

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: RECYCLING AND CONVERTED PRODUCTS

Code No.: PPE 362-5

Program: PULP & PAPER ENGINEERING TECHNOLOGY

Semester: 4 (or 6 in alternate years)

Date: MAY 1988

Author: ADAM SUGDEN

New: Revision: X

APPROVED:  Chairperson

Unci Date **f** iL6M 12/12

CALENDAR DESCRIPTION

Recycling & Converted Products
Course Name

PPE 362-5
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PHILOSOPHY/GOALS: This course deals with the growing importance of the use of secondary fibre through the process of recycling. Operations considered are the collection, re-pulping and cleaning of secondary fibre; recycling processes and their effect on product quality and economics and specific tests that are useful to measure quality of secondary fibre and recycled papers. In addition/ the converting processes used to manufacture corrugated board, sanitary tissues, folding boxes and absorbent products are studied as examples of the wide variety of converting technologies used in the paper industry.

METHOD OF ASSESSMENT (GRADING METHOD): Students will be graded on the basis of their performance in three tests to be given at appropriate intervals during the semester. Each of the tests will be of equal value. 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% will be permitted to write a supplemental test of the theory part only.

TEXTBOOK(S): A new reference book (Hamilton & Leonard (eds.) Pulp and Paper Manufacture: Vol. 3 Secondary Fibres and Non-Wood Pulping. Joint Textbook Committee, CPPA, Montreal, 1987.) will be very useful for the recycling portion of the course. The general reference book by Smook (Handbook for Pulp & Paper Technologists) will be useful for the converting part of the course.

PPE 362

RECYCLING AND CONVERTED PRODUCTS

OBJECTIVES:

The overall educational objectives of this course are that: (1) the student will be able to demonstrate knowledge of the theory, practice and control of all aspects of use and properties of secondary fibre and (2) the student will be able to demonstrate knowledge of selected converting technologies. More specific objectives are as follows:

1. Demonstrate knowledge of the basic concepts of conservation of fibrous raw materials and energy through use of recycling processes.
2. Demonstrate knowledge of the negative role of contaminants in secondary fibre upon recycled paper and paperboard.
3. Demonstrate knowledge on how contaminants are removed.
4. Demonstrate knowledge of the effects of continued recycling on properties of paper and paperboard.
5. Demonstrate knowledge of the basic theories and operations of the conversion of paper and paperboard to finished products.
6. Demonstrate specific knowledge of how corrugated board, corrugated cartons, sanitary tissues, folding boxes and absorbent products are made.
7. Demonstrate ability to extrapolate knowledge of known converting processes and apply it to solving problems in other converting operations.

NATURE OF PRESENTATION:

The course will be given for 4 hours each week in two double periods. This format will allow extended discussions of specific topics as well as the use of guest speakers etc. where applicable. Most of the material will be presented in lecture format. However, problems and other assignments will be used to support the lecture material.

TOPICS COVERED:

WEEK	TOPIC
1.	<ul style="list-style-type: none">- Introduction of course and topics- Nature and size of recycling in Canada- Products made, tonnages, recovery rates- Sources, collection and costs of fibre- Mills, location and ownership
2.	<ul style="list-style-type: none">- Contaminants in secondary fibre- Sources of contaminants- Means of separation- Effects of contaminants on processes and products
3.	<ul style="list-style-type: none">- Contaminant removal- Recycling processes, an overview- Continuous repulper and ragger- Deinking theory and processes
4.	<ul style="list-style-type: none">- Wet-strength resin removal- Screening and cleaning- Paper machine maintenance, machine clothing- Other problems
5.	<p>Effects of recycling Changes in strength properties of paper Changes in optical properties of paper Changes in fibre length distribution Test 1</p>
6.	<ul style="list-style-type: none">- Additives used or required- Broadening base of products made- Cost-effectiveness of recycling- Environmental and social implications
7.	<ul style="list-style-type: none">- Specific tests for recycled paper and paperboard- Contaminant identification- Fibre identification- Surface "wettability" and absorption
8.	<ul style="list-style-type: none">- Reasons for converting- Wet converting processes, an overview- Converting industry, size, location etc.- Economic processes

Processes selected for detailed study
Corrugated containers
Product requirements
Raw materials, grades, properties, authorities
Manufacture of corrugated board
Manufacture of corrugated cartons

Test 2

Manufacture of folding boxes
Product requirements, raw material needs
Equipment and processes used
Sanitary tissue manufacture
Product and raw material requirements
Equipment and processes used
Specific tests

Absorbent products

Product and raw material requirements
Equipment and processes used
Consumer acceptance

Printing and its role in product acceptance

Printing processes
Equipment and substrate properties
Inks, varnished etc.

Package design parameters
Economics of packaging

Test 3