

SAOLT COLLEGE OF APPLIED ARTS & TECHNOLOGY
SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: RAW MATERIALS AND TESTING
Code No.: PPE 151-5
Program: PULP AND PAPERMAKING OPERATIONS
Semester: SEMESTER I
Date: MARCH 1989
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New:

Revision:

APPROVED:


Chairperson

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Date

CALENDAR DESCRIPTION

RAW MATERIALS & TESTING

PPE 151-5

COURSE NAME

COURSE NUMBER

PHILOSOPHY/GOALS:

There are two major parts to this course. The first part is the theory portion that will provide the student with the information required to understand the biology of wood, how its quality affects pulp and paper properties, how it is grown and harvested, how it is processed at the mill before pulping and how it is stored. In addition, the cost of raw materials (wood, pulping and bleaching chemicals) will be dealt with.

The second part is a laboratory portion designed to develop some basic laboratory skills commensurate with those an entry-level employee may be required to use. Included in this part are tests to determine consistency, freeness, permanganate number, effective and active alkali and residual chlorine. Additionally, the students will be taught how to prepare paper handsheets and how to do some basic tests on them.

METHOD OF ASSESSMENT:

The total grade for this course will be based on the two major components. For the theory part, students will be graded on the basis of their performance on two tests, each worth 50 marks, given at appropriate intervals during the semester. The laboratory part will be graded on the basis of the student's performance on seven lab exercises, each worth 10 marks, and two lab tests, each worth 15 marks. Thus the total possible marks for the course will be 200. Students must successfully pass both parts of the course in order that credit be granted.

Letter grades will be assigned according to the standard Sault College system. Students having a final overall cumulative percentage in the theory part of the course of between 50 and 59% may be permitted to write a supplemental examination that will cover only the theory material from the entire course. There will be no opportunity to rewrite the lab portion of the course.

TEXTBOOK(S):

A prepared laboratory manual must be obtained from the College Bookstore for a modest fee. This manual is:

Lab Manual for PPE 011. Raw Materials & Testing.

In addition, a reference book will be required for this and other courses. This book is:

Smook, G., Handbook for Pulp & Paper Technologists. Joint Textbook Committee of the Paper Industry, CPPA, Montreal, 1982.

OBJECTIVES;

The overall educational objective of this course is that the student will be able to demonstrate basic knowledge of the nature, use and processing of woody raw material prior to pulping. Further, the student will demonstrate his or her ability to carry out a number of standard industry tests to the desired level of accuracy.

Specific educational objectives are as follows:

1. Demonstrate a basic knowledge of the biology of wood, how it is structured, how a tree grows and how forests are harvested.
2. Demonstrate a working knowledge of the major effects of wood qualities on pulp and paper properties.
3. Demonstrate a knowledge of the processes used to prepare wood for pulping, such as debarking, chipping and storage.
4. Demonstrate a knowledge of the processes used to prepare secondary fibre for use in a paper mill.
5. Demonstrate a knowledge of the cost, value and amount of all raw materials (including chemicals) used for pulp manufacture.
6. Demonstrate an ability to accurately perform a variety of physical tests on pulp.
7. Demonstrate an ability to accurately perform a variety of chemical tests on pulp and process liquors.
8. To be able to use simple statistical process control (SPC) principles to test the accuracy of all test results.

NATURE OF PRESENTATION:

The course will be given for 4 hours per week. It will consist of one single period for theory and one triple period for the lab activity. The lab period may be used at the instructor's discretion for the appropriate demonstrations, videos, films or special lectures.

TOPICS COVERED:

WEEK	TOPIC
1.	Introduction to course and topics covered Laboratory safety, behaviour and responsibility Introduction to lab exercises, use of equipment
2.	The biology of wood LAB 1. DETERMINATION OF MOISTURE FREE MASS OF PULP
3.	How wood quality affects pulp and paper LAB 1. Continued
4.	How trees grow, how forests are managed and cut LAB 2. FREENESS OF DIFFERENT PULPS Measuring the volume and mass of wood Log and chip transport LAB 2. Continued
6.	Theory Test 1 Preparing wood for pulping - overview LAB 3. PERMANGANATE AND KAPPA NUMBERS OF PULP Slashing to size Debarking, bark handling and disposal Lab Test 1
8.	Chippers and chipping Screening LAB 3. Continued
9.	Chip storage Chip delivery to pulping process LAB 4. CHEMICAL TESTS OF PROCESS LIQUORS

WEEK	TOPIC
10.	- Chip quality, its measurement and effects - Costs of poor chip quality - LAB 5. MAKING PAPER HANDSHEETS'
11.	- Chemical raw materials for pulping & bleaching - Chemical hazards and safety in the mill - LAB 5. Continued
12.	- Pulping chemicals: What? How much? Cost? - LAB 6. BASIC PAPER TESTING
13.	- Some practical problems from mill experience - LAB 7. PROBLEM SET
14.	- LAB 7. Continued
15.	- Review - Theory Test 2 - Lab Test 2