CO 166

Scientific Writing & Computer Applications

3 Credits

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Calendar Description

This course explores fundamental approaches to scientific writing. Considerable time is spent discussing what constitutes critical content and how that content is effectively organized for a variety of documents used in the scientific industry. Strategies for efficient technical writing are emphasized for discipline-specific applications. Students become familiar with common computer software such as Microsoft Word, Excel, and PowerPoint.

Rationale

This course is required for first year students within the Environmental Sciences diploma. The interdisciplinary nature of the Environmental Science programs requires excellent written and oral communication skills. Proficiency in writing and oral communicating is developed in a number of contexts.

Effective communication is an essential aspect of superior work performance, and is often a deciding factor in hiring and ongoing promotions. Technical communication requires specific skills sets and practice. Students develop effective technical writing skills to ensure compliance with current industry standards, coherent transmission of ideas, and critical rational thinking.

Prerequisites

Students are expected to already utilize proper grammar, punctuation, & spelling, and have proficiency typing and using MS Word.

Co-Requisites

None

Course Learning Outcomes

Upon successful completion of this course, students will be able to

1. develop clear, concise, and structured technical documents in MS Word, appropriate to the environmental industry.
2. search scientific databases, review scientific literature, and effectively summarize and paraphrase key information from technical documents.

3. edit and revise technical text.
4. develop a detailed scientific report, with emphasis on writing the introduction, methods, results and discussion sections.
5. properly reference sources.
6. construct tables and figures with effective titles.
7. design and create spreadsheets in MS Excel for environmental data.
8. execute functions in MS Excel to analyze environmental data.
9. design a technical presentation using MS PowerPoint.
10. orally present a MS PowerPoint seminar.

Essential Employability Skills

Essential employability skills are critical for workplace success and lifelong learning. Lakeland College prepares its graduates for the workplace and lifelong learning by integrating and promoting essential employability skills development in its curricula. Each credit course offered at Lakeland College emphasizes one or more of the following five essential employability skills:

A. **Communication Skills** that enable individuals to listen, interpret, express, and convey knowledge and ideas so that they are received and understood.
B. **Teamwork Skills** that enable individuals to respect the thoughts and opinions of others as they work together to plan activities, meet deadlines, complete projects, and contribute to an organization's goals.
C. **Critical Thinking Skills** that enable individuals to conceptualize and analyze issues from various perspectives while rationally evaluating the strengths and limitations of each perspective and deciding what action to take.
D. **Adaptability Skills** that enable individuals to respond quickly, willingly, and positively to new conditions and changing times.
E. **Positive Attitude and Behavioural Skills** that enable individuals to be confident about themselves and to deal with people, problems, and situations with honesty, integrity, and personal ethics.

Please refer to the Knowledge/Skills Matrix of this course outline to review the essential employability skills emphasized in this course.

Resource Materials

***Required Text*:**
Knisely, K. 2021. A student handbook for writing in biology. 6th ed. Macmillan Learning,

New York, NY. 332 p.

***Reference Text*:**
Lannon, J.M., and D. Klepp. 2006. Technical communication. 4th ed. Pearson Education

Canada Inc., Toronto, ON.

***Required Materials*:**
It is recommended that students purchase an external storage device (e.g. memory stick) for transferring files between computers and storing digital information (e.g. backing up your school files).

Conduct of Course

Scientific writing follows a structured protocol and formatting, but requires practice to achieve proficiency. The theory of scientific writing is presented in lectures. Labs provide a supervised forum for students to implement theory and develop competency through practice, evaluation and revision.

Evaluation Procedures

Labs/Assignments	40%
Quizzes	30%
Oral Presentation	15%
Major Report	15%
Total	**100%**

To obtain credit in this course, all assignments must be completed and handed in on time. Late submissions are assigned a mark of 0.

Knowledge/Skills Matrix

Students apply and demonstrate their knowledge and skills to use

A. Communication Skills

A1.	**by listening, reading, interpreting information, and communicating effectively**
	Evaluation(s)/Goal(s): Assignments/Goals 1-10; Oral Presentation/Goals 1-10; Quizzes/Goals 1-10; Formal Report/Goals 1-10
A2.	**by using written, spoken, and/or visual formats and media to communicate and meet needs of each particular audience**
	Evaluation(s)/Goal(s): Assignments/Goals 1-10; Oral Presentation/Goals 1-10; Quizzes/Goals 1-10; Formal Report/Goals 1-10
A3.	**by using libraries, Internet, technical publications, journals and other sources to find pertinent information**
	Evaluation(s)/Goal(s): Assignments/Goals 1-10; Oral Presentation/Goals 1-10; Quizzes/Goals 1-10; Formal Report/Goals 1-10

B. Teamwork Skills

B1.	**by using interpersonal skills to create an atmosphere that maximizes the strengths of group members to accomplish tasks**
	Evaluation(s)/Goal(s): Assignments/Goals 1-10; Oral Presentation/Goals 1-10; Formal Report/Goals 1-10

B2. by using interpersonal skills to resolve conflict, relate to others, and assist others	
	Evaluation(s)/Goal(s): Assignments/Goals 1-10; Oral Presentation/Goals 1-10; Formal Reports 1-10
B3. by contributing and listening to others as group determines realistic objectives, prioritizes tasks, and identifies resources and timelines	
	Evaluation(s)/Goal(s): Assignments/Goals 1-10; Oral Presentation/Goals 1-10; Formal Report/Goals 1-10
B4. by treating other members of the group open-mindedly and fairly	
	Evaluation(s)/Goal(s): Assignments/Goals 1-10; Oral Presentation/Goals 1-10; Formal Report/Goals 1-10
B5. by developing tactics/strategies to accomplish tasks	
	Evaluation(s)/Goal(s): Assignments/Goals 1-10; Oral Presentation/Goals 1-10; Formal Report/Goals 1-10

C. Critical Thinking Skills

C1. by seeing critical thinking as a lifelong process of self-assessment	
	Evaluation(s)/Goal(s): Assignments/Goals 1-10; Oral Presentation/Goals 1-10; Quizzes /Goals 1-10; Formal Report /Goals 1-10
C2. by examining problems closely	
	Evaluation(s)/Goal(s): Assignments/Goals 1-10; Oral Presentation/Goals 1-10; Quizzes/Goals 1-10; Formal Report/Goals 1-10
C3. by examining beliefs, assumptions, and opinions, and weigh them against the facts	
	Evaluation(s)/Goal(s): Assignments/Goals 1-10; Oral Presentation/Goals 1-10; Quizzes/Goals 1-10; Formal Report/Goals 1-10
C4. by seeking out the truth	
	Evaluation(s)/Goal(s): Assignments/Goals 1-10; Oral Presentation/Goals 1-10; Quizzes/Goals 1-10; Formal Report/Goals 1-10
C5. by finding solutions; make decisions	
	Evaluation(s)/Goal(s): Assignments/Goals 1-10; Oral Presentation/Goals 1-10; Quizzes/Goals 1-10; Formal Report/Goals 1-10
C6. by incorporating new ideas that may not necessarily agree with previous thought on the topic	
	Evaluation(s)/Goal(s): Assignments/Goals 1-10; Oral Presentation/Goals 1-10; Quizzes/Goals 1-10; Formal Report/Goals 1-10
C7. by seeing connections between topics and use knowledge from other disciplines to enhance reading and learning experiences	
	Evaluation(s)/Goal(s): Assignments/Goals 1-10; Oral Presentation/Goals 1-10; Quizzes/Goals 1-10; Formal Report/Goals 1-10

D. Adaptability Skills

D1. by working independently or as part of team	
	Evaluation(s)/Goal(s): Assignments/Goals 1-10; Oral Presentation/Goals 1-10; Quizzes/Goals 1-10; Formal Report/Goals 1-10
D2. by carrying out multiple tasks or projects	
	Evaluation(s)/Goal(s): Assignments/Goals 1-10; Oral Presentation/Goals 1-10; Quizzes/Goals 1-10; Formal Report/Goals 1-10

D3. by being innovative and resourceful: identify and suggest alternative ways to get the job done	
	Evaluation(s)/Goal(s): Assignments/Goals 1-10; Oral Presentation/Goals 1-10; Quizzes/Goals 1-10; Formal Report/Goals 1-10
D4. by being open and respond constructively to change and uncertainty	
	Evaluation(s)/Goal(s): Assignments/Goals 1-10; Oral Presentation/Goals 1-10; Quizzes/Goals 1-10; Formal Report/Goals 1-10

E. Positive Attitude and Behavioural Skills

E1. by dealing with people, problems, and situations with honesty, integrity, and personal ethics	
	Evaluation(s)/Goal(s): Assignments/Goals 1-10; Oral Presentation/Goals 1-10; Quizzes/Goals 1-10; Formal Report/Goals 1-10
E2. by showing interest, initiative, and effort	
	Evaluation(s)/Goal(s): Assignments/Goals 1-10; Oral Presentation/Goals 1-10; Quizzes/Goals 1-10; Formal Report/Goals 1-10
E3. by affirming the need for positive solutions and encourage positive interaction and feedback	
	Evaluation(s)/Goal(s): Assignments/Goals 1-10; Oral Presentation/Goals 1-10; Quizzes/Goals 1-10; Formal Report/Goals 1-10
E4. by balancing personal and family activities with job-related activities	
	Evaluation(s)/Goal(s): Assignments/Goals 1-10; Oral Presentation/Goals 1-10; Quizzes/Goals 1-10; Formal Report/Goals 1-10

Grade Equivalents and Course Pass Requirements

A minimum grade of D (50%) (1.00) is required to pass this course.

Letter	F	D	D+	C-	C	C+	B-	B	B+	A-	A	A+
Percent Range	0-49	50-52	53-56	57-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-100
Points	0.00	1.00	1.30	1.70	2.00	2.30	2.70	3.00	3.30	3.70	4.00	4.00

Students must maintain a cumulative grade of C (GPA - Grade Point Average of 2.00) in order to qualify to graduate.

Attendance

Classroom and laboratory attendance is considered vital to the learning process and as significant to the students' evaluation as examinations and reports, therefore absenteeism is recorded.

a. Students having a combination of excused and/or unexcused absence of 20 percent or higher for the scheduled course hours can be required to withdraw and would then automatically receive a "RW" (required withdrawal) for the course, regardless of any other evaluation results. (RW is a failing grade).

b. An excused absence is one that is verified with your instructor. Verification should be prior to the absence or the next class day following the absence. Verification of the

absence may take the form of a note from your doctor/College nurse regarding illness, or a note from another instructor regarding a field trip or other activity, or authorization by your instructor following an in-person meeting. Be sure to contact your instructor and ask what they will require from you as verification of each absence. An unexcused absence is anything NOT verified by the instructor prior to the absence or the next class day following the absence.

NOTE: Any exceptions to the above attendance policy (e.g. timetable conflicts, work-related issues) must be approved in writing by the Department Chair prior to the beginning of the course.

It is the students' responsibility to know their own absentee record.

Normal hours are 8:30 a.m. to 6:30 p.m., with potential for evening courses, exams or extended field trips. Students are expected to be available for classes during these times.

Course Units/Topics

Lecture Topics:

What is Scientific/Technical Writing?
- Differences from non-technical writing
- Objectives
- Role of publishing in science

How to Write Technically
- Basic grammar review
- Verb Tenses, Perspective, and Voice
- Writing for clarity
- Paragraphing and creating topic sentences

How to Read Scientific Papers
- Scientific paper format
- Strategies for comprehension

Outlining
- Brainstorming ideas
- Creating a working outline

Abstracts

Oral Communications
- Delivery Styles
- Rehearsing
- Working with AV equipment

- Handling questions
- Receiving feedback

Laboratory Topics:

Lab exercises are designed to incrementally develop scientific writing skills as presented in the lecture component. Assignments are often completed in the lab period, so attendance is mandatory. Topics to be covered will include:

- Using appropriate scientific language
- Researching using library resources
- Basic and advanced MS Word, MS Excel, and MS PowerPoint functions
- Preparation of technical documents
- Editing and Revisions
    - revising your own work, and the work of others (peer editing)
    - writing drafts
    - revising for clarity, style, mechanics, etc.
- Comprehending scientific journal articles
- Preparation and proper display of graphics in scientific reports
- Preparation and oral presentation of a seminar topic

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