COURSE OUTLINE: NRT141 - SCIENCE AND NATURE

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Course Code: Title	NRT141: SCIENCE AND NATURE
Program Number: Name	5212: ADVENTURE RECREATION 5214: FISH/WILD CONSERVATN 5220: NAT ENVIRONMENT TN
Department:	NATURAL RESOURCES PRG
Academic Year:	2024-2025
Course Description:	This course examines six topics of science that provide a fundamental understanding of the relationship of scientific research, biology and chemistry to natural resource management. Topics include Science and the Scientific Method, The Hierarchy of Matter, The Species in an Evolutionary Context, Use of the Periodic Table, The Cell as the Fundamental Unit of Life and Chemical Interactions in the Environment.
Total Credits:	3
Hours/Week:	3
Total Hours:	42
Prerequisites:	There are no pre-requisites for this course.
Corequisites:	There are no co-requisites for this course.
Vocational Learning Outcomes (VLO's) addressed in this course: **Please refer to program web page for a complete listing of program outcomes where applicable.**	**5212 - ADVENTURE RECREATION** VLO 1 Demonstrate clear, concise and industry appropriate written, spoken and visual communication skills. VLO 7 Describe the scientific method and how it shapes our understanding of the ecology of the natural world. VLO 8 Demonstrate an understanding of sustainable development and apply the foundations in the natural environment. VLO 10 Evaluate and apply current technologies and mathematical concepts used to collect, manage and analyze data. VLO 11 Analyze, evaluate and apply subjective and objective safety considerations for Adventure Recreation and Parks activities. **5214 - FISH/WILD CONSERVATN** VLO 1 Demonstrate clear, concise and industry appropriate written, spoken and visual communication skills VLO 4 Demonstrate the correct use of standard laboratory equipment and skills required to carry out experiments and study various organisms. VLO 7 Recognize the contributions and applications of various science disciplines in the understanding of natural environments. VLO 8 Demonstrate an understanding of sustainable development and apply these

	principles to the natural environment. VLO 10 Evaluate and apply current technologies and mathematical concepts used to collect, manage and analyze data. VLO 11 Analyze, evaluate and apply subjective and objective safety considerations. **5220 - NAT ENVIRONMENT TN** VLO 1 Collect data from representative biological and environmental samples using routine test procedures. VLO 3 Apply the basic concepts of science to natural resource conservation and management. VLO 7 Work safely in adherence to occupational health and safety standards. VLO 11 Communicate technical information accurately and effectively in oral, written and visual forms. VLO 13 Apply awareness of global environmental issues to conservation and management of natural resources.
Essential Employability Skills (EES) addressed in this course:	EES 1 Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience. EES 2 Respond to written, spoken, or visual messages in a manner that ensures effective communication. EES 3 Execute mathematical operations accurately. EES 4 Apply a systematic approach to solve problems. EES 6 Locate, select, organize, and document information using appropriate technology and information systems. EES 7 Analyze, evaluate, and apply relevant information from a variety of sources. EES 8 Show respect for the diverse opinions, values, belief systems, and contributions of others. EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals. EES 10 Manage the use of time and other resources to complete projects. EES 11 Take responsibility for ones own actions, decisions, and consequences.
General Education Themes:	Science and Technology
Course Evaluation:	Passing Grade: 50%, D A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.
Other Course Evaluation & Assessment Requirements:	Academic success is directly linked to attendance. Missing more than 1/3 of the course hours in a semester shall result in an F Grade for the course.

Course Outcomes and Learning Objectives:

Course Outcome 1	Learning Objectives for Course Outcome 1
1. Explain and apply the scientific method to natural resource problem solving.	1.1 Distinguish between science and technology. 1.2 Describe the steps in the scientific method. 1.2 Using the scientific method demonstrate how you would

	solve a given natural resource problem. 1.3 Prepare a technical report to describe the results of a lab analysis of waste recycling at Sault College. 1.4 Describe the organization and purpose of each section of a technical report.
Course Outcome 2	**Learning Objectives for Course Outcome 2**
2. Explain the Hierarchy of Matter.	2.1 Show the connectivity and increasing complexity of nature from atomic particles to the total ecosphere. 2.2 Demonstrate the dependence of all levels of nature on chemical interaction. 2.3 Show how chemistry, biology and ecology are inter-related through the hierarchy of matter.
Course Outcome 3	**Learning Objectives for Course Outcome 3**
3. Explain the relationship of species to evolutionary process.	3.1 Describe the various criteria used to determine species status. 3.2 Explain the basis for classifying living organisms. 3.3 Categorize select examples of specimens from the field into their respective taxonomic groups. 3.4 Correctly use the binomial system of classification. 3.5 Give examples of morphological, anatomical, physiological, behavioural and ecological characteristics used to distinguish species.
Course Outcome 4	**Learning Objectives for Course Outcome 4**
4. Explain cellular functions.	4.1 Identify the fundamental components of a living cell and explain their functions. 4.1 Characterize and provide examples of the 4 basic life molecules: sugars, proteins, lipids and nucleic acids. 4.2 Explain how cells obtain nutrients. 4.3 Summarize the processes of photosynthesis, respiration, diffusion, protein synthesis and exchange of genetic information. 4.3 Demonstrate division of function in multi-cellular organisms.
Course Outcome 5	**Learning Objectives for Course Outcome 5**
5. Explain various characteristics of water as they relate to life systems.	5.1 Describe various chemical and physical properties of water including: density, viscosity, polarity, surface tension, specific heat, solubility and pH. 5.2 Determine the dissolved oxygen concentration of water using a titration method. 5.3 Calculate acid/base neutralizations. 5.4 Determine the pH of water using a titration method and a pH meter. 5.5 Explain thermal stratification of lakes and lake turnover.
Course Outcome 6	**Learning Objectives for Course Outcome 6**
6. Demonstrate the relationships of chemical interactions to important global environmental issues.	6.1 Explain bio-magnification 6.2 Describe the causes for and impacts of the following global environmental problems a)acid deposition, b)ozone depletion, c)global warming, d)eutrophication

Course Outcome 7	Learning Objectives for Course Outcome 7
7. Develop proficiency in the use of the compound microscope.	7.1 Use a compound microscope to observe and draw cellular material. 7.2 Measure size of microscopic materials. 7.3 Calculate the scale of drawings. 7.4 Demonstrate proper care and handling of the microscope.
Course Outcome 8	**Learning Objectives for Course Outcome 8**
8. Develop safe and correct lab techniques with respect to chemical handling and instrument use.	8.1 Discuss and apply safe lab procedures including handling of dangerous chemicals. 8.2 Demonstrate knowledge of the Workplace Hazardous Materials Information System. 8.3 Demonstrate the proficient use of various laboratory equipment and instruments. 8.4 Prepare solutions.
Course Outcome 9	**Learning Objectives for Course Outcome 9**
Develop a working knowledge of the periodic table.	9.1 Distinguish between metals, non-metals and noble gases. 9.2 Demonstrate relationships between protons, electrons and neutrons in identifying chemical elements 9.3 Determine electron configurations of atoms. 9.4 Identify valence shells and valence electrons. 9.5 Determine potential atomic arrangements of ions and covalent compounds. 9.6 Calculate gram molecular weights of compounds. 9.7 Demonstrate use of Lewis dot diagrams. 9.8 Use tables to determine energy changes in combustion reactions.

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight
Labs	40%
Quizzes	20%
Test 1	20%
Test 2	20%

Date: June 21, 2024

Addendum: Please refer to the course outline addendum on the Learning Management System for further information.