

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

COURSE OUTLINE

COURSE TITLE: RECYCLING AND CONVERTED PRODUCTS

CODE NO: PPE 362-4 **SEMESTER:** IV (VI - ALT. YEARS)

PROGRAM: PULP & PAPER ENGINEERING TECHNOLOGY

AUTHOR: ADAM SUGDEN

DATE: MAY 1990 **PREVIOUS OUTLINE DATED:** MAY 1988

APPROVED:

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DATE

RECYCLING & CONVERTED PRODUCTS

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TOTAL CREDIT HOURS: 64

PREREQUISITE: NONE

I. PHILOSOPHY/GOALS:

This course deals with the practical, political and economic 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.

II. STUDENT PERFORMANCE 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.

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COURSE NAME

PPE 362-4
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III. TOPICS TO BE 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.	<ul style="list-style-type: none">- Effects of recycling- Changes in strength properties of paper- Changes in optical properties of paper- Changes in fibre length distribution- Test 1
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

III. TOPICS TO BE COVERED (Continued):

WEEK	TOPIC
9.	<ul style="list-style-type: none">- Processes selected for detailed study- Corrugated containers- Product requirements- Raw materials, grades, properties, authorities
10.	<ul style="list-style-type: none">- Manufacture of corrugated board- Manufacture of corrugated cartons
11.	<ul style="list-style-type: none">- Test 2- Manufacture of folding boxes- Product requirements, raw material needs- Equipment and processes used
12.	<ul style="list-style-type: none">- Sanitary tissue manufacture- Product and raw material requirements- Equipment and processes used- Specific tests
13.	<ul style="list-style-type: none">- Absorbent products- Product and raw material requirements- Equipment and processes used- Consumer acceptance
14.	<ul style="list-style-type: none">- Printing and its role in product acceptance- Printing processes- Equipment and substrate properties- Inks, varnishes etc.
15.	<ul style="list-style-type: none">- Package design parameters- Economics of packaging- Test 3

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PPE 362-4

COURSE NAME

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

Students will be graded on the basis of their performance on three tests and two assignments. The tests are of equal value and represent 75% of the final mark. The assignments represent 25% of the final mark.

Final 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.

V. REQUIRED STUDENT RESOURCES:

There is no textbook for this course. However, a course manual, "Course Manual for PPE 362, Recycling and Converted Products" is in preparation. Sections will be available during the presentation of the course.

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

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.

The student is also directed to the contents of the following journals found in the library or through faculty collections.

Pulp & Paper Canada

TAPPI

Canadian Pulp and Paper Journal

Pulp & Paper

Paper Age

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COURSE **NAME**

PPE 362-4
CODE NO.

VII. SPECIAL NOTES:

NATURE OF PRESENTATION

The course will be given for 4 hours each week in two single and one double period. 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.