Software Evolution
Course Organization

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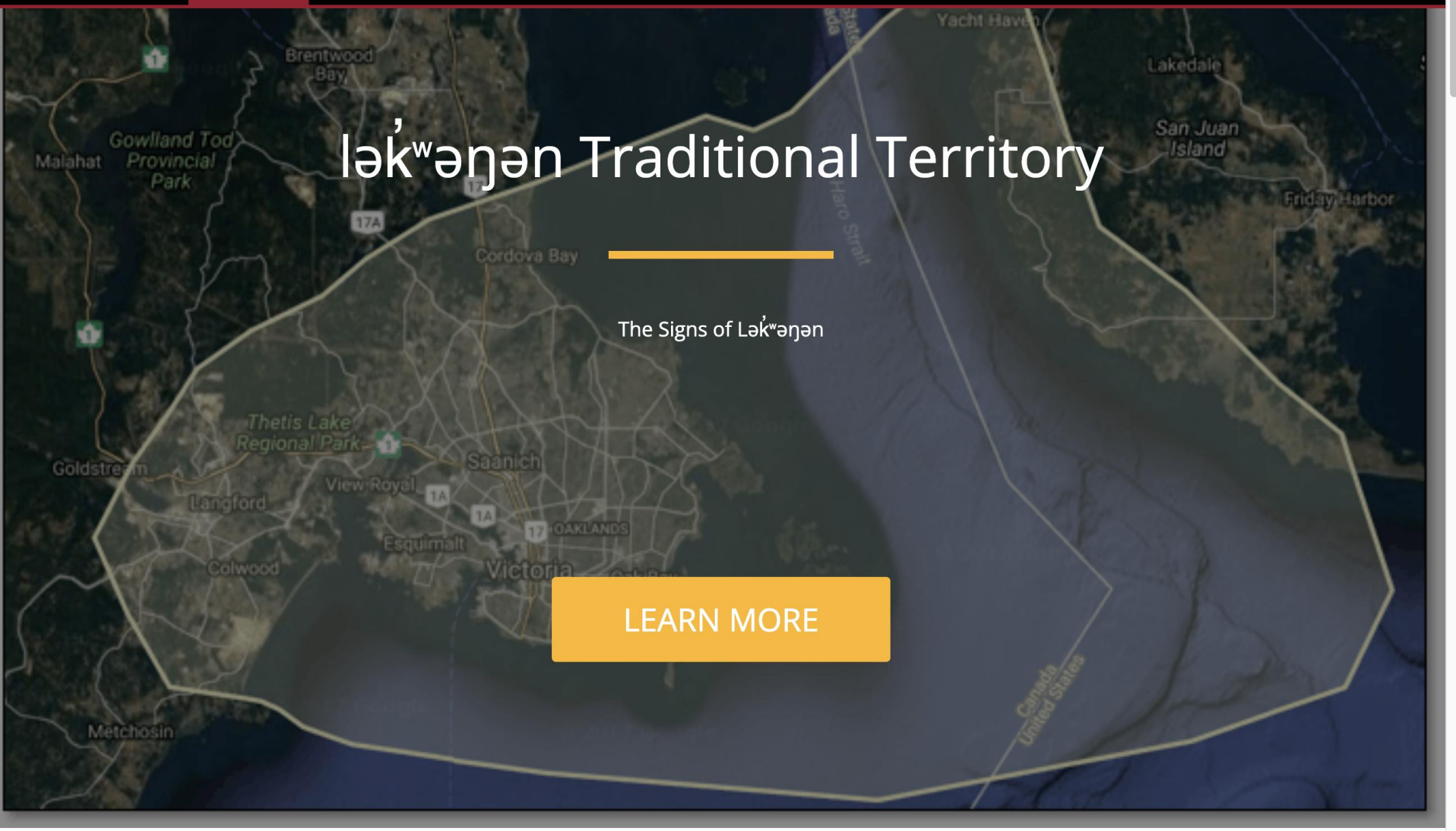
songheesnation.ca/community/l-k-ng-n-traditional-territory



ləkʷəŋən Traditional Territory

The Signs of Ləkʷəŋən

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Learning Objectives

- Main Goal:
  - to be able to satisfactorily carry out software evolution and maintenance activities through the use of methods, tools and techniques, and based on a theoretical framework and on the software engineering state-of-the-practice.

- Specific Goals are related to:
  - Understanding the main issues of evolving software systems
  - Mastering methods, techniques and tools to handle evolution
  - Critically evaluating methods, techniques and tools

Topics

1. Software evolution and maintenance
2. Changes, concepts and concept location
3. Impact analysis and actualization
4. Software verification and testing
5. Issue tracking
6. Software refactoring
7. Open source software development
8. Software design and models
9. Reverse engineering and architecture recovery
10. Version control, continuous integration and delivery
11. Software comprehension
12. Laws of software evolution

Textbooks and Readings

- Recommended textbook:
  - Rajlich, V. (2011). Software engineering: The current practice. CRC Press.
- Additional complementary textbooks:
  - Tripathy, P., & Naik, K. (2014). Software evolution and maintenance: a practitioner's approach. John Wiley & Sons.
  - Demeyer, S., & Mens, T. (2008). Software Evolution. Springer.
  - Mens, T. (2014), A. Serebrenik, & A. Cleve (Eds.). Evolving Software Systems. Heidelberg: Springer.
- Papers and Book Chapters (compulsory reading)
  - One per week
  - Will be available on Brightspace

Three types of classes

- Introductory lectures on concepts and skills (most common)
  - Introduction to software evolution concepts and practices
  - What you can expect in a lecture:
    - The instructor presents a topic
    - Students may actively pose questions or comments during the presentation
    - The instructor may also present examples of problem solving
    - If needed, the instructor may pose questions on a particular topic, and students may present their opinions on the topic.
- Tutorials on software evolution tools (three classes)
  - Presentation of tools and best practices
- Critical discussion of a technical paper / book chapter (weekly)
  - Pre-lecture quiz based on paper/chapter content
  - Whole class discussion using a critical summary format

Pre-Lecture Quizzes (10% grade)

- Weekly quizzes
  - Available on Monday
  - To be answered before discussion class (generally on Friday)
  - Content about scheduled technical paper / book chapter
- Format
  - 5 to 10 multiple choice or multiple selection questions
  - 10 minutes to answer (relaxed to 20 minutes)
  - Maximum of two attempts for each quiz
- Grading
  - 10 best grades out of 12 quizzes
  - Each of the kept grades accounts for 1% of the final grade

How to prepare for the quizzes and the technical paper class discussions

- **Actively reading a technical text**
  - When you read it, try to understand the authors' point of view and answer some basic questions such as the ones below, which are general for technical/scientific texts.

1. What is the **main goal** that the authors are addressing in this text?
2. What is the **problem** that the authors are trying to solve?
3. What is the **solution, in short**, that the authors offer to the problem?
4. What is the **detailed solution** that the authors offer to the problem?
5. In your opinion, what are the **pros** of this text?
6. In your opinion, what are the **cons** of this text?
7. In your opinion, what are the **consequences** of this text?
8. After you do that, you will be ready to **answer the quiz**.

Group Assignments (45% grade)

- Three group assignments (due weeks 6, 10 and 13)
  - 15% weight for each assignment
  - **Must pass grade of 50%** in the average of the 3 assignments
- Performed in groups of six students
  - Requirement: each group must come from the same lab section
    - Groups must be confirmed with your TA in your registered lab section on Week 2
    - Any unsolved group assignment issues will be solved by your TA and a final group composition will be done on Week 3
    - Together with the final group composition, there will be:
      - A group repository on GitHub
      - A group channel on Microsoft Teams
  - Pair programming is strongly recommended
  - Lab time will also be used for compulsory group meetings

About the Group Assignments

- Focus on an existing open source system (Jabref)
  - JabRef is a reference management tool based on bibtex (.bib)
  - 20 years of software development, mainly in Java for desktop
  - Recent data from https://openhub.net/p/jabref
    - 695 contributors, with 19,786 commits
    - 191,536 lines of code, well established, mature codebase
- Three assignments
  - Each assignment will have more than one task, to ensure group work happens
  - We recommend assignments using pair programming and rotating pairs to improve developer experience
  - Please expect assignments with growing complexity, as you gain experience with software evolution tasks

Labs (8% grade)

- 10 weekly labs (see course schedule)
  - Lab descriptions available on Wednesdays at 6pm
  - Labs will serve two main goals:
    - An introduction to methods, techniques and tools
    - Compulsory group meetings related to the group assignments
- Grading
  - 8 best grades out of 10 labs
  - There will be no concessions for missed lab work
    - keeping the 8 best grades is already a general concession
  - Each of the kept grades accounts for 1% of the final grade
  - Each lab will be graded with a grade from 0 to 4
    - When there is no group meeting, grade is your exercise work
    - When there is exercise work and a group meeting, half of your grade is your exercise work; the other half, your group meeting participation
    - When there is only a group meeting, your grade is your participation

About the Labs

- Introduction to methods, techniques and tools
  - Generally, the first half of most labs
  - Set of exercises to work through
  - Most of them will be based on pair work / pair programming
  - Choose your pair from the same lab section and group
  - Demonstrate your work to your TA during your registered lab time
- Compulsory group meetings
  - Second half of most labs
  - Choose some form of developer meeting format (e.g., Scrum meetings)
  - TA will circulate around the five groups to help with group challenges

Exams (45% grade)

- Midterm Exam (12%)
  - ECS 123, on February 28, 8:30am to 9:20am
  - Multiple choice and multiple selection questions on software evolution concepts, skills and tools
  - Subjective questions on student's understanding and informed opinion on software evolution practices
- Final Exam (25%)
  - Three hour exam scheduled by the university and held during the final exam period
  - **Must pass grade of 50%** in the final exam
  - Multiple choice and multiple selection questions on software evolution concepts, skills and tools
  - Subjective questions on student's understanding an informed opinion on software evolution practices

Course Grading

Coursework	Weight
Quizzes (10 best grades out of 12 quizzes)	10%
Labs (8 best grades out of 10 labs)	8%
Group Assignments (must pass 50% grade)	45%
Midterm Exam	12%
Final Exam (must pass 50% grade)	25%
TOTAL	**100%**

Communication

- Make sure you are registered in the Microsoft Teams group "Spring 2024 SENG 371 A01 A02 X"
- In this Team, there are:
  - a "General" channel, to discuss course content and quizzes (and general issues about labs and assignments)
  - three "Lab0X" channels for discussions on both labs and group assignments
  - Group channels (to be created) for the each group
- About interacting with instructors on the channels:
  - Lecturer and TAs will interact with you in the General channel
  - Your designed lab instructor will be mainly responsible to interact with you in the lab channel about the ongoing labs and assignments
  - Your group channel is mainly for your own group discussions, and the instructors will not take part in your discussions there.
- Use emails wisely
  - Emails only for specific issues relevant only to **you**
  - Please include "SENG 371" in subject line
  - If you do not follow the two guidelines above, emails will not be answered

Instructor Team

- Lecturer:
  - Dr. Roberto A. Bittencourt (rbittencourt@uvic.ca)
  - Office hours: Tuesdays, 9:30 - 11:20am in ECS 458 only
- Lab Instructors (TAs):
  - Amirreza Balouchi (amirrezabalouchi@uvic.ca)
  - Mostafa Abbasi (abbasi@uvic.ca)
  - Shuja Mughal (shujamughal@uvic.ca)
- Lab Sections will happen at ELW B220
  - B01: Thursdays, 3:30pm - 5:20pm (Shuja Mughal)
  - B02: Fridays, 10:30am - 12:20pm (Amirreza Balouchi)
  - B03: Fridays, 1:30pm - 3:20pm (Mostafa Abbasi)

Questions?