Astronomy 11

Course Outline

Course Overview

Astronomy 11 explores the science of space from the Earth to distant galaxies, from the present to the Big Bang. This course is designed to allow students to gain an understanding of the universe they live in. This is a project based course. This means that there are projects that allow students to explore areas of interest in more detail and choose the level of math and science they prefer. Some projects are more math oriented for students who prefer the hard sciences while other projects are more humanities based while still allowing students to learn new things about space. There is one mandatory project in this course which expects students to go outside and look up at the sky. This project is designed to help students become more familiar with the sky in their own backyards and develop a feel for how to describe locations of objects in the night sky. This course is locally developed and therefore does not count as a science credit but it does still count as an elective and gives credits towards graduation.

Course Content and Suggested Timelines

The suggested timeline is for students aiming to complete the course in one semester (5 months). Double the timeframes for two semesters (10 months).

Unit 1- Introduction to Astronomy (Suggested time: 3.5 weeks)

This unit has a number of different topics. It starts with star gazing and the stories behind some of the prominent constellations. These stories come from the Greek mythology but there are many other cultures with different stories for the same constellations. You can help us build a reference of these stories if you know some. From star gazing we move on to our location in the cosmos and some history of astronomy. Then we look at some sky motions that are caused by the Earth's rotation and revolution and the effects they have here on Earth. If you want to know something about astronomy, you really need to know something about telescopes! So we have a brief introduction to the two main types of telescopes and a quick look at some of the technology involved in the giant telescopes. Finally, there is an introduction to light and spectrum. This section is optional as it is a little heavier on the science. If you're interested, have a look. It is definitely useful for stars and it helps to explain how we know what we do about them.

Unit 2 – The Solar System (Suggested time: 3.5 weeks)

The solar system includes the Sun and everything that orbits it. Starting at home here on Earth we travel to the Moon, the other terrestrial planets: Mercury, Venus and Mars. Then it's off to the giant planets: Jupiter, Saturn, Uranus and Neptune. Finally we will have a look at the smaller objects in our solar system: asteroids, comets and meteors. I hope you enjoy our trip through our solar system. A chance to compare geology of the rocky planets, compositions of the giant planets and hopefully gain an appreciation of how special our little planet truly is!

Unit 3 – The Sun (Suggested time: 3.5 weeks)

The Sun -- the source of all the energy on Earth and the entire solar system! In this unit you will learn how the Sun produces all of that energy. The Sun is a very dynamic star and since it is so close to us we are able to observe it in a lot of detail. You will learn about the features of the Sun and the cycles that it goes though. You will also learn how it affects us here on Earth. Our Sun is a dwarf star that in the grand scheme of the universe isn't all that special but it is the most important star to everything here on Earth.

Unit 4 – Stars (Suggested time: 3.5 weeks)

There are a hundred billion stars in just our galaxy alone! Stars that are between 4 light years and 4 billion light years away. How can you compare them? In this unit you will learn how astronomers compare stars and how using just their light can explain their whole history. You will also learn about some of the most fascinating objects in the universe: white dwarfs, pulsars, black holes and supernova. The violent deaths of stars and the strange corpses they leave behind could lead you on a truly fascinating journey of discovery.

Unit 5 – The Nature of the Universe (Suggested time: 3.5 weeks)

The Big Bang! The birth of our universe, the starting of time itself! In this unit you will learn about galaxies like our own Milky Way and stranger more exotic galaxies from the past. You will also learn about how it all began and where it may be leading. Not to forget, what does it all look like now? This unit covers a huge range of space and time. Are you ready to explore it?

Unit 6 – Exoplanets and Astrobiology (Suggested time: 3.5 weeks)

One of the greatest mysteries -- are we alone in the universe? Since 1992 there have been over 3000 confirmed exoplanets, planets that orbit stars other than our Sun. This number is increasing as new technology is implemented to help the search. What do these worlds look like? How were they found? Is there any chance that other living beings may be out there wondering about us? In this unit you will learn about exoplanets and their discoveries. You will also look at the basic requirements for life and whether or not those requirements could be met on these newly discovered worlds.

Course Materials

All coursework is online. The course website contains all the lesson videos, lesson notes, and project descriptions. No further course materials are required.

As this is a locally developed course there are no Ministry of Education IRPs.

Assessment Information

Discussions	15% of the course
Observation assignment	13% of the course
Projects (1 project for each unit)	72% of the course (12% each)

Discussions: (10%)
Astronomy is a fascinating subject because it encompasses a large number of different scientific fields. Astronomy has aspects of physics, chemistry, Earth science and even biology. In your previous science courses you have learned about these topics. In this course you will consider your previous knowledge in these areas and respond to a number of different discussions. **There are no correct answers in the discussions**, they were designed that way! I am looking for **critical thinking and reasoning skills**. The ability to communicate your thoughts is very important in science. As well as the way you respond to other people's ideas. So respond to the original discussion question and then look through what others have written. Do you agree? Why or why not? Can you make an argument against what someone has written? Or can you add information to support their point of view? These discussions are there to help you interact with other students in the course as well as me. Take advantage of it, it's not common in an on-line course. Please be courteous in your responses to other student's postings. Think about how you would feel if those comments were directed towards you.
Remember that participating in discussions is worth 15% of your course grade. Think about the topic, write a response, and interact with your fellow students!

Observation Assignment: (13%)
The observing assignment is a **mandatory assignment**. It is designed to help you explore the night sky. It uses a combination of actual outside observations and computer work. Astronomy is a descriptive science so you will be asked to observer, draw and explain what you see in the night sky. I hope you enjoy this project.

Project: (72%)

Astronomy 11 is designed as a project based learning course. For this reason you **must** complete one project for each unit of the course. That is **six projects in total**. This may seem like a lot but remember that there are no other assignments, quizzes or tests to distract you from your project work. There will be a number of different choices of projects in each unit. Some of these project choices are math or science based, while others are creative. I have tried to address all learning styles when I developed the project ideas. Some project varieties are: short stories or journals, experimental, scrap book, designing a web page, teaching a lesson, models, debates, graphic novels, videos, TV or news reports, and even designing a scavenger hunt! I am sure you can find a project that will play to your strengths in each of the six units. Do you have a better idea? Just let me know and we can work something out.

Projects have **four** parts to them:

1. a proposal -- explaining what you want to do, what equipment you will need (if any), what resources you are considering using -- **Please wait for feedback on the proposal before starting the project**
2. The project itself
3. A self-assessment on your project -- see the rubrics given with each project
4. A reflection on what you learned and how it has impacted your understanding of nature. It could also be a reflection on the learning process. -- Reflecting on learning helps to solidify what we have learned in our minds, and allows us to evaluate what we have learned and how we learn best. It is a critical part of learning and an excellent skill to develop.

Remember that each project is worth 12% of the course mark, so take pride in you work and show me what you are truly capable of. Also remember, that I am here to help. If you need it, just ask!

Supervised and Invigilated Exams:

There are no tests in this course.

When students are not meeting the learning outcomes/ falling behind

When students fall behind the expected pace or plan, they will be contacted via email or phone and if there is no improvement or response, parents will also be contacted. If deemed necessary, contact with the student's home school may also occur to help determine a solution.

Students are expected to let the course teacher know when they are struggling with course content. In response, the course teacher will provide appropriate help or strategies to support learning. The course teacher will also provide feedback on course work to support learning and help students improve. Parents will be made aware if their child is actively working but struggling to meet the learning outcomes of the course.

Students falling behind in a manner where it does not appear that they will complete the course within a year will be sent reminder emails. Without a response or renewed efforts in the course, the student may be assigned an F or withdrawn. Should they begin actively working in the course, the student may be given an alternate completion date.

Expectations

- Adhere to the EBUS Academic Integrity Policy
- Contact your teacher when help is needed
- Review feedback from assignments and tests, where applicable
- Work to complete the course in a timely manner
- Communicate respectively
- Review weekly progress reports

Reporting to Parents:

There are 4 term report cards that can be downloaded from the student dashboard. A notice will go out when these report cards are available.

Every week that EBUS is in Session the teacher will send out a progress report showing the student's progress.

Contacting Your Teacher:

Your teacher will be available Monday to Friday during regular school hours. If you are having trouble with any concepts, please contact your teacher right away!
Your teacher for this course is: Stephanie Sedgwick (email): ssedgwick@sd91.bc.ca.