Ontario eSecondary School
Course Outline
2022-2023

Ministry of Education Course Title: Biology, University Preparation	
Ministry Course Code: SBI4U	
Course Type: University Preparation	
Grade: 12	
Credit Value: 1.0	
Prerequisite(s): SBI3U, Grade 11, University Preparation	
Department: Science	
Course developed by: **David Fairfax**	**Created March 5th, 2017** **Updated: April 25th, 2019**
Length: **One Semester**	**Hours:** **110**
This course has been developed based on the following Ministry documents: 1. *Science, The Ontario Curriculum, Grades 11 and 12*, 2008, (revised) 2. *Growing Success: Assessment, Evaluation, and Reporting in Ontario Schools (2010)* 3. *Learning for All (2013)*	

COURSE DESCRIPTION/RATIONALE

This course provides students with the opportunity for in-depth study of the concepts and processes that occur in biological systems. Students will study theory and conduct investigations in the areas of biochemistry, metabolic processes, molecular genetics, homeostasis, and population dynamics. Emphasis will be placed on the achievement of detailed knowledge and the refinement of skills needed for further study in various branches of the life sciences and related fields

Prerequisite: Biology, Grade 11, University Preparation

OVERALL CURRICULUM EXPECTATIONS

Scientific Investigation Skills and Career Exploration

By the end of the course, students will:

- demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills (initiating and planning, performing and recording, analysing and interpreting, and communicating)

Biochemisty

By the end of this course, students will:

- identify chemical structures, functions, and chemical properties of biological molecules involved in some common cellular processes and biochemical reactions and understand the importance of these in the maintenance of normal cellular function.
- analyze technological applications related to enzyme activity in the food and pharmaceutical industries

Metabolic Processes

By the end of this course, students will:

- identify and describe the cellular organelles involved in cellular respiration and photosynthesis, and the various metabolic reactions taking place during these processes and will understand the importance of these reactions in the maintenance of normal cellular function.
- analyze medical and technological applications related to cellular respiration and photosynthesis

Molecular Genetics

By the end of this course, students will:

- identify key scientific contributions leading to the discovery of DNA and DNA function, and describe the key events in DNA replication and protein synthesis with an emphasis on impacts of mutations on protein function and disease.
- analyze common biotechnological tools and applications related to molecular genetics

Homeostasis

By the end of this course, students will:

- will identify key components of the nervous, endocrine and excretory system, and describe their role in maintaining homeostasis and how select chemical substances and environmental factors affect these processes.
- will assess the impact of various drugs on homeostatic mechanisms

Population Dynamics

By the end of this course, students will:

- demonstrate an understanding of concepts related to population growth, and explain the factors that affect the growth of various populations of species, use models to calculate the growth of populations and analyze the relationships between population growth, personal consumption, technological development, and our ecological footprint.
- assess the impact of human population growth on the sustainability of resources for future generations

COURSE CONTENT

Unit	*Length*
Unit 1: Biochemistry	25 hours
Unit 2: Metabolic Processes	22.5 hours
Unit 3: Molecular Genetics	24 hours
Unit 4: Homeostasis	24 hours
Unit 5: Population Dynamics	14.5 hours
Total	**110 Hours**
	2 Hour exam
	2.5 Hour Culminating Task

The students will experience a variety of activities:

Video presentations and technological aids with videos embedded to enrich the course content and clarify concepts and skills being studied.

Practice (formative) quizzes as a review for students with access to answers for timely feedback to help reinforce the concepts and skills being studied.

Inquiry activities that will allow students to develop/practice problem solving and critical thinking skills, as well as enrich the course content and clarify concepts and skills being studied.

Visuals and graphic organizers are a great way for students to demonstrate their knowledge of subject matter through graphic organizers, pictures, and texts.

Individual Activities

Individual activities allow the teacher to accommodate interests and needs and to access the progress of individual students. The teacher plays an important role in supporting these activities through the provision of ongoing feedback to the students, both orally and in writing. These activities include the following in the course:

Research is completed in an online environment and the use of using reliable sources/A.P.A. formatting is reinforced.

Individual assignments - the teacher can support the student in these activities with ongoing feedback.

Oral presentations are facilitated through the use of video conferencing and video recording.

Practical extension and application of knowledge helps students develop their own voice, and gives them the ability to make personal connections, and connections to the world throughout their course.

ASSESSMENT, EVALUATION, AND REPORTING

Assessment: The process of gathering information that accurately reflects how well a student is achieving the identified curriculum expectations. Teachers provide students with descriptive feedback that guides their efforts towards improved performance.

Evaluation: Assessment of Learning focuses on Evaluation which is the process of making a judgement about the quality of student work on the basis of established criteria over a limited, reasonable period of time.

Reporting: Involves communicating student achievement of the curriculum expectations and Learning Skills and Work Habits in the form of marks and comments as determined by the teacher's use of professional judgement.

STRATEGIES FOR ASSESSMENT

Assessment practices can nurture students' sense of progress and competency and information instruction. Many diagnostic tools, e.g. checklists and inventories, are used at regular intervals throughout the units to encourage students' understanding of their current status as learners and to provide frequent and timely reviews of their progress.

Teachers are encouraged to share goals with students early in the course and to connect Unit learning experiences frequently and explicitly with big ideas, overall expectations, and performance tasks.

ASSESSMENT ACTIVITIES

- ❑ Virtual lab assignments
- ❑ Individual conference meetings
- ❑ Practice (formative) quizzes
- ❑ Oral presentations
- ❑ Research projects (STSE focused)
- ❑ Inquiry Assignments
- ❑ Tests & Exam

EVALUATION

The final grade will be determined as follows:

- ❑ Seventy percent of the grade will be based on evaluation conducted throughout the course. This portion of the grade should reflect the student's most consistent level of achievement throughout the course, although special consideration will be given to more recent evidence of achievement.
- ❑ Thirty percent of the grade will be based on a final evaluation administered at or towards the end of the course. This evaluation will be based on evidence from a combination of the following: an examination and a performance task, an essay, and/or another method of evaluation suitable to the course content. The final evaluation allows the student an opportunity to demonstrate comprehensive achievement of the overall expectations for the course.

  (*Growing Success: Assessment, Evaluation and Reporting in Ontario Schools*. Ontario Ministry of Education Publication, 2010 p.41)

Weightings	
Course Work	**70**
Knowledge/Understanding	21
Thinking/Inquiry	21
Communication	10.5
Application	17.5
Final	**30**
Performance Task	10
Final Exam	20

TERM WORK EVALUATIONS (70%)

The overview below outlines all Assessment and Evaluation activities for each unit of the course. The following weighting system should be applied when generating a student's mark:

Teacher conferences (AAL)– 5
Practice quizzes (AFL) - 12
Inquiry Assignments (AOL) – 8
STSE Projects (AOL) - 4
Unit Tests (AOL) – 5