Ontario eSecondary School
Course Outline
2018-2019

Ministry of Education Course Title: Biology, University Preparation	
Ministry Course Code: SBI3U	
Course Type: University Preparation	
Grade: 11	
Credit Value: 1.0	
Prerequisite(s): Science, Grade 10, Academic	
Department: Science	
Course developed by: **Shah Khan**	**Date: July 2018**
Length: **One Semester**	**Hours:** **110**
This course has been developed based on the following Ministry documents: 1. *The Ontario Curriculum, Grades 11 and 12, 2008, revised*	

COURSE DESCRIPTION/RATIONALE

This course furthers students' understanding of the processes that occur in biological systems. Students will study theory and conduct investigations in the areas of biodiversity; evolution; genetic processes; the structure and function of animals; and the anatomy, growth, and function of plants. The course focuses on the theoretical aspects of the topics under study, and helps students refine skills related to scientific investigation.
Prerequisite: Science, Grade 10, Academic

OVERALL CURRICULUM EXPECTATIONS

Scientific Investigation Skills and Career Exploration

By the end of this course, students will:

1. 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 communication);
2. Identify and describe careers related to the fields of science under study, and describe the contributions of scientists, including Canadians, to those fields.

Diversity of Living Things

By the end of this course, students will:

1. Analyse the effects of various human activities on the diversity of living things;
2. Investigate, through laboratory and/or field activities and classification techniques;
3. Demonstrate an understanding of the diversity of living organisms in terms of the principles of taconomy and phylogeny.

Evolution

By the end of this course, students will:

1. Analyse the economic and environmental advantages and disadvantages of an artificial selection technology, and evaluate the impact of environmental changes on natural selection and endangered species;
2. Investigate evolutionary processes, and analyse scientific evidence that supports the theory of evolution;
3. Demonstrate an understanding of the theory of evolution, the evidence that supports it, and some of the mechanisms by which it occurs.

Genetic Processes

By the end of this course, students will:

1. Evaluate the importance of some recent contributions to our knowledge of genetic processes, and analyse social and ethical implications of genetic and genomic research;
2. Investigate genetic processes, including those that occur during meiosis, and analyse data to solve basic genetics problems involving monohybrid and dihybrid crosses;
3. Demonstrate an understanding of concepts, processes, and technologies related to the transmission of hereditary characteristics.

Animals: Structures and Function

By the end of this course, students will:

1. Analyse the relationships between changing societal needs, technological advances, and our understanding of internal systems of humans;
2. Investigate, through laboratory inquiry or computer simulation, the functional responses of the respiratory and circulatory systems of animals, and the relationships between their respiratory, circulatory, and digestive systems;
3. Demonstrate an understanding of animal anatomy and physiology, and describe disorders of the respiratory, circulatory, and digestive systems.

Plants: Anatomy, Growth, and Function

By the end of this course, students will:

1. Evaluate the importance of sustainable use of plants to Canadian society and other cultures;
2. Investigate the structures and functions of plant tissues, and factors affecting plant growth;
3. Demonstrate an understanding of the diversity of vascular plants, including their structures, internal transport systems, and their role in maintaining biodiversity.

COURSE CONTENT

Unit	*Length*
Unit 1: Diversity of Living Things	22 hours
Unit 2: Genetic Processes	22 hours
Unit 3: Evolution	20 hours
Unit 4: Animals (Structure and Function)	20 hours
Unit 5: Plants' Anatomy, Growth and Function	18 hours
Culminating Task	5 hours
Final Exam	3 hours
Total	**110 hours**

UNIT DESCRIPTIONS

UNIT 1: DIVERSITY OF LIVING THINGS

Students will analyse the effects of various human activities on the diversity of living things. They will investigate through laboratory and simulations, the principles of scientific classification, using appropriate sampling and classification techniques. Students will also demonstrate and understanding of the diversity of living organisms in terms of the principles of taxonomy and phylogeny. Students will be assessed through mini-tests and a unit test. The culminating task will consist of a written report centered around a species from the animal kingdom. Students will assume the role of a Scientist/Educator/Animal Protection Activist and create an imaginary exhibit for their particular species at a fictional zoo. They will also include information on the history of the species, morphology as well as any human impacts on the particular species.

UNIT 2: GENETIC PROCESSES

Students will evaluate the importance of some recent contributions to our knowledge of genetic processes, and analyse social and ethical implications of genetic and genomic research. Students will also investigate genetic process, including those that occur during meiosis, and analyze data to solve basic genetic problems involving monohybrid and dihybrid crosses. They will also demonstrate an understanding of concepts, processes, and technologies related to the transmission of hereditary characteristics. Students will be assessed through a mini-test and a unit test. The culminating task for this unit will be a Genetics ethics assignment.

UNIT 3: EVOLUTION

Students will analyse the economic and environmental advantages and disadvantages of an artificial selection technology, and evaluate the impact of environmental changes on natural selection and endangered species. They will investigate evolutionary processes, and analyse scientific evidence that supports the theory of evolution. Students will also demonstrate and understanding of the theory of evolution, the evidence that supports it, and some of the mechanisms by which it occurs. Students will be assessed through a mini-test and a unit test. The culminating task for this unit will consist of a poster assignment. The students will choose an ancient ancestral species from a list provided by the teacher. The students will then provide information on the species, explain the possible theories of extinction using the theory of natural selection and present-day descendants.

UNIT 4: ANIMALS (STRUCTURE AND FUNCTION)

Students will analyze the relationships between changing societal needs, technological advances, and our understanding of internal systems of humans. During this unit, students investigate through laboratory inquiry or computer simulation, the functional responses of the respiratory and circulatory systems of animals, and the relationships between their respiratory, circulatory and digestive systems. They will also demonstrate an understanding of animal anatomy and physiology, and describe disorders of the respiratory, circulatory, and digestive systems. Financial literacy will be included during this unit. Students will analyze the social or economic impact of a medical device or technology related to the treatment of the human circulatory, respiratory, or digestive system. The students will be assessed through one mini-test and a unit test. The cumulative assignment for this unit will consist of a lab report following standing lab report writing format.

UNIT 5: PLANTS' ANATOMY, GROWTH AND FUNCTION

Students will evaluate the importance of sustainable use of plants to Canadian society and other cultures. They will investigate the structures and functions of plant tissues, and factors affecting plant growth. They will also demonstrate and understanding of the diversity of vascular plants, including their structures, internal transport systems, and their role in maintaining biodiversity. The students will be assessed through one mini-test and a cumulative assignment.

TEACHING AND LEARNING STRATEGIES

The students will experience a variety of activities:

Teacher demonstrations (research skills, etc.) through video conferencing, email, or telephone conversations with subject teacher, or videos provided of a teacher or student demonstrating the concepts and skills being studied. This helps the student and teacher create an atmosphere of trust and respect to aid in the online learning environment.

Video presentations and technological aids (research) with videos embedded to enrich the course content and clarify concepts and skills being studied. Also the use of online pre-approved quizzes and games to help a student become more familiar with the concepts and skills being studied.

Diagnostic and review activities (audio and video taping) can be student-lead or teacher lead to work as a review for students through audio and video made to share among each other to help reinforce the concepts and skills being studied.

Small Group Activities

> The teacher sets up small group activities to provide opportunities for active and oral learning as well as to bolster practical communication and teamwork skills. The teacher plays a critical role during group activities by monitoring group progress as well as answering questions that arise and using questions to assist students in their understanding. In this way, the teacher also facilitates student understanding of effective learning, communication, and team building during group activities.

The small group activities include the following:

Paired or small group research activities students are able to share their work online with not only their teachers, but their classmates too. Students are able to share resources through online chat and video conferencing. The ability to learn from each other, work on teamwork skills, and practice communication are valued and encouraged throughout the course.

Practical extension and application of knowledge is used as an effective learning strategy in this course because it allows the students to read and listen to the texts and stories and reflect back with connections to themselves, other texts and the world. Students are encouraged to share their understandings through work submitted each day, phone conversations about course work, or videoconferencing.

Oral presentations in an online environment we have the equipment to have student either live video conference oral presentations, or make videos and submit them for their oral presentations. These oral presentations can be viewed by fellow students (when appropriate) and the teacher. Students can learn from one another, and from their teacher. Such activities include dramatic readings and performances.

Charts and graphs are used to present effective learning opportunities of concepts and skills to students who would benefit from visual objects to learn. Every student learns differently, and it is used to help students discover another way to present their information such as graphic organizers, lists, and pictures.

Individual Activities

> The teacher should provide a variety of individual assignments to expand and consolidate the learning that takes place in the whole-class and small group 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. Teachers are encouraged to include individual activities such as the following in the course:

Research is completed in an online environment by teaching the students first about plagiarism rules and giving examples of good sources to use. The students are not only limited to the online search for information, but have resources available by links on the Moodle page of information that has been scanned and uploaded.

Individual assignments are worked on at a student's own pace. 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. Students are given a variety or reading and viewing texts to give them many chances to apply their new concepts, skills, and knowledge.

Ongoing project work is something that is valued in the earning of an English credit. The ongoing project can be submitted to the teacher for ongoing feedback in both written and oral work.

Reading students are able to read a variety of texts online. The students may print out the reading material to use it to highlight, take notes, and have with them when a computer is not available.

Written assignments are used to allow students to develop their skills in writing, comprehension, and communication. With the online format students submit their work, and have a chance to get feedback from the teacher, and submit their best work. This can be demonstrated with reading responses, personal writing, report writing, essay writing, script writing, business and technical writing, and individual research assignments.

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. Assessment of student acquisition of listening and talking, reading and viewing and writing skills also occurs regularly through unobtrusive teacher observation and conferencing.

Units conclude with performance tasks, e.g., interviews and from essays that build towards and prepare students for the end-of-course culminating task in Unit Five. 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, i.e. check bricks; teacher-adapted generic rubrics available in many sources, including the *Ontario Secondary School Literacy Course (OSSLC) Profile,* so that they are more task-specific. The teacher might ask: "What does the criteria look like for this particular task?" Or "What does limited effectiveness look like?" The teacher could involve students in the discussion, modification, or creation of rubrics, and teach students to use rubrics as a learning tool that can support the writing process and practice.

ASSESSMENT ACTIVITIES (NOTE: UPDATED REMOVE).

- ❑ Homework assignments
- ❑ Individual conference meetings
- ❑ Online Discussion Forums
- ❑ Online Conferences
- ❑ Readings Activities and Case Studies
- ❑ Diagnostic tests and writing tasks
- ❑ Reflections Forums
- ❑ Online Oral presentation
- ❑ Tests & Exam
- ❑ Lab Report Writing
- ❑ Lab Gizmos (Online Simulations)
- ❑ Self-Assessment Tasks

EVALUATION

The final grade will be determined as follows:

- ❑ Seventy per cent 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 per cent 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 one or a combination of the following: an examination, a performance, 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	20
Thinking/Inquiry	20
Communication	15
Application	15
Final	**30**
Culminating Activity	15
Final Exam	15

TERM WORK EVALUATIONS (70%):

Evaluation Item	Description	Category
Online Conferences	Unit 1: Issues in Biodiversity Unit 2: Gene Therapy Conference (K, C, A Only) Unit 3: Evolution Lab Conference (K, C, A Only) Unit 4: Ethics of Dissection (K,C)	K,I,C,A
Unit Test/Quiz(s)	Unit 1 Test Unit 2 Test Unit 3 Test Unit 4 Test Unit 5 Test	K,I,C,A
Cumulative	Unit 1: Arthropod Design Assignment	K,I,C,A

Assignment(s)	Unit 3: Galapagos Boobies Island Assignment Unit 5: Human Uses of Plants Presentation	
Mini Test(s)	Unit 4 Quiz	K,I,A

FINAL EVALUATIONS (30%):

Evaluation Item	Description	Category
Portfolio Project	E-Portfolio	K,I,C,A
Final Exam	Final Examination	K,I,C,A

AFL/AAL/AOL Tracking sheet:

Unit 1: Diversity of Living Things – 22 hours

AAL	AFL	AOL
Lesson 1.4 Probiotics Bacteria Article Research and Summary Forum	Lesson 1.1 Mapping Article Activity	Design an Arthropod Assignment
Lesson 1.7 Fungi Kingdom Research Questions	Lesson 1.3 Turtles Dichotomous	Live Chat: Explore an Issue Biodiversity Check brick
Lesson 1.9 Inside the Cell Interactive Online Forum	Lesson 1.5 Edible Vaccines Case Study	Live Chat: Explore an Issue in Biodiversity + Reflection
Lesson 1.9 Microbiology Practice Quiz	Lesson 1.6 Inside a cell worksheet	Unit 1 Test
Live Chat: Explore an Issue in Biodiversity + Reflection	Lesson 1.10 Alberta Tar Sands and Human Diversity Forum	

Unit 2: Genetic Processes – 22 hours

AAL	AFL	AOL
Lesson 2.1 If Mitosis goes wrong? Forum	Lesson 2.2 Applications of Mitosis PubMed Article File Response	Unit 2 TED Talk Gene Therapy Reflective Conference
Lesson 2.6 Cows and Bulls Problem	Lesson 2.3 Unit of Focus Formative	Unit 2 Test
Lesson 2.8 Designer Babies Forum	Lesson 2.7 Pedigree Dominant and Recessive Practice Problems	
	Lesson 2.9 Dihybrid Crossing Worksheet Assignment	
	Lesson 2.10 TED Talk Gene Therapy Forum	

Unit 3: Evolution – 21 hours

AAL	AFL	AOL
Evolution Lab Game	Lesson 3.1 Nature of Science Activity Forum	Evolution Lab Game Online Reflection
Lesson 3.5 Theory of Evolution by Natural Selection Forum	What is Scientific Theory?	Unit 3 Evolution Lab Game Reflection Seminar Check brick
Artificial vs. Natural Selection Activity	Lesson 3.3 Part 2: Genetic Variation Response Forum	Unit 3 Galapagos Boobies Summative Assignment
Galapagos Boobies: Appear in Chat and Talk	Darwin Mapping Activity	Unit 3 Galapagos Boobies Assignment Check brick
	Lesson 3.5 Peppered Moth Lab	Unit 3 Test
	Lesson 3.9 Controversy around Evolution Forum	
	Lesson 3.10 Controversy around Evolution Forum	
	Galapagos Boobies: Appear in Chat and Talk	

Unit 4: Animals (Structure and Function) – 20 hours

AAL	AFL	AOL
Lesson 4.1 An Introduction to Internal Systems Starting Points Activity	Lesson 4.1 Introduction to Internal Systems Questions	Unit 4 Quiz
Lesson 4.3 How Big Are Your Lungs? Forum	Lesson 4.2 Digestive System worksheet	Lesson 4.8 Virtual Pig Dissection
Lesson 4.5 Atherosclerosis Forum	Lesson 4.4 To Vape or not to Vape	Live Chat: Ethics of Dissection
	Lesson 4.6 Heart Diagram	Unit 4 Test
	Harmful Lifestyle Choice Activity	

Unit 5: Plants' Anatomy, Growth and Function – 18 hours

AAL	AFL	AOL
Lesson 5.2 Reflect and Connect Questions	Lesson 5.1 Monocot and Dicot Plants Activity 2 Forum	Lesson 5.8 Human Uses of Plants
Lesson 5.7 Biology Journal Response Forum	Lesson 5.3 Tree Ring Activity	Unit 5 Test
	Lesson 5.4 Plant transport handout	
	Lesson 5.5 Plant Hormones Activity Sheet	
	Lesson 5.6 Plant responses	

Finals

AOL
Culminating Project
Final Exam

CONSIDERATION FOR PROGRAM PLANNING

Students learn best when they are engaged in a variety of ways of learning. Guidance and career education courses lend themselves to a wide range of approaches in that they require students to research, think critically, work cooperatively, discuss relevant issues, and learn through practice in a variety of settings. Helping students become self-directed, lifelong learners is a fundamental aim of the guidance and career education curriculum. When students are engaged in active and experiential learning strategies, they tend to retain knowledge for longer periods and develop meaningful skills. Active and experiential learning strategies also enable students to apply their knowledge and skills to real-life issues and situations.

ANTIDISCRIMINATION EDUCATION IN GUIDANCE AND CAREER EDUCATION

Classroom teachers are the key educators of students who have special education needs. They have a responsibility to help all students learn, and they work collaboratively with special education teachers, where appropriate, to achieve this goal. Special Education Transformation: The Report of the Co-Chairs with the Recommendations of the Working Table on Special Education, 2006 endorses a set of beliefs that should guide program planning for students with special education needs in all disciplines. Those beliefs are as follows: All students can succeed. Universal design and differentiated instruction are effective and interconnected means of meeting the learning or productivity needs of any group of students. Successful instructional practices are founded on evidence-based research, tempered by experience.

PROGRAM CONSIDERATIONS FOR ENGLISH LANGUAGE LEARNERS

Ontario schools have some of the most multilingual student populations in the world. The first language of approximately 20 per cent of the students in Ontario's English language schools is a language other than English. Ontario's linguistic heritage includes several Aboriginal languages; many African, Asian, and European languages; and some varieties of English, such as Jamaican Creole. Many English language learners were born in Canada and raised in families and communities in which languages other than English were spoken, or in which the variety of English spoken differed significantly from the English of Ontario classrooms. Other English language learners arrive in Ontario as newcomers from other countries; they may have experience of highly sophisticated educational systems, or they may have come from regions where access to formal schooling was limited. When they start school in Ontario, many of these students are entering a new linguistic and cultural environment.

THE ROLE OF TECHNOLOGY IN THE ENGLISH PROGRAM

Information and communications technologies (ICT) provide a range of tools that can significantly extend and enrich teachers' instructional strategies and support students' language learning. ICT tools include multimedia resources, databases, Internet websites, digital cameras, and word-processing programs. Tools such as these can help students to collect, organize, and sort the data they gather and to write, edit, and present reports on their findings. Information and communications technologies can also be used to connect students to other schools, at home and abroad, and to bring the global community into the local classroom. Whenever appropriate, therefore, students should be encouraged to use ICT to support and communicate their learning.

ACCOMMODATIONS

Accommodations will be based on meeting with parent, teachers, administration and external educational assessment report. The following three types of accommodations may be provided:

- ***Instructional accommodations:*** such as changes in teaching strategies, including styles of presentation, methods of organization, or use of technology and multimedia.
- ***Environmental accommodations:*** such as preferential seating or special lighting.
- ***Assessment accommodations:*** such as allowing additional time to complete tests or assignments or permitting oral responses to test questions.

Other examples of modifications and aids, which may be used in this course, are:

- Provide step-by-step instructions.
- Help students create organizers for planning writing tasks.
- Record key words on the board or overhead when students are expected to make their own notes.
- Allow students to report verbally to a scribe (teacher/ student) who can help in note taking.
- Permit students a range of options for reading and writing tasks.
- Where an activity requires reading, provide it in advance.
- Provide opportunities for enrichment.