DOC.#349

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE: PAPER QUALITY

CODE NO.: PPE166-2 **SEMESTER:** TWO

PROGRAM: PULP AND PAPERMAKING OPERATIONS

AUTHOR: KEVIN PEVATO

DATE: JUNE 1992 **PREVIOUS OUTLINE DATED:** NEW

APPROVED: DEAN, SCHOOL OF SCIENCES & NATURAL RESOURCES — DATE d9 /99£

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TOTAL CREDIT HOURS: 32

PREREQUISITE(S): None

I. PHILOSOPHY/GOALS:

This course is designed to be the theoretical portion which compliments a lab component (Paper Testing - PPE167). The two courses can be studied in lieu of Paper Quality and Testing PPE165.

The philosophy of this course is to provide the student with theory as it relates to Paper Quality. The course is divided into the four main paper testing categories; strength, surface, optical, and permeability. The test methods associated with each of the paper properties will be referenced.

The goal is to provide the student with the knowledge and understanding of tests conducted on a finished sheet of paper which are used to monitor paper quality.

Process control is tied directly to quality and paper testing. Therefore, the final section will briefly highlight the use of Statistical Process Control in the paper industry. the concept of a "Zone Control Chart" is presented as a statistical tool used in some paper mill applications.

II. STUDENT PERFORMANCE OBJECTIVES:

Upon successful completion of this course the student will be able to:

1. Demonstrate knowledge of the value of paper properties as a means of predicting paper end-use performance.
2. Demonstrate the importance of proper sampling procedures and paper conditioning.
3. Explain the theory associated with strength determinations of paper with respect to basis weight, burst, tensile, stiffness and tearing resistances.
4. Explain the theory associated with surface determinations of paper with respect to smoothness, pick strength, and abrasion resistance.
5. Explain the theory associated with optical determinations of paper with respect to brightness, opacity, gloss and colour.
6. Explain the theory associated with permeability of paper with respect to determinations sizing degree, oil resistance, water absorbency, grease resistance, air resistance, and water vapour permeability.
7. Explain the value and use of Statistical Process Control in maintaining paper quality and process control
8. Demonstrate the use of Zone Control Charts as a statistical tool which can be used for process control.

PAPER QUALITY **PPE166-2**

COURSE NAME **COURSE NUMBER**

III. TOPICS TO BE COVERED:

Introduction to Paper and Paperboard Testing:

- Introduction to course content
- Reasons for Testing paper and paperboard
- Importance of Sampling and Conditioning

Mechanical and Strength Properties and Testing:

- Basis Weight
- Caliper
- Density and Bulk
- Tensile Strength, Stretch, and Tensile Energy Absorption
- Tear Strength
- Burst Strength
- Folding endurance
- Stiffness

Surface Properties and Testing:

- Roughness or smoothness
- Pick strength
- Abrasion resistance

Optical Properties and Testing:

- Brightness
- Opacity
- Gloss
- Colour

Permeability Properties and Testing:

- Water Resistance
- Grease Resistance

Statistical Process Control:

- The value of SPC in process control
- Zone Control Charts

PAPER QUALITY **PPE166-2**

COURSE NAME **COURSE NUMBER**

IV. EVALUATION METHODS:

The suggested evaluation method for this course is two written tests, each test equally weighted;

Test 1	50%
Test 2	50%
Total	100%

Test 1
- Introduction
- Physical and Mechanical strength
- Surface Properties

Test 2
- Optical Properties
- Barrier and Resistance Properties
- Statistical Process Control

V. REQUIRED STUDENT RESOURCES:

A course study guide, Paper Quality - PPE166, by Kevin Pevato, must be obtained from the College bookstore.

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

The following book is available in the College Library and if you work in the area of paper testing, you may want to add it to your or your Company's library. It is a good general reference texts for this subject matter:

Scott, William E. and Trosset, Stanley, Properties of Paper, Tappi Press, TAPPI, 1989. Library Reference Number TS 1121.S28 1989. ISBN 0-89852-052-5

Smook, G. A., Handbook for Pulp and Paper Technologists, Joint Textbook Committee of the Pulp and Paper Industry of the United States and Canada, Canadian Pulp and Paper Association, 1982.

Britt, Kenneth W., Handbook of Pulp and Paper Technology, Second Edition, van Nostrand Reinhold Company, Litton Education Publishing Inc., 1970. ISBN 0-0442-15645-6

PAPER QUALITY **PPE166-2**

COURSE NAME **COURSE NUMBER**

VI. ADDITIONAL RESOURCE MATERIALS AVAILABLE IN THE COLLEGE LIBRARY BOOK SECTION: (cont'd)

Jaehn, Alfred H.: "How to plan a control chart program" TAPPI 74(9):299 (1991); "Control charts that get your signals straight" TAPPI 71(4):215; "Zone Control Charts: a new tool for quality control" TAPPI 70(2):159 (1987) .

Sugden, E.A.N., Pulp and Paper Testing Methods, First Collected Edition, Sault College, 1989. (available in bookstore).

Canadian Pulp and Paper Standard Testing Method

TAPPI Test Methods

This book is currently not available in the bookstore, however, it can be ordered. I found it very informative and detailed when writing the Optical Property section of the manual.

Hunter, Richard S., The Measurement of Appearance, Wiley-Intersicenc^^ Publication, John Wiley & Sons Inc., 1975. ISBN 0-471-42141-3

The following pamphlet which provides additional information on optical properties can be obtained by contacting Hunter Lab at (703) 471-6870.

Another book which I suggest that you investigate if you are interested in the area of Statistical Process Control is: Jaehn, Al, Focus on Quality, "A guide to quality improvement in the pulp and paper industry", Tappi Press, TAPPI, 1989.

VII. SPECIAL NOTES:

Students with special needs (e.g. physical limitations, visual impairments, hearing impairments, learning disabilities) are encouraged to discuss required accommodations confidentially with the instructor.

Your instructor reserves the right to modify the course as he/she deems necessary to meet the needs of students.