

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



Sault College

COURSE OUTLINE

COURSE TITLE: PAPER MANUFACTURE

CODE NO. : PPE 110-4 **SEMESTER:** 2

PROGRAM: PULP AND PAPER MAKING OPERATIONS,
PULP AND PAPER ENGINEERING TECHNICIAN,
PULP AND PAPER ENGINEERING TECHNOLOGY

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DATE: Dec. 1999 **PREVIOUS OUTLINE DATED:** NEW

APPROVED:

DEAN

DATE

TOTAL CREDITS: 4

PREREQUISITE(S): NONE

LENGTH OF

COURSE: 15 WEEKS **TOTAL CREDIT HOURS:** 45

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For additional information, please contact
School of
(705) 759-2554, Ext.

I. COURSE DESCRIPTION:

This course is designed to provide the student with the basic knowledge of the entire papermaking process starting with the nature of the fibres and stock preparation. It progresses through stock proportioning and use of chemical additives to stock delivery on the paper machine. Wet-end papermaking specifics for single and twin wire fourdrinier type machines as well as cylinder machines will be covered.

Press types and their operation, wet press felts and felt cleaning will be studied. Paper dryers, their operation and energy consumption will be explored. Size presses, on-machine controls, overall operation and paper quality will also be studied.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

1. Indicate a knowledge of stock preparation

Potential Elements of the Performance:

- Define stock preparation
- Explain why pulpers are used
- Describe the operation of a pulper
- Explain why refiners are used
- Describe the operation of a refiner
- Name five common additives and explain why they are used
- Explain colour and how it is measured
- Perform simple stock flow calculations

2. Understand approach piping

Potential Elements of the Performance:

- Explain the function of the fan pump
- Explain why stock valves are used
- Explain the operation of a pressure screen
- Explain the operation of cleaners
- Know what a dearator is and why it is used
- Describe the function of a flow spreader
- Define jet / wire ratio
- Explain L / b ratio
- Describe pressure formation and its affect upon sheet properties

- Describe how the slice is adjusted

3. Show a knowledge of paper machine formers

Potential Elements of the Performance:

- Explain why the forming section is important
- Describe "good" formation and how to easily recognize it
- List six drainage variables and explain their effect on formation
- Distinguish between foils and flatboxes
- Draw a diagram of and explain harmonic rhythm
- List three types of devices used to induce controlled drainage in the forming section
- Calculate water removal rates

4. Indicate a knowledge of presses

Potential Elements of the Performance:

- Explain how water is removed in a press
- Define a nip
- List ten pressing variables
- Sketch a four nip press
- Explain why uhle boxes are used
- Explain the purpose of bowed rolls
- Explain why nip impressions are taken

5. Show a knowledge of drying

Potential Elements of the Performance:

- Describe the two main activities in the dryers
- Describe the two forms in which water is found in paper
- Name the three dryer stages
- Using a diagram, illustrate the activity of condensate in a dryer can as speed increases
- Distinguish between the two types of dryer section designs
- Explain the function of pocket ventilation
- Explain the purpose of a separator
- Describe how a thermocompressor works
- Distinguish between wet and dry felts

6. Indicate a knowledge of reeling and the importance of quality

Potential elements of the performance:

- Explain the function and purpose of the reel
- Explain why a scanner is used

- Explain why quality is important
- Define ISO and "Total Quality Management"

III. TOPICS:

1. Overview and Background
2. Stock Preparation
3. Approach Piping
4. Formers
5. Presses
6. Dryers
7. Reeling
8. Quality

REQUIRED RESOURCES/TEXTS/MATERIALS:

- IV.** Tunney, Anne, "Study Guide for PPE 110 Paper Manufacture"
Sault College of Applied Arts and Technology, Sault Ste. Marie, 1991

V. EVALUATION PROCESS/GRADING SYSTEM:

A final grade in this course will be based on the results of three tests weighted equally.

The following semester grades will be assigned to students in postsecondary courses:

<u>Grade</u>	<u>Definition</u>	<u>Grade Point Equivalent</u>
A+	90 - 100%	4.00
A	80 - 89%	3.75
B	70 - 79%	3.00
C	60 - 69%	2.00

R (Repeat)	59% or below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field placement or non-graded subject areas.	
X	A temporary grade. This is used in limited situations with extenuating circumstances giving a student additional time to complete the requirements for a course (see <i>Policies & Procedures Manual - Deferred Grades and Make-up</i>).	
NR	Grade not reported to Registrar's office. This is used to facilitate transcript preparation when, for extenuating circumstances, it has been impossible for the faculty member to report grades.	

VI. SPECIAL NOTES:

Special Needs:

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with the instructor and/or contact the Special Needs office, Room E1204, Extension 493, 717, or 491 so that support services can be arranged for you.

Retention of course outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Disclaimer for meeting the needs of learners:

The Professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in the course should consult the instructor.