Grande Prairie Regional College
Department of Science
Bachelor of Applied Forest Resource Management
Course Outline (Winter 2004)

Course: *Wood Technology and Utilization* (FO4200) 3(3-0-2)

Instructor	**Office**	**Phone**	**E-mail**
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Classroom	**Lab**	**Time of Lectures**	**Time of Labs**
G118	B305	Tuesday and Thursday (11:30 – 12:50)	Monday (14:30 - 16:20)

Prerequisites: FO1200

Calendar Description
Chemical and physical properties of wood; wood identification; primary, secondary and other uses of wood: lumber, plywood, chip and particle boards, pulp and paper, panel products, wood fibre products, and reconstituted woods products. Introduction to integrated wood products.

Course Objectives
1) To understand process of wood formation and how it relates to wood properties;
2) To learn of the physical and chemical properties of wood and the identification of woods in major Canadian tree species;
3) To understand how wood properties affect both the type of products being made, and the properties of these wood products. Unless the student has a firm understanding of what wood is and how it varies between and within species, problems which arise in its utilization cannot be fully appreciated. Foresters are very often involved directly in these problems of utilization.
4) To understand the industries which depend upon wood for their raw materials, their major products and manufacturing processes, the type and quality of wood required, and the method of measuring and evaluating various types of wood raw materials.

Required Textbook
Bowyer, JL, Shmulsky R and Haygreen JG. 2000. Forest Products and Wood Science - An Introduction, 4th Edition, Iowa State University Press.

Major Reference Books
Forest Products Laboratory. 1999. Wood handbook--Wood as an engineering material. Gen. Tech. Rep. FPL-GTR-113. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory. 463 p. It is available free of charge at http://www.fpl.fs.fed.us/documnts/FPLGTR/fplgtr113/fplgtr113.htm.
Hoadley, R. Bruce, 1990. Identifying Wood: Accurate Results with Simple Tools. The Taunton Press, Inc., Connecticut.
Farrar, JL. 1995. Trees of the Northern United States and Canada. Iowa State Press, Iowa.

Useful Web Sites
http://www.cwc.ca; http://www.woodweb.com
http://www.forintek.ca; http://www.citw.org/
http://www.cla-ca.ca/English/index.phtml; http://www.fpl.fs.fed.us.

Course Content
The following lists the major topics to be addressed in this course and the required and suggested readings.

Topic	Week	Readings (Chapters)	
		Textbook (required)	Wood Handbook (suggested)
Course introduction, importance of wood as raw materials.	Week 1	Introduction & 19	1
Tree growth and wood formation, Macroscopic features of wood.	Week 2	1 & 2	2
Composition and structure of wood cells	Week 3	3	2
Comparative wood structure of softwood and hardwood	Week 4 & 5	4 & 5	1
Introduction to juvenile wood and reaction wood, wood of branches and roots, bark.	Week 6	6 & 7	2
(Winter break)	Week 7		
Wood & water, moisture in wood, shrinking and swelling of wood, wood drying	Week 8	8	3 & 12
Wood density and specific gravity Relation of specific gravity to wood properties.	Week 9	9	3
Mechanical properties of wood, basic stress/strain concepts, strength of wood, effects of moisture content, specific gravity, knots, slope of grain, other factors on wood strength.	Week 10	10	4
Wood durability, deterioration and protection, principles of wood treatment procedures.	Week 11	11	13 & 14
Lumber products and manufacturing, differences between hardwood and softwood lumber.	Week 12	13	5 & 6
Structural and non-structural panels - plywood, OSB, decorative plywood, particle board, fibreboards.	Week 13 and part of 14	14 & 15	10
Composite lumber products	Part of week 14	16	10 & 19
Pulp and paper products, and wood as energy and chemical products	Week 15	17 & 18	
Silvicultural practices and wood quality, and course review	Week 16	12	

Requirements
Regular attendance to the lectures and participation in classroom discussion are required. Presence at each laboratory for this course is compulsory. A passing grade in the lab is required to pass the course. A medical note from your Doctor(s) is required for all excused absences. Mark will be deducted on the overdue assignment(s) and lab report(s) at a rate of 20% per day.

Evaluation (relative percentage):

Class Quizzes/Assignments	20%
Lab quizzes/Reports	20%
Midterm Exam	25%
Final Exam	35%
	100%

Alpha Grade	***4-Point Equivalent***	***Designation***
A+	4.0	*Excellent*
A	4.0	
A-	3.7	*First Class Standing*
B+	3.3	
B	3.0	*Good*
B-	2.7	
C+	2.3	*Satisfactory*
C	2.0	
C-	1.7	
D+	1.3	*Minimal Pass*
D	1.0	
F	0.0	*Fail*

Laboratory Schedule

Week	LAB #	DESCRIPTION
1	1	Lab schedule and introduction
2	2	Introduction to wood identification; Softwood identification
3	3	Softwood identification and the quiz. Starting Hardwood identification.
4	4	Hardwood identification & the quiz
5	5	Wood moisture content, swelling and specific gravity.
6	6	Testing wood mechanical properties
7		Winter break
8	7	Impact of different species, wood moisture content, & wood quality on wood mechanical properties.
9	8	Wood utilization – lumber production
10	9	Wood utilization – production of finger-joint lumber
11 12	10 10	Wood utilization – pulp and paper production
13	11	Wood utilization – OSB production
14	12	Wood utilization – Bio-energy
15	13	Open session

The detailed lab instruction will be distributed before each lab. Each student is expected to supply the following at each lab: **calculator**, pencils, eraser, some paper, and binder to record and hold data sheets.