

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

COURSE OUTLINE

Course Title: PULP TECHNOLOGY II
Code No.: PPE 245-4
Program: PULP & PAPER TECHNOLOGY
Semester: III
Date: 1983-08-18
Author: E.A.I. SUGDEN

New:

Revision:

APPROVED:


Chairperson

Date / '

CALENDAR DESCRIPTION

PULP TECHNOLOGY II

PPE 245-4

Course Name

Course Number

PHILOSOPHY/GOALS:

This is a theory course designed to provide the student with background and understanding of the mechanical and semi-chemical pulping processes and equipment. The student will know the raw material requirements and limitations of the processes; the effects of process variables on product quality; a broad knowledge of the mechanical pulping segment of the industry; and will know and be able to trace various post-pulping processes, eg. screening, thickening, storing, refining, cleaning and bleaching. An important attribute of this course will be the recognition of the quantity, quality and economic interactions between all process variables.

METHOD OF ASSESSMENT (GRADING METHOD):

Students will be graded on the basis of their performance in 4 tests to be given at appropriate intervals during the semester. Each test will be worth 25% of the final mark. Letter grades will be assigned as follows:

A = 80 + %

B = 70 - 79%

C = 59 - 69%

R = -59%

Students having an final standing of R and who have a course average of at least 55% will be permitted to write a supplemental test.

TEXTBOOK(S):

Macdonald, R.G. & Franklin, J.N. eds., The Pulping of Wood, Pulp & Paper Manufacture Series, Vol. I, McGraw-Hill, New York, 1969.

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OBJECTIVES:

Upon completion of the course the student will:

1. Understand the theory of mechanical, chemi-mechanical and semi-chemical pulping processes and will be able to differentiate between them.
2. Understand the basis of operation of equipment used in the above processes.
3. Know the raw material requirements and limitations of each process.
4. Possess a broad overview of the mechanical pulping segment of the industry in Ontario, Canada and internationally.
5. Know the effects of process variables on quantity, quality and economic viability of products from each process.
6. Know and be able to trace various post-pulping processes including those of screening, thickening, storing, refining, cleaning and bleaching. Furthermore, the student will understand the quality, quantity and economic interaction between these processes.

NATURE OF PRESENTATION:

This is a theory course consisting of three separate meetings per week. One meeting consists of a nominal 2-hour period. At appropriate times, this period may be used for short field trips.

COURSE TOPICS:

<u>Week</u>	<u>Topics Covered</u>
1	<u>INTRODUCTION TO PULP TECHNOLOGY II</u> <ul style="list-style-type: none">- Discussion of scope of course- Reasons and objectives of course- Prior experience- Review of wood structure, interfibre bonds, roles of lignin, cellulose, hemicellulose, and extractives.- Review of chemical pulping from earlier courses.

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COURSE TOPICS:

<u>Week</u>	<u>Topics Covered</u>
2	<u>MECHANICAL PULPING - AN OVERVIEW</u> <ul style="list-style-type: none">- Historical development- World industry- Canadian industry- Ontario industry- Raw materials- Nature of products, volume and value
3	<u>MECHANICAL PULPING PROCESSES - INTRODUCTION</u> <ul style="list-style-type: none">- Fibre - to - fibre bonds and lignin- Glass transition temperature of lignin- Wood strength versus temperature- How temperature is applied in pulping<ul style="list-style-type: none">- friction, vibration, rotational energyall give heat
4-6	<u>MECHANICAL PULPING PROCESSES - BASIC PROCESSES</u> <ul style="list-style-type: none">- Stone groundwood (SGW and PGW)- Refiner groundwood (RGW and TMP)- Examine these in light of stone and refiner parameters, eg. grit size, sharpness, burr pattern, refiner plates, energy, wood, water, yield, quality, uses of product, pollutants
7-9	<u>CHEMI-MECHANICAL PROCESSES</u> <ul style="list-style-type: none">- Chemi-stone groundwood (CSGW)- Chemi-refiner groundwood (CRGW)- Chemi-thermomechanical pulp (CTMP)- Examine in light of processes, additives, yields, economics, energy, quality, uses, pollutants
10-11	<u>SEMI-CHEMICAL PULPING PROCESSES</u> <ul style="list-style-type: none">- Neutral sulphite semi-chemical (NSSC)- Soda pulping- Non-sulphur pulping- Examine as above

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COURSE TOPICS:

<u>Week</u>	<u>Topics Covered</u>
12-16	<u>POST-PULPING PROCESSES FOR ALL PULPS</u> <ul style="list-style-type: none">- Screening- Thickening- Storing- Post refining and cleaning- Bleaching

EVALUATION:

Students will be graded on the basis of thier performance on 4 tests to be given at appropriate intervals during the semester. These will be announced. Each test will be worth 25% of the final mark. Letter grades will be assigned as follows:

A = 80+%
B = 70-79%
C = 59-69%
R = -59%

Students with a final standing of R and having a course average of at least 55% will be permitted to write a supplemental test.

TEXTBOOK:

Macdonald, R.G. & Franklin, J.N. eds., The Pulping of Wood, Pulp & Paper Manufacture series, Vol. I, McGraw-Hill, New York, 1969.

REFERENCES:

Rydholm, S.A., Pulping Processes, Interscience, New York, 1961.

Britt, K.W. ed., Handbook of Pulp and Paper Technology, 2nd Edition, Van Nostrand, New York, 1970.