to be submitted in order to gain credit for the submissions.
- The availability of laboratory materials (often LIVE organisms, enzymes with brief functional time-frames, etc.) will dictate whether or not make-up laboratory experience can occur. Under the circumstances that this is not possible, the instructor will provide the student data and expect a formal lab report (format to be discussed as needed to the topic) with background research citations in order to make up for the missed experience.

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**Academic Integrity Guidelines:** All students are required to take responsibility for upholding everyone's honesty in the classroom. All students will sign a copy of the GSST Honor Pledge during the first week of school.

*The Pledge: "I pledge to support the Governor's School for Science and Technology (GSST) Code for Academic Work. I will refrain from any dishonesty or deception, such as cheating or plagiarizing, which are honor code violations, on any and all academic work. I am further aware that as a member of the academic community, I should report any suspected violations to an instructor."*

**No form of cheating, copying, or plagiarizing will be tolerated.** Homework and class assignments are independent work and should not be copied. Students may share lab data collected by members of their group, however lab reports and all other written assignments are to be done independently unless the assignment clearly states that it is group work. The level of collaboration allowed between students will be indicated on each assignment. In addition, students will read and sign the *Appropriate Collaboration* form to clarify types of assistance that are encouraged vs. not tolerated in this course.

In the case of copying, there will be **no determination of who copied from whom; all students involved will receive no credit for the assignment and the students involved may be referred to the GSST administration for disciplinary action.** Regarding tests and quizzes, if students share information during an assessment or look at notes or other written materials during the assessment, all students involved will receive no credit for the assessment and the students will be referred to the school's administration for disciplinary action.

To avoid plagiarism, all sources of literature and website research must be cited properly to give the author(s) credit. In addition, **such information will be summarized or paraphrased, never just copied from its source.**

The goal of the Governor's School is not only to help students to gain entry into top colleges and access learning and career opportunities, but to thrive and excel once they have gained that entry. To this end, we take the academic integrity of each of our students very seriously.

GSST [Grading Procedure](#)

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### **Student Learning Outcome 1**

Students will be able to explain the processes by which energy enters living organisms and what happens as it passes between and through all levels of the biological hierarchy. Students will also be able to compare and contrast the processes by which matter moves through and between organisms/levels of organisms.

### **Student Learning Outcome 2**

Students will be able explain how information is stored in biological systems, how it is accurately replicated, and how the information is processed and used by individual cells/organisms. Students should also be able to explain how that information flows between generations and the patterns of inheritance that result. Students should also be able to describe the application of these concepts.

### **Student Learning Outcome 3**

Students will be able to explain the process of evolution by natural selection, including molecular influences and how that process has affected all life forms in the past and continues to do so today. Students should also be able to explain historical examples and current examples. Students should be able to summarize the evidence for evolution and modifications made to the basic Darwinian explanation.

### **Student Learning Outcome 4**

Given different the levels within the hierarchy of science in general and biology in particular, students will be able to analyze the interrelationships between structural elements at that level and the functions performed. Students will also be able predict the resulting changes that may occur when a structural element of a hierarchy is changed.

### **Student Learning Outcome 5**

Given any biological system, students should be able explain how the parts of the system interact to make the functioning system a whole entity. Students should also be able to describe the emergent properties at any level within a biological system. Students should have experience applying the scientific process by using a model or simulation to describe a system and predict/demonstrate how changes in the model affect the system.

### **Student Learning Outcome 6**

Students will be able to explain the process by which science seeks to understand the world around us. This area should include the design of a hypothetical experiment to test a hypothesis either given to the student or derived by the student from observations provided. Students should be able to identify the role of observation in this process.

### **Student Learning Outcome 7**

Complete a dissection of a laboratory mammal and demonstrate knowledge of the anatomy and function of its systems.

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**Animal Dissections:** During the second semester, a variety of preserved animals will be dissected. This is a highly valuable learning experience that is strongly recommended. If a student prefers not to dissect, or if we find ourselves limited to virtual learning, comparative anatomy will be addressed via virtual dissection using software, internet videos and tutorials, as well as diagrams and photos from previously dissected organisms.

**Classroom Expectations:** *These will change to reflect the learning format (virtual, hybrid, face-to-face)*

**1. Biology is a fascinating subject! It is expected that every member of the class will make a concerted effort to learn by working through lessons and assignments, delving into assigned readings and videos with a curious mind-set, and attempting to make connections between new and previous information.** The instructor will provide feedback to students in writing or verbally after assignments have been submitted and it is expected that the students will review and consider the feedback, to help the student improve in understanding and application.

**2. Distance learning strategies will be employed at many points throughout the school year, including on Early Release or No-School days for the various home schools, days missed due to inclement weather, responding to mandated closures due to the ongoing pandemic, and for individual home-bound students.** When distance learning, real-time \*Live\* Zoom sessions may be required and/or asynchronous work may be assigned. Attendance will be recorded as a function of participation in live sessions and group meetings, measured through real-time oral or written responses to discussion questions when students will be called upon by name as well as asynchronous assignments.

Distance learning requires some shared etiquette. As you prepare to "join" the class conference, allow your microphone to be functional, but mute your microphone to prevent feedback. Unless this is not possible, students are required to have video ON, as this is helpful to the entire class learning environment, unless a Parent-Teacher conference has determined an alternative expectation without the camera on. Respectful dialogue, whether written in the Chat or stated aloud, is expected.

**3. Each student is expected to pay attention and participate in class in a meaningful way.** Students should take notes during lecture and class discussions, so they can track conversations and respond appropriately. Some assignments will be marked as having no credit attached – students will get feedback via class discussion, instructor feedback, or self-checks using a provided key. While these assignments, based upon a student's ability to use resources to get information, gain no credit, they are nonetheless critical to the student's achievement of success in the course, preparation for graded assignments and assessments, and are expected to be completed by the due dates given.

**4. Inappropriate conduct will not be permitted.** Your teacher will warn you if inappropriate conduct is observed. If a few verbal warnings are not effective at correcting an inappropriate behavior, a student's parent/guardian will be contacted and the GSST administration will be notified.

**5. Many assignments will be submitted and evaluated electronically, while others will be submitted on paper.** Due dates are posted for each assignment. If a student has accommodations for extra time, the student must let the instructor know and have a guidance counselor provide documentation. Assignments will include lab activities and answers to thought questions, tutorials and quizzes in MasteringBiology (linked to our Canvas course), assignments that are uploaded as documents, pdf, videos, and photos as jpeg. Because photos of written assignments are generally illegible, it is required that these assignments are done electronically and submitted, or scanned (table-top scanner or scanning app on personal device) and uploaded. **Office Lens for Android and Genius Scan for iPhone are two quality free scanning apps.**

**7. The instructor can only be an advocate for the student if the student communicates with the instructor.** Every effort to coach and guide students to their highest success will be made. However, expectations will not be lowered.

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### Topic Schedule for 2022-2023.

Please note that this schedule may change. Topics may be rearranged, added, or eliminated.

### FALL SEMESTER:

#### **Chemical Basis of Life**

Properties of Water (Chapter 3)

Chemical Bonds, Uniqueness of Carbon, Functional Groups (Chapter 4)

Biological Macromolecules (Chapter 5)

#### **Cell Structure**

The Anatomy and Physiology of the Cell and the Importance of the Cell Membrane (Chapters 6 & 7)

#### **Metabolism**

Mechanisms of Cell Communication and the Roles of Enzymes in Cells (Chapters 8 & 11)

#### **Photosynthesis & Release of Energy**

Important Biochemical reactions: Cellular Respiration and Fermentation (Chapter 9)

Photosynthesis (Chapter 10)

#### **Cell Reproduction, Mitosis and Meiosis**

The Cell Cycle, Regulation of the Cell Cycle, and Cancer (Chapter 12)

Meiosis & Gamete Production (Chapter 13)

#### **Inheritance Patterns and Role of Chromosomes**

Mendelian Genetics and the Role of Chromosomes in Inheritance (Chapters 14 & 15)

#### **DNA Structure and Function**

DNA Structure and Gene Expression (Chapters 16 & 17)

Uses of DNA Technology in the World Today (Portions of Chapters 20 & 21)

Regulation of Gene Expression (Chapter 18)

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**SPRING SEMESTER:**

**Biotechnology**

Uses of DNA Technology in the World Today (Portions of Chapters 20 & 21)

**Evidence and Processes of Evolution**

Population Genetics, Natural Selection, and Evolution (Chapters 22-24)

**Noncellular Pathogens**

Viruses, Viroids, & Prions (Chapter 19)

**Diversity of Life**

Phylogeny and the Diversity Prokaryotes, Protists, Fungi, and Plants (Chapters 26-31)

Plant Diversity (Chapters 29, 30)

Fungi (Chapter 31)

Animal Development and Diversity: Invertebrates and Vertebrates (Chapters 32-34)

**Plant Anatomy and Physiology**

Plant Structure, Growth & Development, How Plants Obtain and Transport Resources, and Plant Reproduction (Chapters 35, 36, 38)

**Animal Anatomy and Physiology**

Animal Form and Function: Nutrition, Circulation and Gas Exchange, Immune System (Chapters 40, 41, 42, 43)

**Ecology**

Population, Community, and Ecosystem Ecology (Chapters 52-55)



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**Please return only this page to your teacher after you and a parent/guardian have read the syllabus, no later than Friday, September 16<sup>th</sup>, 2022.**

I have read the syllabus for Advanced Biological Analysis at GSST. I will contact Dr. Patterson, by phone at 766-1100, x3324, via CANVAS, or by email [mary.patterson@nhrec.org](mailto:mary.patterson@nhrec.org) if I have any questions.

Student's Printed Name: \_\_\_\_\_

Student's Signature: \_\_\_\_\_

Parent/Guardian's Signature: \_\_\_\_\_