

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: BLEACHING, SCREENING & CLEANING

Code No.: PPE 160-4

Program: PULP AND PAPERMAKING OPERATIONS

Semester: SEMESTER II

Date: MARCH 89

Author: ADAM SUGDEN

New: X **Revision:**

APPROVED: 
Chairperson

Date

CALENDAR DESCRIPTION

BLEACHING, SCREENING & CLEANING

PPE 160-4

COURSE NAME

COURSE NUMBER

PHILOSOPHY/GOALS ;

This course deals with the technical aspects of pulp purification and includes the processes of pulp screening, pulp cleaning and pulp bleaching. The technologies of each of these types of processes will be investigated though the major emphasis will be placed on bleaching.

Screening requirements, equipment and basic theories will be covered. Process conditions, fundamental flow diagrams and material balances will be studied. Removal of contaminants from pulp by cleaning systems will be studied in terms of equipment and process conditions.

Pulp bleaching for both mechanical and chemical pulps will be studied in terms of basic theories, process types, conditions and process flows. The basic chemistry of bleaching and of the preparation of bleaching chemicals will be covered. Hazards associated with bleaching and required safety precautions will be emphasized.

METHOD OF ASSESSMENT :

Students will be graded on the basis of their performance in three tests given at appropriate intervals through the semester.

Letter grades will be assigned according to the standard Sault College system. Those students having a cumulative percentage between 50 and 59% may be permitted to write a supplemental test covering material from the entire course.

TEXTBOOK(S) ;

There is no specific textbook for this course though parts of the general reference book used in other courses will be required reading.

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 knowledge of the important theories, process conditions and results of pulp bleaching, screening and cleaning. Specific objectives include the following:

1. Demonstrate knowledge of the underlying basic theories of pulp screening and cleaning.
2. Demonstrate a knowledge of the function and operating principles of process equipment used in screening and cleaning.
3. Demonstrate knowledge of the correct placement of cleaning and screening equipment within process flow diagrams.
4. Perform simple material and flow balances through pulp screening and cleaning processes.
5. Demonstrate a knowledge of the basic theories of pulp bleaching.
6. Demonstrate knowledge of the bleaching processes used for mechanical and chemical pulps.
7. Demonstrate knowledge of the nature, preparation, hazards and safe handling practices of process chemicals used in pulp bleaching.
8. Demonstrate knowledge of equipment used and process flows of selected bleaching processes used for mechanical and chemical pulps.

NATURE OF PRESENTATION;

The course will be given for three hours per week in three single periods, The course is based on lectures and selected classroom exercises. One or two laboratory demonstrations of bleaching processes will be made in conjunction with PPE 026 (Paper Quality & Testing) to support the lecture material.

TOPICS COVERED:

WEEK	TOPIC
1.	<ul style="list-style-type: none">- Introduction to course and topics- The need for pulp purification
2.	<ul style="list-style-type: none">- Pulp screening: Why is it needed?- What happens? Theories- How do we screen?
3.	<ul style="list-style-type: none">- Types of equipment used in screening- Process conditions and limitations- Process flows and balances
4.	<ul style="list-style-type: none">- Pulp cleaning: Why is it needed?- What happens? Underlying theories- How is pulp cleaned?
5.	<ul style="list-style-type: none">- Types of equipment used in cleaning- Process conditions- Process flows and balances
6.	<ul style="list-style-type: none">- Test 1- Pulp bleaching- General theories
7.	<ul style="list-style-type: none">- Bleaching mechanical pulps- Processes used
8.	<ul style="list-style-type: none">- Chemical bleaching agents and reactions with pulp- Hazards and safety- Equipment used
9.	<ul style="list-style-type: none">- Dithionite bleaching of mechanical pulps- Peroxide bleaching of mechanical pulps
10.	<ul style="list-style-type: none">- Test 2- Bleaching chemical pulps and processes used
11.	<ul style="list-style-type: none">- Chemical bleaching agents and reactions with pulp- Process flows, conditions and control
12.	<ul style="list-style-type: none">- Hazards and safety- Oxygen bleaching
13.	<ul style="list-style-type: none">- Chlorination- Caustic extraction
14.	<ul style="list-style-type: none">- Chlorine dioxide bleaching- Peroxide bleaching- Test 3