



VANCOUVER ISLAND  
UNIVERSITY

## Forest Resources Technology Program FRST 271 – Forest Road Design Course Outline

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Term: Fall  
Lecture/ Lab: TBA  
Instructor: TBA

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### CALENDAR DESCRIPTION

An introduction to forest road design techniques. Topics include the influence of harvesting systems, silviculture systems, and protection of environmental values on the location and design of forest roads.

### SCOPE AND CREDIT

Forestry 271 is designed for second-year students in the Forest Resources Technology program. Successful completion of first-year forestry or the instructor's permission is required for enrolment.

### COURSE FORMAT

The typical week will be one hour of lecture time and three hours lab time. Labs are usually outdoors so students must come prepared for fieldwork.

### TEXTS

#### Course Textbooks:

- Kiser, J. 2010. Surveying for Forestry and the Natural Resources, J. Bell & Assoc., 276 p. (purchased in FRST 111)
- BCFS Engineering Manual, Province of BC

[http://www.for.gov.bc.ca/hth/engineering/documents/publications\\_guidebooks/manuals\\_standards/Eng-Manual.pdf](http://www.for.gov.bc.ca/hth/engineering/documents/publications_guidebooks/manuals_standards/Eng-Manual.pdf)

#### Other References (optional):

- Forestry Handbook, Fourth Edition, U.B.C. Forest Club

### **Equipment and Supplies:**

- Six-ring notebook with Duksbak or Rite in the Rain Metric Field paper
- 2H Pencil
- Graph paper
- Compass with adjustable declination
- Douglas protractor
- Post Scale
- Biodegradable flagging tape
- personal first aid kit

### **Field Safety, Personal Protective Equipment and Clothing:**

- Caulk boots
- High visibility hard hat
- High visibility Cruiser's vest
- Safety whistle
- Rain gear and gloves

Students inadequately dressed or equipped may be dismissed from field lab sessions.

If you finish a field assignment early and want to leave the area you must notify the instructor. This policy will ensure that no injured person is left in the woods and that searches are not carried out for students that have gone home.

### **LEARNING OUTCOMES**

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

1. Assess the potential hazards of working in the forest; demonstrate safe work procedures for carrying out tasks, and use appropriate personal protective equipment requirements and describe emergency procedures.
2. Define and use technical terms applicable to forest road design in conversation with peers and in technical reports.
3. Apply differential levelling theory and procedures by:
  - a. Collecting data and recording field notes
  - b. Closing a traverse in the field to an error of closure of 0.2 m.
4. Explain the relationship between traffic volumes, road standards, construction costs, and hauling costs for a typical forestry operation.
5. Project a feasible logging road on a contour map by selecting suitable control points and linking them with appropriate road grades.

6. Conduct a road reconnaissance by locating control points in the field and linking them with a grade line.
7. Design horizontal alignment into your road grade by projecting tangents and curves.
8. Prepare high quality field notes for a Class 5 resource road.
9. Survey a circular curve in the field (switchback) and prepare road profiles and cross sections.
10. Design a short road on the University Woodlot by integrating your knowledge of grades, control points, horizontal alignment.
11. Synthesize road survey information and produce road plans and profiles.
12. Analyse field data to accurately estimate cross sectional areas of a stream and calculate culvert size using the California Method.
13. In conjunction with FRST 261, prepare a detailed road plan and accompanying report for a site on the University Woodlot. Students will evaluate site conditions, select the most appropriate harvesting system, identify the operational limits of the equipment and consolidate the information in a road plan that considers physical, environmental, legal and economic constraints.

## **EVALUATION**

### **Grade Scale:**

<b>(%)</b>	<b>Letter</b>	<b>Grade Point</b>
90-100	A+	4.33
85-89	A	4.00
80-84	A-	3.67
76-79	B+	3.33
72-75	B	3.00
68-71	B-	2.67
64-67	C+	2.33
60-63	C	2.00
55-59	C-	1.67
50-54	D	1.00
0-49	F	0.00

**Grade Breakout (sample):**

Lab Assignments	30%
Midterm Exams	20%
Quizzes	5 %
Fall Group Project	20%
Professionalism	5 %
Final Exam	20%

- All assignments and lab reports, unless otherwise stated, are due at the **start** of the following lab period.
- A penalty of 10% per day applies to late assignments.
- No marks will be awarded for assignments if marked work has already been returned to the rest of the class.
- Work that is substantially below standard for grammar or spelling will be returned unmarked for rewriting. Late penalties will still apply.
- Unless I specifically state **in writing** that group submissions are acceptable, they are not. Although data is often gathered in groups, each student must hand in their own individual assignment containing your thoughts and work.

## ACADEMIC POLICIES

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

<https://www2.viu.ca/forestry/Current-Students/VIU-Policies/index.asp>

## SAMPLE SCHEDULE

Week	Lecture Topics	Lab Topics
1	Course Introduction	Levelling Field
2	Road Standards, Route Projection, Grades	Route Projection, Grade Lines on paper
3	Grade Lines Field	Grade Lines Field
4	Interior Field Trip	Interior Field Trip
5	Horizontal Curves, Deflection Angles	Horizontal Curves, Deflection Angles (lower playing field on campus)
6	Midterm #1	spare
7	Field Switchbacks (woodlot)	Field Switchbacks on a slope
8	Plotting: Plans, Profiles, cross sections	Plotting: Plans, Profiles, cross sections
9	Culvert Design size and location	Culvert Design (woodlot)
10	Vertical curves	Vertical curves
11	Midterm #2	Spare
12	Field Project	Field Project