



VANCOUVER ISLAND  
UNIVERSITY

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SCIENCE & TECHNOLOGY

FORESTRY

## Forest Hydrology and Riparian Management

FRST 143

### Course Outline

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Term: FALL

Instructor: TBA

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#### **DESCRIPTION**

This course provides an overview of the effects of forest management on watershed processes, water quality and aquatic habitats. Topics include climate and climatic patterns, water chemistry and the water cycle; water budgets; watersheds - their structure, physiological/morphological characteristics and dynamics; stream, lake, and wetland morphology and classification; fish habitat and riparian ecosystems. The conservation and management of water and riparian resources within forest lands will be examined.

*Prerequisite: Enrolment in first year forestry or permission of instructor.*

#### **SCOPE AND CREDIT**

This 3-credit course is designed for students in the first year of the Forest Resources Technology program or the Forestry undergraduate transfer program. The VIU Forestry program is accredited by the Canadian Technology Accreditation Board.

## COURSE FORMAT

The term will consist of four hours of lecture/lab weekly; some field trips or labs may require scheduling a longer time period. (1:0:3)

## LEARNING OUTCOMES

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

1. Describe the water cycle, global water distribution and the relative importance and function of water in our environment and to organisms.
2. Explain the role and functions of forests in the water cycle.
3. Discuss the key processes in the water balance equation.
4. Describe surface and subsurface hydrologic processes.
5. Discuss in moderate detail how forest management activities impact the hydrologic cycle, water quality and fish habitat.
6. Measure stream flows and calculate culvert requirements.
7. Apply standardized assessment procedures for stream and wetland classification, stream morphology, fish habitat and water quality.
8. Describe watersheds and their morphological characteristics and how these affect water balance within them.
9. Identify and describe stream morphology and fish habitat features.
10. Describe how forested watersheds, streams, riparian ecosystems and fish habitat are managed and protected in British Columbia.
11. Evaluate a drainage basin using standard coastal watershed assessment procedures to guide future management practices.
12. Describe how to address harvesting and forest road related water management issues.

In addition to the subject-specific learning outcomes listed above, specific program learning outcomes will be covered. Upon successful completion of this course students will have furthered their ability to:

- **Read & comprehend material appropriate to my field;** students will be required to do independent research on a forest hydrology matter and report back to the class.
- **Independent learning;** students will be responsible to independently research, learn and be responsible for a lesson topic.
- **Resolving issues or conflicts;** students will be required to assess a riparian disturbance and develop a protocol to avoid event reoccurrences.

## **REQUIRED READINGS:**

Required readings will supplement lecture material. These readings may or may not be discussed in class but your understanding will be assessed in quizzes and exams.

**References:** Not required but obtainable from the Vancouver Island University bookstore:

1. Hewlett, John. 1982. *Principles of Forest Hydrology*. The University of Georgia.

2. W.R. Pollard, F.G. Hartman, C. Groot, P. Edgell .1997. *Field Identification of Coastal Juvenile Salmonids*. Harbour Publishing.

#### WEB REFERENCES:

1. Pike, R.G., T. E. Redding, R.D. Moore, R.D. Winkler and K.D. Bladon (editors). *Compendium of Forest Hydrology and Geomorpholgy in British Columbia*. B.C. Ministry of For. Range, For. Sci. Prog., Victoria, B.C. and Forrex Forum for Research and Extension in Natural Researches, Kamloops, B.C. Land Management Handbook 66, 805 pp. <http://www.for.gov.bc.ca/hfd/pubs/Docs/Lmh/Lmh66.htm>
2. The Pacific Streamkeepers Federation. <http://www.pskf.ca>

#### OPTIONAL TEXTS: (Not required but may be available in the VIU bookstore):

1. Dunster, J. and Katherine Dunster. 1996. *Dictionary of Natural Resource Management*, UBC Press.
2. Watts, S.B. and L. Tolland (Eds.). 2005. *Forestry Handbook for British Columbia, 5th Edition*, The Forestry Undergraduate Society, UBC Faculty of Forestry, 773 p.

#### FIELD EQUIPMENT & SAFETY

Some of the labs are outdoors. For labs or field trips involving walking off of roads or established trails, students are required to wear hard hats, caulk boots and hi-visibility vests; have safety eyewear or have a wire mesh face shield on the hardhat; and carry a personal first aid kit. Outdoor labs will be cancelled only when extreme weather compromises safety or the learning objectives (e.g., excessive wind or snowfall). Students must be equipped with proper field gear and clothing for all types of weather and will not be permitted to participate in outdoor lab exercises without complete safety equipment.

#### FIELD SUPPLIES

- Six-ring field pocket notebook and waterproof paper
- A mechanical pencil (or pencils + sharpener)
- Emergency whistle for vest

#### COURSE COMMUNICATIONS

If your email has changed since registration, please supply your current email address to the instructor. Information regarding the course will be distributed through email and on the Moodle site.

#### STUDENT EVALUATION (sample)

##### GRADE BREAKOUT

MID-TERM	25%
LABS AND ASSIGNMENTS	40%
FINAL EXAM	25%
PROFESSIONALISM	10%

**GRADING STANDARDS AND SCALE CAN BE FOUND ON THE D2L FORESTRY PORTAL**

**ACADEMIC POLICIES AND STANDARDS**

For information on exam policies, missing tests, assignment format standards, late assignments, (professionalism) instructor assessment and academic misconduct (e.g., plagiarism), please refer to the VIU Forestry Department website or the Forestry Portal on D2L.

**SCHEDULE - (sample)**

<b>Modules</b>	<b>Topic</b>
1	Introduction to Forest Hydrology <ul style="list-style-type: none"> <li>• Functions of water in the environment</li> <li>• Global water distribution and budget</li> <li>• Properties of water</li> <li>• Weather patterns and their influence on the hydrologic cycle.</li> </ul>
2	<ul style="list-style-type: none"> <li>• Hydrologic cycle</li> <li>• Water balance equation</li> <li>• Precipitation and Evaporation</li> <li>• Energy balance and Watersheds</li> </ul>
	<b>Thanksgiving - no classes</b> <b>Remembrance Day - no classes</b>
3	<ul style="list-style-type: none"> <li>• Water basin morphology</li> <li>• Ground water</li> <li>• Water infiltration capacity and storage, runoff and stream flow</li> <li>• Measuring watershed water flow</li> </ul>
<b>Morning Field trip to the Nanaimo Watershed</b>	
	<b>Midterm Exam</b>
4	<ul style="list-style-type: none"> <li>• Stream classification</li> <li>• Channel morphology and aquatic habitat</li> <li>• Disturbance indicators</li> <li>• Measuring and describing streams in the field</li> <li>• Calculating stream flow</li> </ul>
5	Wetland Classification
6	Intro to Fish Habitat and Riparian Management Fish and Stream Legislation
7	<ul style="list-style-type: none"> <li>• Water Quality</li> <li>• Determination of water quality</li> </ul>
8	<ul style="list-style-type: none"> <li>• Riparian Management Plans</li> <li>• Watershed Assessments</li> <li>• Cumulative effects of road construction and harvesting on Watersheds</li> </ul>