COURSE OUTLINE		
TERM: SPRING 2026	**COURSE NO: GEOG 325**	
INSTRUCTOR:	**COURSE TITLE: GIS APPLICATIONS IN NATURAL RESOURCE MANAGEMENT**	
OFFICE: LOCAL: **E-MAIL:**	**SECTION NO:**	**CREDITS: 4.0**
OFFICE HOURS:		
COURSE WEBSITE:		

Capilano University is named after Chief Joe Capilano (1854–1910), an important leader of the Sḵwx̱wú7mesh (Squamish) Nation of the Coast Salish Peoples. We respectfully acknowledge that our campuses are located on the unceded territories of the səlilwətaɬ (Tsleil-Waututh), shíshálh (Sechelt), Sḵwx̱wú7mesh (Squamish), and xʷməθkʷəy̓əm (Musqueam) Nations.

COURSE FORMAT
Four hours of class time and two hours of lab time for a 15-week semester, which includes two weeks for final exams.

COURSE PREREQUISITES
45 credits of 100-level or higher coursework and one of the following: GEOG 225, COMP 115, STAT 101 or STAT 205

CALENDAR DESCRIPTION
The demands for better management of natural resources require management of spatial data and information. This course provides a technical understanding of the application of Geographical Information System (GIS) software to natural resource management in confronting environmental issues. Laboratory exercises provide practical use of GIS in solving natural resource management problems.

COURSE NOTES
GEOG 325 is an approved Science and Technology course for Cap Core requirements.
GEOG 325 is an approved Quantitative/Analytical course for baccalaureate degrees.
GEOG 325 is an approved Laboratory Science course.
GEOG 325 is an approved Science course.
GEOG 325 is an approved Numeracy course for Cap Core requirements.

REQUIRED TEXTS AND/OR RESOURCES
A book similar to (depending on the software chosen for the course):

Michael Wing and Pete Bettinger. *Geographic Information Systems Applications in Natural Resource Management.* Oxford University Press. ISBN: 9780195426106

Law, Michael and Collins, Amy. 2018, *Getting to Know ArcGIS 10 Desktop, 5th edition*. Redlands, California: ESRI press.

Shammunul Islam, Simon Miles, Luigi Pirelli, *Mastering Geospatial Development with QGIS 3.x: An in-depth guide to becoming proficient in spatial data analysis using QGIS 3.4 and 3.6 with Python*, 3rd Edition, Packt Publishing, 2019. ISBN - 13:9781788994873

COURSE STUDENT LEARNING OUTCOMES

On successful completion of this course, students will be able to do the following:

- Clearly identify natural resource management problems that can be studied through spatial analyses.
- Understand basic techniques of satellite image processing and how the data are interpreted and integrated into spatial analysis of landscapes.
- Translate research questions in natural resource fields into remote sensing (RS) and Geographical Information System (GIS) analysis techniques.
- Apply GIS functionality towards natural resource questions using proprietary software and open-source software.
- Demonstrate good understanding of key GIS concepts, spatial/aspatial database structures, data models, and geospatial analysis.
- Design, select and conduct GIS analyses to address identified natural resource management problems, and effectively communicate with potential stakeholders about the spatial analysis results.
- Write brief and concise laboratory reports in appropriate technical style demonstrating the student's understanding and interpretation of results.
- Understand the advantages and limitations of RS/GIS based analysis approaches.
- Be competent in GIS analysis methods (i.e. classification, hydrology, habitat, interpolation, network analysis) commonly used in natural resource management assessment, planning and management.
- Solve problems independently through basic spatial/aspatial database management, spatial analyses, and GIS programming in natural resource management.
- Collect and map data pertaining to natural resources using RS technique and GIS technology.
- Explore GIS and RS datasets in different formats used in natural resource management.

Students who complete this Science and Technology course will be able to do the following:

- Apply numerical and computational strategies to solve problems.
- Assess the impacts of human activity on natural systems and articulate ways in which environmental sustainability may be achieved.
- Evaluate scientific information (e.g., distinguish primary and secondary sources, assess credibility and validity of information).
- Demonstrate how a problem, concept, or process can be modelled numerically, graphically, or algorithmically.
- Explain how scientific inquiry is based on investigation of evidence and evolves based on new findings.

- Participate in scientific inquiry and communicate the elements of the process, including making careful and systematic observations, developing and testing a hypothesis, analyzing evidence, and interpreting results.

Students who complete this Numeracy course will be able to do the following:

- Apply both analytical and numerical skills to solve problems.
- Summarize and analyze data in quantitative forms.
- Interpret and draw conclusions from an analysis of quantitative data.
- Represent quantitative information in a variety of forms (e.g. symbolically, visually, numerically, and verbally).
- Incorporate quantitative evidence in support of an argument.

COURSE CONTENT

The following information provides a general topic guide to the lecture and lab topics for the course. Detailed readings, lecture outlines, and labs for each day will be accessible from the course website. Lecture and lab material will be tightly integrated.

Week	Lecture Content	Lab Content
1	Course Introduction GIS tools for natural resource management	Form groups and submit draft project title
2	Collection of data for natural resource management Data models and database structures	Geodatabase in ArcGIS
3	Maps, data-entry & editing, metadata, map transformations	Vector data model, model builder, and land classification
4-5	Remote sensing: aerial and satellite images	Exploring and using remotely sensed data sets available for natural resources management
6-7	Introduction to tables & relational databases	Using Google Earth Engine for change analysis
8	Basic spatial analyses	Spatial analysis and Cartographic Modeling
9	Raster analysis	Image Processing, Classification and Map Accuracy Assessment in Environmental Management
10	Terrain analysis	Hydrological and climatic mapping using GIS
11-13	Applications of GIS to natural resource management	Finalize the class project, present the poster Lab exam
14-15	Final Exam Period	

EVALUATION PROFILE

Lab assignments and Lab Tests*	20-50%
Project*	20-50%
Quizzes and Exams*	20-50%
Total	100%

* No single assignment will be worth more than 35%

NOTE: A passing grade (50% or more) is required on both the lab and lecture portions of the course for the student to obtain a passing grade for the entire course.

GRADING PROFILE

A+ = 90-100	B+ = 77-79	C+ = 67-69	D = 50-59
A = 85-89	B = 73-76	C = 63-66	F = 0-49
A- = 80-84	B- = 70-72	C- = 60-62	

Incomplete Grades

Grades of Incomplete "I" are assigned only in exceptional circumstances when a student requests extra time to complete their coursework. Such agreements are made only at the request of the student, who is responsible to determine from the instructor the outstanding requirements of the course.

Late Assignments

Assignments are due at the beginning of the class on the due date listed. If you anticipate handing in an assignment late, please consult with your instructor beforehand.

Missed Exams/Quizzes/Labs etc.

Make-up exams, quizzes and/or tests are given at the discretion of the instructor. They are generally given only in medical emergencies or severe personal crises. Some missed labs or other activities may not be able to be accommodated. Please consult with your instructor.

Attendance

Students are expected to attend all classes and associated activities.

English Usage

Students are expected to proofread all written work for any grammatical, spelling and stylistic errors. Instructors may deduct marks for incorrect grammar and spelling in written assignments.

Electronic Devices

Students may use their own electronic devices during class for note-taking only.

On-line Communication
Outside of the classroom, instructors will communicate with students using either their official Capilano University email or eLearn; please check both regularly. Official communication between Capilano University and students is delivered to students' Capilano University email addresses only.

UNIVERSITY OPERATIONAL DETAILS

Tools for Success
Many services are available to support student success for Capilano University students. A central navigation point for all services can be found at: https://www.capilanou.ca/student-services/

Capilano University Security: download the CapU Safe Alert App

Policy Statement (S2009-06)
Capilano University has policies on Academic Appeals (including appeal of final grade), Student Conduct, Academic Integrity, Academic Probation and other educational issues. These and other policies are available on the University website.

Academic Integrity (S2017-05)
Any instance of academic dishonesty or breach of the standards of academic integrity is serious and students will be held accountable for their actions, whether acting alone or in a group. See policy and procedures S2017-05 Academic Integrity for more information: https://www.capilanou.ca/about-capu/governance/policies/

Violations of academic integrity, including dishonesty in assignments, examinations, or other academic performances, are prohibited and will be handled in accordance with the Student Academic Integrity Procedures.

Academic dishonesty is any act that breaches one or more of the principles of academic integrity. Acts of academic dishonesty may include but are not limited to the following types:

Cheating: Using or providing unauthorized aids, assistance or materials while preparing or completing assessments, or when completing practical work (in clinical, practicum, or lab settings), including but not limited to the following:

- Copying or attempting to copy the work of another during an assessment;
- Communicating work to another student during an examination;
- Using unauthorized aids, notes, or electronic devices or means during an examination;
- Unauthorized possession of an assessment or answer key; and/or,
- Submitting of a substantially similar assessment by two or more students, except in the case where such submission is specifically authorized by the instructor.

Fraud: Creation or use of falsified documents.

Misuse or misrepresentation of sources: Presenting source material in such a way as to distort its original purpose or implication(s); misattributing words, ideas, etc. to someone other than the original source; misrepresenting or manipulating research findings or data; and/or suppressing aspects of findings or data in order to present conclusions in a light other than the research, taken as a whole, would support.

Plagiarism: Presenting or submitting, as one's own work, the research, words, ideas, artistic imagery, arguments, calculations, illustrations, or diagrams of another person or persons without explicit or accurate citation or credit.

Self-Plagiarism: Submitting one's own work for credit in more than one course without the permission of the instructors, or re-submitting work, in whole or in part, for which credit has already been granted without permission of the instructors.

Prohibited Conduct: The following are examples of other conduct specifically prohibited:

- Taking unauthorized possession of the work of another student (for example, intercepting and removing such work from a photocopier or printer, or collecting the graded work of another student from a stack of papers);
- Falsifying one's own and/or other students' attendance in a course;
- Impersonating or allowing the impersonation of an individual;
- Modifying a graded assessment then submitting it for re-grading; or,
- Assisting or attempting to assist another person to commit any breach of academic integrity.

Sexual Violence and Misconduct

All Members of the University Community have the right to work, teach and study in an environment that is free from all forms of sexual violence and misconduct. Policy B401 defines sexual assault as follows:

> Sexual assault is any form of sexual contact that occurs without ongoing and freely given consent, including the threat of sexual contact without consent. Sexual assault can be committed by a stranger, someone known to the survivor or an intimate partner.

Safety and security at the University are a priority and any form of sexual violence and misconduct will not be tolerated or condoned. The University expects all Students and Members of the University Community to abide by all laws and University policies, including B.401 Sexual Violence Policy and B.401.1 Sexual Violence Procedure (found on Policy page https://www.capilanou.ca/about-capu/governance/policies/)

Emergencies: Students are expected to familiarise themselves with the emergency policies where appropriate and the emergency procedures posted on the wall of the classroom.