

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

COURSE OUTLINE

COURSE TITLE: PULP TECHNOLOGY III

CODE NO.: PPE 242-4 **SEMESTER:** IV

PROGRAM: PULP & PAPER ENGINEERING TECHNOLOGY

AUTHOR: KEVIN PEVATO

DATE: MAY 1991 **PREVIOUS OUTLINE DATED:** MAY 1990

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TOTAL CREDIT HOURS: 64

PREREQUISITE:

I. PHILOSOPHY/GOALS:

This theory course deals with the post-pulping processes that are common to any type of pulp production, e.g. mechanical, semi-chemical or full chemical pulping. Processes examined in detail are: pulp screening, pulp washing, pulp cleaning, lignin preserving and lignin removal bleaching, pulp machine operation, pulp baling and finishing. Additionally, pulp mill effluent sources, their impact and handling will be dealt with.

II. STUDENT PERFORMANCE OBJECTIVES:

The overall educational objective of this course is that the student will be able to demonstrate broad knowledge of the technologies and theories of commonly used post-pulping unit processes.

1. Demonstrate working knowledge of coarse screening processes and equipment.
2. Demonstrate broad knowledge of pulp washing theories, processes and equipment.
3. Demonstrate broad knowledge of fine screening and pulp cleaning theories, process conditions and equipment.
4. Demonstrate broad knowledge of the theories, practice and process equipment used in lignin-preserving bleaching of high yield pulps.
5. Demonstrate broad knowledge of theories, practices, process flaws, parameters and equipment used in lignin-removal bleaching of low yield pulps.
6. Demonstrate working knowledge of pulp machine operations, pulp baling and finishing processes.
7. Demonstrate working knowledge of sources of mill effluent sources and their environmental impact.

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III. TOPICS TO BE COVERED:

TOPICS COVERED:

WEEK	TOPIC
1.	Introduction to course and topics covered General nature of post-pulping processes Objectives of post-pulping processes Pulp knotting Knotter types Pulp washing background Washer types
3.	Washer operation Washer balances Pulp screening Pulp screen types Pulp screen operations Pulp screen balances
5.	Pulp cleaning Types of cleaners Test 1 Pulp thickening Pulp storage Other concerns Pulp bleaching overview Reductive bleaching of mechanical pulps Processes used Preparation of bleach liquors Process conditions Equipment used Effects on pulp product

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WEEK	TOPIC
S .	- Oxidative bleaching of chemical pulps - Overview of processes involved - Test 2
10.	- Oxygen bleaching - Chlorination
11.	- Chlorine dioxide substitution in chlorination - Caustic extraction stages - Oxygen addition to caustic extraction
12.	- Hypochlorite bleaching - Chlorine dioxide bleaching
13.	- Preparation of bleaching chemicals
14.	- Peroxide bleaching - Ozone bleaching
15.	- Pulp machines - Pulp drying - Pulp baling
16.	- Review of effluent sources - Test 3

IV. EVALUATION METHODS: (INCLUDES ASSIGNMENTS, ATTENDANCE REQUIREMENTS ETC.)

Students will be graded on the basis of their performance in three tests to be given at appropriate intervals during the semester. The sum of these three tests will be worth 80% of the total mark for the course. The remaining 20% will be earned as a result of successful completion of selected assignments. These may include problem sets, brief reports or a seminar presentation.

Letter grades will be assigned as follows:

A+ = 90-100%, A = 80-89%, B = 70-79%, C = 60-69%, R = less than 60%

Students having a final standing of "R" and who have a course average of at least 55% may be permitted to write a supplemental test covering the theory part of the entire course.

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V. REQUIRED STUDENT RESOURCES:

A course manual, "Course Manual for PPE 242; Pulp Technology III" is in preparation. Sections will be available during the presentation of the course.

VI. ADDITIONAL RESOURCE MATERIAL AVAILABLE IN THE COLLEGE LIBRARY BOOK SECTION:

Useful reference books applicable to this course are as follows:

GENERAL: Smook, Handbook for Pulp & Paper Technologists.

SCREENING: Leask & Kocurek, Pulp & Paper Manufacture. Vol. 2
Mechanical Pulping.

BLEACHING: Singh, The Bleaching of Pulp.

VII. SPECIAL NOTES:

Nature of Presentation:

The course will be given for 4 hours per week using one double and two single periods. This format will allow the inclusion of guest speakers, seminars, etc. when required. Attendance at all sessions is a course requirement.

Students with special needs (e.g. physical limitations, visual impairments, hearing impairments, learning disabilities) are encouraged to discuss required accommodations confidentially with the instructor.

Your instructor reserves the right to modify the course as he/she deems necessary to meet the needs of students.