

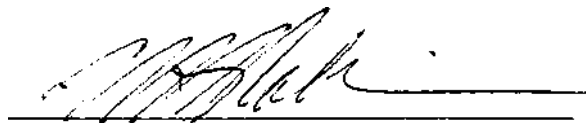
SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY  
SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: PAPER TECHNOLOGY II  
Code No.: PPE 340-5  
Program: PULP & PAPER ENGINEERING TECHNOLOGY  
Semester:  
Date: November 15, 1984  
Author Adam Sugden

New: x Revision:

APPROVED:



Chairperson

^E-12/H

Date

CALENDAR DESCRIPTION

Paper Technology II

PPE 340-5

Course Name

Course Number

PHILOSOPHY/GOALS:

The pre-requisite to this course is PPE 240 (Paper Technology I), which covered aspects of papermaking up to and including the formation of paper on the machine.

This course deals with papermaking technology from the press section through to the end of the dryer section. It includes press configurations, press roll designs and materials, machine clothing design and construction, felt conditioning equipment and processes, and the theoretical aspects of water removal by pressing.

The theoretical aspects of water removal through evaporative drying and the economy of drying will be studied. In addition, the technology of condensate removal systems, steam control, pocket ventilation, hood designs, steam economy and heat recovery will be investigated.

METHOD OF ASSESSMENT (GRADING METHOD):

The student's performance in this course will be assessed on the basis of his or her performance on three (3) tests and one (1) term report, each of which will be worth 25% of the final grade. 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 covering the theory part of the course.

TEXTBOOK(S):

Unfortunately, at the time of writing, there is no totally suitable textbook for this course. However, the student should refer to the list of reference books provided at the commencement of the semester.

PPE 340

PAPER TECHNOLOGY II

OBJECTIVES:

The student will be able to trace the flow of the paper web through the paper machine from the couch roll to the exit from the dryer. The various scientific principles involved with water removal from the sheet (by pressing and evaporation) will be studied. The student's ability to fully understand these mechanisms will be evaluated by means of specific test questions.

The associated technologies of press design, configuration and operation together with a basic understanding of wet press felt construction and properties will be learned. Aspects of sheet transfer between sections of the paper machine together with dryer design and technology will be covered. A full understanding of the principles of paper machine drive systems will be obtained and evaluated.

NATURE OF PRESENTATION:

The course will be given for 5 hours per week in three 1-hour periods plus one 2-hour segment. When possible, invited speakers will present information based on their industrial experience in order to supplement the theory aspects of the course.

TOPICS COVERED:

Topic Number

Topic

1.

INTRODUCTION

- Scope of the course
- Review of fibre treatment and paper formation

2.

PRINCIPLES OF WATER REMOVAL BY PRESSING

- Viscosity of water
- Effects of temperature on water removal
- Differential absorptivity of felt and paper
- Effects of capillary size and felt structure
- Felt conditioning effects

PRESS SECTION

- Purpose of the press section
- Press configurations
- Press roll design and materials of construction
- Wet press felt manufacture and qualities

PRESS SECTION (Cont'd,)

- Wet felt cleaning systems
- Press drive section
- Control systems
- Evaluation of performance and efficiency

PRINCIPLES OF WATER REMOVAL AT DRYERS

- Definition of terms
- Theory of evaporation
- Thermodynamics

DRYER SECTION

- Design and materials
- Configurations and modifications
- Dryer cylinders
- Dryer drive systems
- Steam and condensate removal systems
- Dryer pocket ventilation
- Dryer fabric design and construction

STEAM ECONOMY AND HEAT RECOVERY

- Processes and equipment
- Economies, Sankey diagrams

COSTS OF WATER REMOVAL

- Cost/ton of paper produced
- Effect of increasing solids content in presses

ALTERNATIVE DRYING METHODS

- Infrared dryers
- Airborne dryers
- Air-through drying
- Microwave drying