ITT Technical Institute

SC1130

Survey of the Sciences

Onsite Course

SYLLABUS

Credit hours: 4.5

Contact/Instructional hours: 56 (34 Theory Hours, 22 Lab Hours)

Prerequisite(s) and/or Corequisite(s):

None.

Course Description:

This survey course is designed to familiarize the student with the methods of rational inquiry and problem solving in the sciences. Students will explore a selection of topics in the scientific fields, including physics, chemistry, biology, astronomy and earth science, to develop basic scientific literacy and the ability to critically analyze issues of science. This course includes a laboratory component.

Where Does This Course Belong?

Program Information

Program Scope and Core Content Areas

General Studies courses are interdisciplinary courses that support both core and general education courses.

General Education courses include courses in the humanities, composition, mathematics, the sciences, and the social sciences.

Program Goals and Objectives

General Education courses are designed to provide ITT Tech students with a well-rounded education in the context of their technical programs. Each course emphasizes one or more of ITT Tech's General Education Student Learning Outcomes.

1. Demonstrate personal responsibility.
2. Analyze information.
3. Solve complex problems.
4. Communicate effectively in oral, written and visual forms.
5. Contribute as a member of a team.
6. Pursue lifelong learning opportunities.

Career Impact

General Education courses provide breadth to a core technical program. Courses in General Education are intended to broaden a student's educational experience, and therefore, broaden his/her perspective.

NOTE: *Refer to the catalog for the state-specific course and program information, if applicable.*

This course is a basic Science course that serves the School of Health Sciences and the School of Criminal Justice. The goal of the Survey of the Sciences course is to provide a well-rounded general studies experience, to help develop science knowledge and reawaken a love of science and experimentation that most people had as children.

Course Summary

Major Instructional Areas

1. Introduction to Conceptual Integrated Science
2. The Scientific Method
3. Basic Concepts in Physics
4. Basic Concepts in Chemistry
5. Basic Concepts in Biology
6. Basic Concepts in Astronomy
7. Basic Concepts in Earth Science
8. Application of Problem-Solving Techniques to the Selected Sciences
9. Exercise of Quantitative Skills: Employing Basic Mathematics and Elementary Algebra throughout

Course Objectives

1. Explain the significance of scientific literacy in our daily lives.
2. Apply the introductory concepts of physics.
3. Apply the introductory concepts of chemistry.
4. Apply the basic concepts of biology.
5. Apply the basic concepts of earth science.
6. Apply the basic concepts of astronomy.
7. Apply problem-solving techniques, using applied basic mathematics and elementary algebra, to the selected natural sciences.
8. Analyze scenarios that integrate different natural sciences.
9. Apply the scientific method to real life situations.
10. Use the ITT Tech Virtual Library to research various topics.

Detailed Topical Outline

1. Introduction to Integrated Science and the Scientific Method
    1.1. Introduction to Science
        1.1.1. What is Science?

- 1.1.2. How Does Science Relate to My Life?
- 1.1.3. What Does a Scientist Do?

1.2. Scientific Method

- 1.2.1. Science Means Asking Questions
- 1.2.2. The Scientific Method
- 1.2.3. Measurements

1.3. Branches of Science

- 1.3.1. The Branches of Science
- 1.3.2. Current Research in Science
- 1.3.3. Science in the Real World

2. Physics I – Laws of Motion and Thermodynamics

2.1. Universal Laws of Motion

- 2.1.1. Laws of Motion

2.2. Universal Law of Gravity

- 2.2.1. Gravity
- 2.2.2. Gravitational Force

2.3. Forms of Energy

- 2.3.1. Energy
- 2.3.2. Heat

2.4. Thermodynamics

- 2.4.1. Second Law of Thermodynamics
- 2.4.2. Heat Transfer in a Lake
- 2.4.3. Alternative Energy

3. Physics II – Electricity, Magnetism and Electromagnetic Radiation

3.1. Electricity

- 3.1.1. Electricity

3.2. Magnetism

- 3.2.1. Magnets

3.3. Electromagnetism

- 3.3.1. Electromagnetism and Energy Production
- 3.3.2. Electricity, Magnetism, and the Human Body
- 3.3.3. MRI’s and Pacemakers
- 3.3.4. Make an Electromagnet

3.4. Waves

- 3.4.1. Properties of Waves

3.5. Radiation

- 3.5.1. The Electromagnetic Spectrum

4. Chemistry I
    4.1. Atomic Structure
        4.1.1. Atoms, Elements, and the Periodic Table
    4.2. Spectroscopy
        4.2.1. Spectroscopy
    4.3. Chemical Reactivity
        4.3.1. Molecules and Chemical Bonds
        4.3.2. Chemical Reactions
        4.3.3. Water (Hydrogen Bonds, Solution and Precipitation Reactions)
        4.3.4. The Science of Fireworks
        4.3.5. Flame Spectroscopy: Applying a Quantum Leap, Virtual Discovery Lab
    4.4. States of Matter
        4.4.1. States of Matter
5. Chemistry II
    5.1. Material Properties
        5.1.1. Properties of Materials
    5.2. Semiconductors
        5.2.1. Conductance, Semiconductors and Diodes
        5.2.2. Transistors, Microchips, and Computers
    5.3. Radioactivity
        5.3.1. Isotopes and Radiation
        5.3.2. Mass and Energy →Nuclear Power
        5.3.3. Radiation and Human Health
        5.3.4. Atomic Dating Using Isotopes Virtual Discovery Lab
6. Biology I – Strategies of Life
    6.1. Biology Introduction
        6.1.1. What is Life?
    6.2. Classification of Living Things
        6.2.1. Classification of Life
        6.2.2. Species
        6.2.3. Family Tree
        6.2.4. Exploring the Diversity of Life
        6.2.5. Organism Identification
        6.2.6. Yeast Discovery Lab
7. Biology II – Cellular and Molecular Biology
    7.1. Cells
        7.1.1. Cells

- 7.1.2. Mitosis and Meiosis
- 7.1.3. Metabolism
- 7.1.4. Aerobic vs. Anaerobic
- 7.1.5. Cells as a Source of Energy

7.2. Biomolecules

- 7.2.1. Proteins
- 7.2.2. Carbohydrates
- 7.2.3. Lipids
- 7.2.4. Nutrition

8. Biology III – DNA and Genetics

8.1. Heredity

- 8.1.1. Classical Genetics
- 8.1.2. Punnet Squares

8.2. Genetic Code

- 8.2.1. Structure of DNA
- 8.2.2. Isolating DNA, Discovery Lab
- 8.2.3. Gene Expression
- 8.2.4. Mutations and Cancer
- 8.2.5. DNA Fingerprinting

8.3. Genetic Engineering

- 8.3.1. Genetic Engineering

9. Earth Science

9.1. Changing Earth

- 9.1.1. Plate Tectonics
- 9.1.2. Volcanoes
- 9.1.3. Earthquakes
- 9.1.4. Biogeography
- 9.1.5. Volcanic Viscosity

9.2. Earth's Cycles

- 9.2.1. Hydrologic Cycle
- 9.2.2. Atmospheric Cycle
- 9.2.3. The Rock Cycle
- 9.2.4. Geology of the Area

10. Astronomy and Cosmology

10.1. Stars

- 10.1.1. Studying Stars
- 10.1.2. Life Cycle of Stars

- 10.2. Cosmology
  - 10.2.1. Galaxies
  - 10.2.2. Composition of the Universe
  - 10.2.3. Cost of Space Exploration
  - 10.2.4. The Solar System
  - 10.2.5. The Expanding Universe
- 11. Course Review and Final Examination

Learning Materials and References

Required Resources

Complete Textbook Package	New to this Course	Carried over from Previous Course(s)	Required for Subsequent Course(s)
Trefil, J. & Hazen, R. (2013). The sciences: An integrated approach (7th ed.). Hoboken, NJ: John Wiley and Sons, Inc.	■		

Recommended Resources

Books and Professional Journals

- Nature http://www.nature.com/nature/index.html
- New Scientist http://www.newscientist.com/
- Science http://www.sciencemag.org/
- Scientific American http://www.scientificamerican.com/

ITT Tech Virtual Library (accessed via Student Portal | https://studentportal.itt-tech.edu)

- Alpha Development Group Staff. Complete Idiot's Guide to Einstein's Universe. Indianapolis, IN: Alpha Books, 1999.
- Christophorou, L. G. Place of Science in a World of Values and Facts. New York: Kluwer Academic Publishers, 2001.
- Fried, George H., and George J. Hademenos. Schaum's Easy Outline: Biology. New York: McGraw-Hill Professional Book Group, 2001.
- Gautreau, Ronald. Schaum's Outline of Modern Physics. NY: McGraw-Hill Professional Book Group, 1999.
- Gibilisco, Stan. Everyday Math Demystified. New York: McGraw-Hill Professional Publishing, 2004.
- Gibilisco, Stan. Physics Demystified. NY: McGraw-Hill Professional, 2002.
- Goldberg, David E. Schaum's Easy Outline Beginning Chemistry. New York: McGraw-Hill Trade, 2003.
- Gower, Barry. Scientific Method: A Historical and Philosophical Introduction. New York: Routledge, 1996.
- Henry, John. The Scientific Revolution and the Origins of Modern Science. 2nd ed. New York: Palgrave Macmillan, 2001.
- Jenkins, Stephen H. How Science Works: Evaluating Evidence in Biology and Medicine. New York: Oxford University Press, Incorporated, 2004.

- Kakalios, James. Physics of Superheroes. NY: Penguin Group, USA Incorporated, 2005.
- Lightman, Alan. Discoveries: The Great Breakthroughs in 20th Century Science. New York: Knopf Publishing Group, 2005.
- Mayr, Ernst. What Makes Biology Unique?: Considerations on the Autonomy of a Scientific Discipline. Cambridge, UK: Cambridge University Press, 2004.
- Miller, Bob. Bob Miller's Basic Math and Pre-Algebra for the Clueless. New York: McGraw-Hill Trade, 2002.
- Patch, Kimberly, and Smalley, Eric, eds. Physics: Applications from the Edge of Science. Technology Research News, 2002.
- Pokras, Sandy, Michael Crisp, Francine L Ruvolo. Team Problem Solving. Revised ed. Course Technology Crisp, 1994.
- Rozakis, Laurie E. Schaum's Quick Guide to Writing Great Research Papers. New York: McGraw-Hill Professional Book Group, 1999.
- Stansfield, William D., Jaime S. Colome, and Raul J. Cano. Schaum's Easy Outline Molecular and Cell Biology. New York: McGraw-Hill Trade, 2003.

Other References

- Wiley Student Companion site: http://bcs.wiley.com/he-bcs/Books?action=index&itemId=1118185269&bcsId=7524

- Wiley Media Site: http://www.wiley.com/college/trefil/1118185269/preview/trefil7e_preview.htm

NOTE: All links are subject to change without prior notice.

Information Search

Use the following keywords to search for additional online resources that may be used for supporting your work on the course assignments:

- Scientific literacy
- Physics
- Chemistry
- Biology
- Earth science
- Astronomy
- Natural sciences

Suggested Learning Approach

In this course, you will be studying individually and within a group of your peers. As you work on the course deliverables, you are encouraged to share ideas with your peers and instructor, work collaboratively on projects and team assignments, raise critical questions, and provide constructive feedback.

Use the following advice to receive maximum learning benefits from your participation in this course:

DO	DON'T
▪ Do take a proactive learning approach ▪ Do share your thoughts on critical issues and potential problem solutions ▪ Do plan your course work in advance ▪ Do explore a variety of learning resources in addition to the textbook ▪ Do offer relevant examples from your experience ▪ Do make an effort to understand different points of view ▪ Do connect concepts explored in this course to real-life professional situations and your own experiences	▪ Don't assume there is only one correct answer to a question ▪ Don't be afraid to share your perspective on the issues analyzed in the course ▪ Don't be negative about the points of view that are different from yours ▪ Don't underestimate the impact of collaboration on your learning ▪ Don't limit your course experience to reading the textbook ▪ Don't postpone your work on the course deliverables – work on small assignment components every day

Instructional Methods

The curriculum is designed to encourage a variety of teaching strategies that support the course objectives while fostering higher cognitive skills. This course will employ multiple methods to deliver content and inspire and engage you, including lectures, collaborative learning options, and hands-on activities. This course is composed of Theory and Lab components. Your progress will be regularly assessed through Assignments, Labs, Quizzes, a Mid-Term Exam and a Final Exam.

Out-of-Class Work

For purposes of defining an academic credit hour for Title IV funding purposes, ITT Technical Institute considers a quarter credit hour to be the equivalent of: (a) at least 10 clock hours of classroom activities and at least 20 clock hours of outside preparation; (b) at least 20 clock hours of laboratory activities; or (c) at least 30 clock hours of externship, practicum or clinical activities. ITT Technical Institute utilizes a

“time-based option” for establishing out-of-class activities which would equate to two hours of out-of-class activities for every one hour of classroom time. The procedure for determining credit hours for Title IV funding purposes is to divide the total number of classroom, laboratory, externship, practicum and clinical hours by the conversion ratios specified above. A clock hour is 50 minutes.

A credit hour is an artificial measurement of the amount of learning that can occur in a program course based on a specified amount of time spent on class activities and student preparation during the program course. In conformity with commonly accepted practice in higher education, ITT Technical Institute has institutionally established and determined that credit hours awarded for coursework in this program course (including out-of-class assignments and learning activities described in the “Course Outline” section of this syllabus) are in accordance with the time-based option for awarding academic credit described in the immediately preceding paragraph.

Course Outline

Unit 1: Introduction to Integrated Science and the Scientific Method

Total outside work: 7 hours

Upon completion of this unit, students are expected to:

- Define science.
- Explain the steps in the scientific method.
- Describe how science impacts daily life.
- Describe different areas of scientific research.
- Relate specific areas of science to everyday life.
- Discuss the implications of the "language barrier" between scientists and the general public.
- Review how the scientific method is applied in current scientific research.
- Demonstrate how a current scientific study uses the steps of the scientific method.
- Apply the scientific method to an experiment.

READING ASSIGNMENT	**Author**	**Chapter/Title**	**Pages (if necessary)**	**Total Pages**
	Trefil	Chapter 1	1-24	24
OUT-OF-CLASS WORK	**Activity**			**Estimated Time**
	Complete the reading assignment			1 hr
	Work on Unit 1 Assignment 1: Science in the Real World			5 hrs
	Work on Unit 1 Lab 1: The Scientific Method			1 hr

Unit 2: Physics I – Laws of Motion and Thermodynamics

Total outside work: 11 hours

Upon completion of this unit, students are expected to:

- Discuss the laws of motion.
- Describe the concepts of forces, mass, weight, and gravity.
- Contrast kinetic and potential energy.
- Describe the First Law of Thermodynamics.
- Describe how heat is transferred to the environment.
- Describe how the Second Law of Thermodynamics relates to heat transfer.
- Explore how gravity can be used as a measurement tool.
- Apply physics concepts to a complex natural phenomenon.
- Explain the concept of heat energy within the context of a body of water.
- Apply knowledge of several branches of science to a real-life scenario.

READING ASSIGNMENT	**Author**	**Chapter/Title**	**Pages (if necessary)**	**Total Pages**
	Trefil	Chapters 2–4		74
OUT-OF-CLASS WORK	**Activity**			**Estimated Time**
	Complete the reading assignment			2 hrs
	Work on Unit 2 Assignment 1: Alternative Energy			5
	Work on Unit 2 Lab 1: Gravity Lab			1 hr
	Study for Unit 3 Quiz 1			3 hrs

GRADED ACTIVITIES / DELIVERABLES	**Grading Category**	**Activity/Deliverable Title**	**Grade Allocation** (% of all graded work)
	Assignment	Unit 1 Assignment 1: Science in the Real World (Assigned in Unit 1)	2%
	Lab	Unit 1 Lab 1: The Scientific Method (Assigned in Unit 1)	2%

Unit 3: Physics II - Electricity, Magnetism and Electromagnetic Radiation

Total outside work: 6 hours

Upon completion of this unit, students are expected to:

- Describe how electricity works.
- Explain the implications of a magnetic field on Earth.
- Discuss electricity, magnetism, and electromagnetism in terms of biological systems.
- Describe the basic properties and kinds of waves.
- Describe the basic properties and categories of electromagnetic waves.
- Relate the concepts of electricity, magnetism, and electromagnetic forces.
- Explain how electromagnetic radiation in the form of light is used by animals.

READING ASSIGNMENT	**Author**	**Chapter/Title**	**Pages (if necessary)**	**Total Pages**
	Trefil	Chapters 5-6		51

OUT-OF-CLASS WORK	**Activity**	**Estimated Time**
	Complete the reading assignment	2 hrs
	Work on Unit 3 Assignment 1: MRI's and Pacemakers	3 hrs
	Work on Unit 3 Lab 1: Make an Electromagnet	1 hr

GRADED ACTIVITIES / DELIVERABLES	**Grading Category**	**Activity/Deliverable Title**	**Grade Allocation** (% of all graded work)
	Assignment	Unit 2 Assignment 1: Alternative Energy (Assigned in Unit 2)	2%
	Lab	Unit 2 Lab 1: Gravity Lab (Assigned in Unit 2)	2%
	Quiz	Quiz 1	5%

Unit 4: Chemistry I

Total outside work: 10 hours

Upon completion of this unit, students are expected to:

- Describe the structure and nature of atoms.
- Describe the patterns found in the periodic table that reflect properties of the atoms.
- Describe how spectroscopy works.
- Describe the process of chemical bonding.
- Demonstrate how molecules interact in simple chemical reactions.
- Explain the relationship between molecular movement, heat, and different states of matter.
- Describe the structure of a water molecule and that relates to the chemical properties of water as a solvent and in terms of cohesion.
- Use flame spectroscopy to identify metals.

READING ASSIGNMENT	**Author**	**Chapter/Title**	**Pages (if necessary)**	**Total Pages**
	Trefil	Chapters 8 and 10		52
OUT-OF-CLASS WORK	**Activity**			**Estimated Time**
	Complete the reading assignment			2 hrs
	Work on Unit 4 Assignment 1: The Science of Fireworks			4 hrs
	Work on Unit 4 Lab 1: Flame Spectroscopy			1 hr
	Study for Unit 5 Quiz 2			3 hrs
GRADED ACTIVITIES / DELIVERABLES	**Grading Category**	**Activity/Deliverable Title**		**Grade Allocation** (% of all graded work)
	Assignment	Unit 3 Assignment 1: MRI's and Pacemakers (Assigned in Unit 3)		2%
	Lab	Unit 3 Lab 1: Make an Electromagnet (Assigned in Unit 3)		2%

Unit 5: Chemistry II

Total outside work: 12 hours

Upon completion of this unit, students are expected to:

- Discuss the different types of material properties.
- Describe how the properties of materials relate to their chemical and molecular structure.
- Relate basic chemistry to the physical properties of materials.
- Describe how semiconductors, doping, and diodes are used in electronics.
- Describe how computers process information in bits using transistors and microchips.
- Describe the basic concepts related to isotopes and radiation.
- Discuss reactions involved in nuclear fusion and fission.
- Compare and contrast the 3 types of radioactive decay.
- Explain the process of radiometric dating.

READING ASSIGNMENT	**Author**	**Chapter/Title**	**Pages (if necessary)**	**Total Pages**
	Trefil	Chapters 11-12		55

OUT-OF-CLASS WORK	**Activity**	**Estimated Time**
	Complete the reading assignment	2 hrs
	Work on Unit 5 Assignment 1: Radioactive Tracing Technology	4 hrs
	Work on Unit 5 Lab 1: Atomic Dating Using Isotopes	1 hr
	Study for the Mid-Term	5 hrs

GRADED ACTIVITIES / DELIVERABLES	**Grading Category**	**Activity/Deliverable Title**	**Grade Allocation** (% of all graded work)
	Assignment	Unit 4 Assignment 1: The Science of Fireworks (Assigned in Unit 4)	2%
	Lab	Unit 4 Lab 1: Flame Spectroscopy (Assigned in Unit 4)	2%
	Quiz	Quiz 2	5%

Unit 6: Biology I – Strategies of Life

Total outside work: 6 hours

Upon completion of this unit, students are expected to:

- Describe the basic characteristics of living things.
- List the categories scientists use to categorize life.
- Describe the importance of a historical experiment in Biology.
- Describe the definition of species.
- Describe how phylogenetic trees are used to demonstrate relationships between groups of organisms.
- Identify and classify living things.
- Explain how yeast obtains energy.

READING ASSIGNMENT	**Author**	**Chapter/Title**	**Pages (if necessary)**	**Total Pages**
	Trefile	Chapter 20		24

OUT-OF-CLASS WORK	**Activity**	**Estimated Time**
	Complete the reading assignment	1 hr
	Work on Unit 6 Assignment 1: Organismal Classification	4 hrs
	Work on Unit 6 Lab 1: Yeast Discovery Lab	1 hr

GRADED ACTIVITIES / DELIVERABLES	**Grading Category**	**Activity/Deliverable Title**	**Grade Allocation** (% of all graded work)
	Assignment	Unit 5 Assignment 1: Radioactive Tracing Technology (ePortfoilio) (Assigned in Unit 5)	2%
	Lab	Unit 5 Lab 1: Atomic Dating Using Isotopes (Assigned in Unit 5)	2%
	Exam	Mid-Term	15%

Unit 7: Biology II – Cellular and Molecular Biology

Total outside work: 11 hours

Upon completion of this unit, students are expected to:

- Describe the basic structure of a Eukaryotic cell.
- Compare and contrast photosynthesis and cellular respiration.
- Compare and contrast mitosis and meiosis.
- Describe the structure and function of proteins, carbohydrates, and lipids in living systems.
- Discuss how molecular structure impacts function in terms of chemical reactions that happen in the cell as well as the effects on the human body at the physiological level.
- Discuss how phospholipids interact with water.
- Explain the process of cellular respiration.
- Illustrate the difference between aerobic and anaerobic exercise.
- Analyze the processes used by cells to harvest energy and describe how energy can be used and converted into other forms of energy.
- Apply knowledge of carbohydrates, lipids, and proteins to nutrition.

READING ASSIGNMENT	**Author**	**Chapter/Title**	**Pages (if necessary)**	**Total Pages**
	Trefil	Chapters 21-22		40

OUT-OF-CLASS WORK	**Activity**	**Estimated Time**
	Complete the reading assignment	2 hrs
	Work on Unit 7 Assignment 1: Nutrition	5 hrs
	Work on Unit 7 Lab 1: Cells as a Source of Energy	1 hr
	Study for Unit 8 Quiz 3	3 hrs

GRADED ACTIVITIES / DELIVERABLES	**Grading Category**	**Activity/Deliverable Title**	**Grade Allocation** (% of all graded work)
	Assignment	Unit 6 Assignment 1: Organismal Classification (Assigned in Unit 6)	2%
	Lab	Unit 6 Lab 1: Yeast Discovery Lab (Assigned in Unit 6)	2%

Unit 8: DNA and Genetics

Total outside work: # hours

Upon completion of this unit, students are expected to:

- Describe what Mendel's experiments established regarding inheritance and genetics.
- Determine how genes follow the rules of classical genetic inheritance.
- Describe the molecular structure of DNA. Explain how the sequence of nucleotides carries information.
- Describe how the structure of DNA plays a part in the steps of transcription and translation.
- Explain how cancer works at the cellular level. Examine different methods used to treat cancer.
- Describe the process, benefits, and ethical and environmental concerns of genetic engineering.
- Assess the role of genetics and DNA fingerprinting in criminal investigations.

READING ASSIGNMENT	**Author**	**Chapter/Title**	**Pages (if necessary)**	**Total Pages**
	Trefil	Chapters 23-24		44

OUT-OF-CLASS WORK	**Activity**	**Estimated Time**
	Complete the reading assignment	2 hrs
	Work on Unit 8 Assignment 1: Mutations and Cancer	5 hrs
	Work on Unit 8 Lab 1: DNA Fingerprinting	1 hr

GRADED ACTIVITIES / DELIVERABLES	**Grading Category**	**Activity/Deliverable Title**	**Grade Allocation** (% of all graded work)
	Assignment	Unit 7 Assignment 1: Nutrition (Assigned in Unit 7)	2%
	Lab	Unit 7 Lab 1: Cells as a Source of Energy (Assigned in Unit 7)	2%
	Quiz	Quiz 3	5%

Unit 9: Earth Science

Total outside work: 8 hours

Upon completion of this unit, students are expected to:

- Describe the theory and mechanisms of plate tectonics.
- Describe how volcanoes form.
- Discuss how earthquakes occur. Describe how seismic waves can be used to learn more about the internal structure of Earth.
- Summarize the hydrologic cycle. Describe how humans play a part in the hydrologic cycle.
- Describe how factors associated with the atmospheric cycle can be measured to predict weather.
- Describe the rock cycle and the three major types of rocks.
- Explain a connection between geology and biology.

READING ASSIGNMENT	**Author**	**Chapter/Title**	**Pages (if necessary)**	**Total Pages**
	Trefil	Chapters 17-18		50
OUT-OF-CLASS WORK	**Activity**			**Estimated Time**
	Complete the reading assignment			2 hrs
	Work on Unit 9 Assignment 1: Geology of the Area			5 hrs
	Work on Unit 9 Lab 1: Volcanic Viscosity			1 hr
GRADED ACTIVITIES / DELIVERABLES	**Grading Category**	**Activity/Deliverable Title**		**Grade Allocation** (% of all graded work)
	Assignment	Unit 8 Assignment 1: Mutations and Cancer (Assigned in Unit 8)		2%
	Lab	Unit 8 Lab 1: DNA Fingerprinting (Assigned in Unit 8)		2%

Unit 10: Astronomy and Cosmology

Total outside work: 15 hours

Upon completion of this unit, students are expected to:

- Describe the nuclear fusion reactions that occur in stars.
- Describe how the nebular hypothesis explains 3 major types of stars: main-sequence stars, red giants, and white-dwarfs.
- Describe the size and history of the universe.
- Differentiate normal matter, dark matter, and dark energy.
- Discuss the structure and history of the solar system.
- Explain how new knowledge in astronomy and cosmology is attained.
- Describe the effects of redshift.
- Explain the nebular hypothesis.
- Describe how living in space impacts human biology.

READING ASSIGNMENT	**Author**	**Chapter/Title**	**Pages (if necessary)**	**Total Pages**
	Trefil	Chapters 14-16		67

OUT-OF-CLASS WORK	**Activity**	**Estimated Time**
	Complete the reading assignment	2 hrs
	Work on Unit 10 Assignment 1: The Solar System	4 hrs
	Work on Unit 10 Lab 1: The Expanding Universe	1 hr
	Study for the Final Exam	8 hrs

GRADED ACTIVITIES / DELIVERABLES	**Grading Category**	**Activity/Deliverable Title**	**Grade Allocation** (% of all graded work)
	Assignment	Unit 9 Assignment 1: Geology of the Area (Assigned in Unit 9)	2%
	Lab	Unit 9 Lab 1: Volcanic Viscosity (Assigned in Unit 9)	2%
	Quiz	Quiz 4	5%

Unit 11: Course Review and Final Examination

Total outside work: 5 hours

Upon completion of this unit, students are expected to:

- Demonstrate an understanding of all course objectives.

READING ASSIGNMENT	**Author**	**Chapter/Title**	**Pages (if necessary)**	**Total Pages**
	None			

OUT-OF-CLASS WORK	**Activity**	**Estimated Time**
	Study for the Final Exam (cont.)	5 hrs

GRADED ACTIVITIES / DELIVERABLES	**Grading Category**	**Activity/Deliverable Title**	**Grade Allocation** (% of all graded work)
	Assignment	Unit 10 Assignment 1: The Solar System (Assigned in Unit 10)	2%
	Lab	Unit 10 Lab 1: The Expanding Universe (Assigned in Unit 10)	2%
	Exam	Final Exam	25%

Note: Your instructor may add a few learning activities that are ungraded.

Evaluation and Grading

Evaluation Criteria

The graded assignments will be evaluated using the following weighted categories:

Category	In-Class	Out-of-Class	Weight
Assignment	0%	20%	20%
Lab	15%	5%	20%
Quiz	20%	0%	20%
Exam	40%	0%	40%
TOTAL	**75%**	**25%**	**100%**

Grade Conversion

The final grades will be calculated from the percentages earned in the course, as follows:

Grade		Percentage
A	(4.0)	90–100%
B+	(3.5)	85–89%
B	(3.0)	80–84%
C+	(2.5)	75–79%
C	(2.0)	70–74%
D+	(1.5)	65–69%
D	(1.0)	60–64%
F	(0.0)	<60%

Academic Integrity

All students must comply with the policies that regulate all forms of academic dishonesty or academic misconduct, including plagiarism, self-plagiarism, fabrication, deception, cheating, and sabotage. For more information on the academic honesty policies, refer to the Student Handbook and the Course Catalog.

(End of Syllabus)