DOC.#379

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE: PULP TECHNOLOGY II

CODE NO.: PPE 245-4 SEMESTER: III

PROGRAM: PULP & PAPER TECHNOLOGY

AUTHOR: A. TUNNEY

DATE: AUGUST 1990 PREVIOUS OUTLINE DATED: AUGUST 1987

APPROVED: DEAN DATE

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PULP TECHNOLOGY II **PPE 245-4**

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TOTAL CREDIT HOURS: 64

PREREQUISITES(S): None

I. PHILOSOPHY/GOALS:

This is the second of three pulping technology courses. This course provides the student with the underlying theory of mechanical, chemi mechanical and semi chemical pulping processes. The effects of raw material properties, process parameters and equipment design upon the end-product properties and economics are important points discussed.

II. STUDENT PERFORMANCE OBJECTIVES:

1. Demonstrate a knowledge of fibre separation during pulping processes.

2. Be able to explain the effect of raw material properties on the pulp produced.

3. Be able to distinguish between the various specific types of pulping processes studied.

4. Be able to explain the underlying theory of mechanical, chemi mechanical and semi chemical pulping processes.

5. Be able to describe the specific processes used to make mechanical, chemi mechanical and semi chemical pulps and how these processes are controlled.

6. Be able to discuss the economic implications of the pulping processes studied.

7. Be able to explain how the major pieces of equipment associated with these processes operate.

8. Be able to explain the effect that pulping process has on the properties of the pulp produced.

III. TOPICS TO BE COVERED:

1. Introduction to Course.
2. An overview of mechanical pulping.
3. Chemistry of wood in mechanical pulping.
4. Basic mechanical pulping.
5. Chemi mechanical pulping.
6. Semi chemical pulping.

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IV. LEARNING ACTIVITIES	**REQUIRED RESOURCES**
1.0 INTRODUCTION TO PULP TECHNOLOGY II	
1.1 Review of wood structure, wood chemistry and interfibre bonding	
1.2 Review of chemical pulping	
2.0 AN OVERVIEW OF MECHANICAL PULPING	
2.1 Historical Development	
2.2 Industry overview (World, Canada and Ontario)	
2.3 Raw materials used	
2.4 Nature of products, volume and value	
3.0 CHEMISTRY OF WOOD IN MECHANICAL PULPING	
3.1 Interfibre bonds and lignin	
3.2 Glass transition temperature of lignin	
3.3 Wood strength versus temperature	**TEST I - Sections 1 - 3**

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4.0 BASIC MECHANICAL PULPING

- 4.1 Principles of groundwood pulping
- 4.2 Stone groundwood processes
- 4.3 Pressurized groundwood processes
- 4.4 Principles of refiner pulping
- 4.5 Refiner pulping processes
- 4.6 Thermo mechanical pulping processes
- 4.7 Physical & optical properties of mechanical pulps
- 4.8 Economics of mechanical pulping — TEST II, Section 4

5.0 CHEMI-MECHANICAL PULPING PROCESSES

- 5.1 Principles of chemi-mechanical pulping
- 5.2 Chemi-stone groundwood
- 5.3 Chemi-refiner groundwood process
- 5.4 Chemi-thermomechanical pulp process
- 5.5 Physical & Optical properties of chemi-mechanical pulps
- 5.6 Economics of chemi-mechanical pulp

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6.0 SEMI-CHEMICAL PULPING

6.1 Principles of semi-chemical pulping

6.2 Neutral sulphite semi-chemical pulping process

6.3 Soda pulping process

6.4 Non-sulphur pulping process

6.5 Physical & Optical properties of semi-chemical pulps

6.6 Economics of semi-mechanical pulps.

TEST III, Section 5 & 6

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V. EVALUATION METHODS:

A final grade will be derived from the results of three tests and at least one assignment, as calculated below.

3 tests (equal value) 90%
Assignments 10%

The grading system will be as follows:

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

Students with a final grade of 55-59% will be permitted to write a comprehensive supplemental exam.

VI. REQUIRED STUDENT RESOURCES:

There is no textbook for this course at present. However, the students are urged to consider the first reference book listed below.

VII. ADDITIONAL RESOURCE MATERIALS AVAILABLE IN THE COLLEGE LIBRARY:

Leask, R.A. & Kocurek, M.J. Eds. Pulp and Paper Manufacture 3rd Edition, Vol. 2: Mechanical Pulping. Joint Textbook committee, CPPA Montreal, 1987. T.S. NOS. P87 V.2.

Periodical section -

TAPPI Journal
Pulp & Paper Journal

VIII. SPECIAL NOTES

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.