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SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



COURSE OUTLINE

COURSE TITLE: Science & Nature

CODE NO. : NRT141

SEMESTER: F13

PROGRAM: Fish & Wildlife Conservation Technician, Adventure Recreation and Parks Technician, Natural Environment Technician and Technologist

AUTHOR: Jerry A. Zuchlinski, M.Sc.

DATE: May 2013 **PREVIOUS OUTLINE DATED:** June 2012

APPROVED: "C.Kirkwood"

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| | "Dean" | DATE |
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TOTAL CREDITS: 3

PREREQUISITE(S): None

HOURS/WEEK: 3

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For additional information, please contact Colin Kirkwood, Dean,
Environment/Technology/Business
(705) 759-2554, Ext. 2688

I. COURSE DESCRIPTION:

This course examines six topics of science that are fundamental to an understanding of the role of research and the relationship of biology and chemical interaction to natural resource management. Topics include Science and the Scientific Method, The Hierarchy of Matter, The Species in an Evolutionary Context, The Cell as the Fundamental Unit of Life, Water as a Medium for Life and Chemical Interactions in the Environment

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

1. Explain and apply the scientific method to natural resource problem solving

Potential Elements of the Performance:

- distinguish between science and technology
- describe the steps in the scientific method
- using the scientific method demonstrate how you would solve a given natural resource problem
- prepare a technical report to describe the results of a lab analysis of waste recycling at Sault College
- describe the organization and purpose of each section of a technical report

2. Explain the Hierarchy of Matter.

Potential Elements of the Performance:

- show the connectivity and increasing complexity of nature from atomic particles to the total ecosphere
- demonstrate the dependence of all levels of nature on chemical interaction
- show how chemistry, biology and ecology are inter-related through the hierarchy of matter

3. Explain the relationship of species to evolutionary process

Potential Elements of the Performance:

- describe the various criteria used to determine species status
- explain the basis for classifying living organisms
- categorize select examples of specimens from the field into their respective taxonomic groups
- correctly use the binomial system of classification

- give examples of morphological, anatomical, physiological, behavioral and ecological characteristics used to distinguish species

4. Explain cellular functions

Potential Elements of the Performance:

- identify the fundamental components of a living cell and explain their functions
- characterize and provide examples of the 4 basic life molecules: sugars, proteins, lipids and nucleic acids
- explain how cells obtain nutriment
- summarize the processes of photosynthesis, respiration, diffusion, protein synthesis and exchange of genetic information
- demonstrate division of function in multi-cellular organisms

5. Explain various characteristics of water as they relate to life systems.

Potential Elements of the Performance:

- describe various chemical and physical properties of water including: density, viscosity, polarity, surface tension, specific heat, solubility and pH
- determine the dissolved oxygen concentration of water using a titration method
- determine the alkalinity of water using a titration method
- determine the pH of water using a titration method and a pH meter
- explain thermal stratification of lakes and lake turnover

6. Demonstrate the relationships of chemical interactions to important global environmental issues

- Potential Elements of the Performance: explain bio-magnification
- describe the causes for and impacts of the following global environmental problems:
 - i) acid deposition
 - ii) ozone depletion
 - iii) global warming
 - iv) eutrophication

7. Develop use of the compound microscope

Potential Elements of the Performance:

- use a compound microscope to observe and draw cellular material
 - measure size of microscopic materials
 - calculate the scale of drawings
 - demonstrate proper care and handling of the microscope
8. Develop safe and correct lab technique with respect to chemical handling and instrument use.

Potential Elements of the Performance:

- discuss and apply safe lab procedures including handling of dangerous chemicals
- demonstrate knowledge of the Workplace Hazardous Materials Information System
- demonstrate use of balances, pH metre, glassware including pipettes and burettes, hot plates, fume hoods
- prepare solutions
- conduct titration procedures

III. TOPICS:

1. Science and the scientific method
2. The Hierarchy of matter
3. The species in an evolutionary context
4. The cell as the fundamental unit of life
5. Water as a medium for life
6. Chemical interactions in the environment

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Science & Nature Lab Manual, Science & Nature Study Guide, Lab Coat and Lab safety glasses.

V. EVALUATION PROCESS/GRADING SYSTEM:

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|---------------|------------|
| 2 Unit Tests | 40% |
| 4 Assignments | 20% |
| <u>6 Labs</u> | <u>40%</u> |
| TOTAL | 100% |

The following semester grades will be assigned to students:

Grade Point

| Grade | Definition | <i>Equivalent</i> |
|--------------|--|-------------------|
| A+ | 90 – 100% | |
| A | 80 – 89% | 4.00 |
| B | 70 - 79% | 3.00 |
| C | 60 - 69% | 2.00 |
| D | 50 – 59% | 1.00 |
| F (Fail) | 49% and below | 0.00 |
| CR (Credit) | Credit for diploma requirements has been awarded. | |
| S | Satisfactory achievement in field /clinical placement or non-graded subject area. | |
| U | Unsatisfactory achievement in field/clinical placement or non-graded subject area. | |
| X | A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course. | |
| NR | Grade not reported to Registrar's office. | |
| W | Student has withdrawn from the course without academic penalty. | |

VI. SPECIAL NOTES:

Course Outline Amendments:

The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Retention of Course Outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Prior Learning Assessment:

Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question. Please refer to the Student Academic Calendar of Events for the deadline date by which application must be made for advance standing.

Credit for prior learning will also be given upon successful completion of a challenge exam or portfolio.

Substitute course information is available in the Registrar's office.

Disability Services:

If you are a student with a disability (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Disability Services office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

Communication:

The College considers **WebCT/LMS** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of the **Learning Management System** communication tool.

Plagiarism:

Students should refer to the definition of "academic dishonesty" in *Student Code of Conduct*. A professor/instructor may assign a sanction as defined below, or make recommendations to the Academic Chair for disposition of the matter. The professor/instructor may (i) issue a verbal reprimand, (ii) make an assignment of a lower grade with explanation, (iii) require additional academic assignments and issue a lower grade upon completion to the maximum grade "C", (iv) make an automatic assignment of a failing grade, (v) recommend to the Chair dismissal from the course with the assignment of a failing grade. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Student Portal:

The Sault College portal allows you to view all your student information in one place. **mysaultcollege** gives you personalized access to online resources seven days a week from your home or school computer. Single log-in access allows you to see your personal and financial information, timetable, grades, records of achievement, unofficial transcript, and outstanding obligations. Announcements, news, the academic calendar of events, class cancellations, your learning management system (LMS), and much more are also accessible through the student portal. Go to <https://my.saultcollege.ca>.

Electronic Devices in the Classroom:

Students who wish to use electronic devices in the classroom will seek permission of the faculty member before proceeding to record instruction. With the exception of issues related to accommodations of disability, the decision to approve or refuse the request is the responsibility of the faculty member. Recorded classroom instruction will be used only for personal use and will not be used for any other purpose. Recorded classroom instruction will be destroyed at the end of the course. To ensure this, the student is required to return all copies of recorded material to the faculty member by the last day of class in the semester. Where the use of an electronic device has been approved, the student agrees that materials recorded are for his/her use only, are not for distribution, and are the sole property of the College.

Attendance:

Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session. *<Optional: It is the departmental policy that once the classroom door has been closed, the learning process has begun. Late arrivers will not be granted admission to the room.>*

Tuition Default:

Students who have defaulted on the payment of tuition (tuition has not been paid in full, payments were not deferred or payment plan not honoured) as of the first week of *<choose November, March, or June>* will be removed from placement and clinical activities. This may result in loss of mandatory hours or incomplete course work. Sault College will not be responsible for incomplete hours or outcomes that are not achieved or any other academic requirement not met as of the result of tuition default. Students are encouraged to communicate with Financial Services with regard to the status of their tuition prior to this deadline to ensure that their financial status does not interfere with academic progress.