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 (in 1985 only, also given in Semester 6)

Date: October 15, 1984

Author Adam Sugden

New: Revision:

APPROVED: _____

Chairperson Date

CALENDAR DESCRIPTION

Rpryrling ft Converted Products PPE 362-5
Course Name Course Number

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.

While the course will primarily be one based on theory, there will be a minor laboratory component involved.

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 test will be worth 20% of the final mark. The remaining 40% of the mark will be based on the completion of 4 laboratory exercises, each worth 10%. Letter grades will be assigned as follows:

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

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): There is no suitable textbook available for this course at present. A laboratory manual will be available outlining the four lab. exercises and a reference list will be given to each student at the beginning of the course.

PPE 362

RECYCLING AND CONVERTED PRODUCTS

OBJECTIVES:

The student, upon completion of the course will be able to demonstrate his or her understanding of the basic concepts of conservation of raw materials and energy through the processes involved with recycling. The role of contaminants in secondary fibre, their removal and their effect on the finished product will also be studied. The student will be able to show understanding of the effect of recycling on fibrous raw materials. By means of laboratory exercises the student will investigate the use of chemical additives as aids to fibre recovery; the change in physical properties of recycled products as well as some specific tests used for recycled papers.

The basic operations of converting paper and paperboard to finished products will be studied. From some selected processes the student will be able to obtain the knowledge and understanding of how these processes work, what their limitations are, the properties of the products and the method by which the processes are controlled. From these examples, the student will be able analyze requirements for other similar converting systems.

NATURE OF PRESENTATION:

The course will be given for 5 hours per week using two 2-hour periods plus a single 1-hour period. This format will allow the laboratory component of the course to be fitted in as required during the semester. When possible, invited speakers will be used to provide more specific coverage of this important segment of the industry.

TOPICS COVERED:

A. RECYCLING

Topic Number	Topic
1.	INTRODUCTION

- Nature and size of industry in Canada
- Products made, tonnages, recovery rates
- Sources, collection and costs of fibre
- Mills, location and ownership

2. CONTAMINANTS IN PAPER

- Sources of contamination
  Means of separation
  Effect of contaminants on process and product
  Contaminant removal

RECYCLING PROCESSES

- Continuous pulper and ragger
- Deinking, washing, flotation
- Wet-strength resin removal
- Screening and cleaning
- Paper machine maintenance, machine clothing

EFFECTS OF RECYCLING

- Changes in strength properties of paper
- Changes in optical properties of paper
- Changes in fibre length distribution
- Additives used or required

MARKETS & ECONOMICS

- The broadening base of products made
- Cost-effectiveness of recycling
- Environmental and social implications

SPECIFIC TESTS FOR RECYCLED PAPER AND BOARD

- Contaminant identification
- Fibre identification, types, sources
- Surface "wettability"
- Water absorption

B. CONVERTED PRODUCTS

INTRODUCTION

- Definition of converting
- Reasons for converting
- Converting industry, size, location, distribution
- Economic factors
- Selected processes

CORRUGATED CONTAINERS

- Product requirements
- Raw materials, grades, properties, authorities
- Equipment
- Processes involved (corrugating, bonding,cutting, adhesion)

SINGLE-PLY BOXES

- Product requirements
- Raw material properties and needs
- Equipment and processes used
- Finishing (printing, laminating, overlaying)
- Specific tests of use with this product type

TISSUE MANUFACTURE

- Product requirements
- Raw materials for strength and softness
- Additives needed (wet strength resins, dyes)
- Equipment and processes used
- Packaging and distribution
- Specific tests for this type of product

MISCELLANEOUS PRODUCTS

- Absorbent products
- Carbon paper
- Non-carbon reproducing
- Moulded pulp products

PACKAGE DESIGN PARAMETERS

- Technical and marketing requirements
- Design process
- Limiting factors
- Economic implications

PRINTING

- Processes involved (Letterpress, offset, gravure)
- Inks and other raw materials
- Equipment
- Quality control and tests