

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

COURSE OUTLINE

Course Title PAPER TESTING
Code No. : PPE 241-4
Program: PULP & PAPER ENGINEERING TECHNOLOGY
Semester:
Date: JANUARY 13, 1984
Author: ADAM SUGDEN

New :

Revision:

APPROVED



Chairperson



Date

CALENDAR DESCRIPTION

PAPER TESTING

PPE 241-4

Course Name

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PHILOSOPHY/GOALS:

A laboratory course through which the student will become familiar with sampling techniques and procedures for the preparation of samples for testing. Building on these basic skills, the student will learn how to perform a wide variety of standard tests to determine quantity, strength, optical, absorptive, surface and certain chemical properties of paper. Comparisons of commercial pulps and papers will be made using all of the developed skills. The majority of the testing procedures will be drawn from the Standard methods published by the Technical Section of the Canadian Pulp and Paper Association.

METHOD OF ASSESSMENT (GRADING METHOD):

The completion of numerous assigned laboratory exercises and the preparation of acceptable reports following a defined standard will constitute 80% of the final grade for the course. The completion of all laboratory exercises is a mandatory requirement. The remaining 20% of the grade will be based on one or more laboratory tests that concentrate on the theoretical aspects of paper testing.

Letter grades will be assigned based on the following performances:

A = 79+%
B = 70 - 79%
C = 60 - 69%
R = -60%

Students having a final standing of 55-59% will be permitted to write a supplemental test on the theory part only.

TEXTBOOK(S):

Standard Methods, Technical Section, Canadian Pulp and Paper Association,
Montreal, 1983.

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PAPER TESTING

OBJECTIVES

1. Upon completion of the course, the student will have learned how to sample a shipment of paper and how to prepare samples for testing. Such techniques take into consideration statistical approaches as well as the overall requirement for sensible and representative test specimens.
2. The student will continue to develop familiarity with the nature, scope and use of Standard Methods issued by the Canadian Pulp and Paper Association as well as certain Standards of other national authorities.
3. The student will have learned how to process pulps in both the Valley Beater and PFI Mill; how to determine a wide range of physical strength properties of paper and paperboards; how to use the many skills inherent in these two tasks to make complete evaluations of commercially made pulps, papers and paperboards. In addition, the student will learn and experience how paper testing is used in the mill environment for process and product quality control.
4. Upon completion of the course the student will also have designed and carried out a co-operative quality survey on consumer paper products. Along the same practical lines, the student will have learned the concepts of material selection and package design in an exercise to design, construct and evaluate a unique package for a natural product.
5. Finally, the student will have learned the concepts, uses, limitations and interpretation of all test procedures used in this course are important aspects of the theory component. Test data that are not interpreted are of no particular use in the management of a process or product.

NATURE OF PRESENTATION;

Each meeting is designed to last 4 hours. In most cases, the first hour of each meeting will be used to introduce a theoretical aspect of paper testing and to discuss a particular laboratory exercise. A Laboratory Manual will be available at the beginning of the course thus allowing the students to familiarize themselves with the day's topic prior to the laboratory period.

There is a limited amount of equipment available for the entire class. This implies that laboratory exercises will not necessarily be done in a particular order. In order to accommodate this procedure, reports will be handed in for marking three times during the semester. The appropriate times for this activity and for the scheduled lab tests will be announced early in the semester.

The remainder of the laboratory period will be spent in carrying out the various laboratory exercises, collating data and preparing reports. The nature of the laboratory exercises, implies that additional working time will be needed for some of them. Assistance and guidance from the teacher and/or technician will be available throughout the formal laboratory period.

LABORATORY TOPICS;

The following topics will constitute the laboratory program. A more complete description of the laboratory exercises will be found in the Laboratory Manual and its summary section. It must be understood that these topics are not in themselves laboratory exercises. They will be combined in several ways in order to develop challenging and rewarding learning experiences.

- Introduction to Paper Testing. A discussion of scope and objectives of the course.
- Laboratory procedures, care and calibration of the equipment.
- Pulp processing skills including the use of the Valley Beater and PFI Mill together with the Canadian Standard Freeness tester to monitor the changes in pulp properties with increasing mechanical treatment.
- Paper testing skills needed to determine basic strength properties of commercially made paper and paperboards. Strength properties such as bursting, tearing, tensile and folding strengths together with other physical properties such as bulk, density and caliper will be measured.
- Two commercial pulps will be evaluated using the combined skills of pulp processing and paper testing. Comparisons will be made between the two pulps and their differences interpreted in light of their potential use in papermaking.
- Using the paper testing skills from above, commercially made papers or paperboards will be compared in terms of their suitability for specific end uses.
- Paper testing in the mill environment will be observed in two industrial locations. This will be a part of a field trip in late May or early June.

- The evaluation of paper properties that relate to consumer preference in the market place will be studied. Properties such as strength, water absorbency, brightness and softness are included here.
- Chemical tests used for paper analysis in the qualification of components, additives, coatings and treatments are important. An introduction to various techniques in this area will be given.
- Concepts of material selection for a specific end use will be studied. Building on these concepts will allow the design and construction of prototype packages for a given product.
- The concepts of test method development culminating in a student-designed test for their packages will result in first hand experience in product evaluation and the understanding of the relationship between material and product properties.

EVALUATION:

Students will be graded by their performance on 9 laboratory exercises and on two laboratory tests. Each laboratory exercise will require acceptable reports written following a defined standard. Of the mark assigned for the course, 80% will come from the student's performance on the laboratory exercises while the remaining 20% will result from the tests which concentrate on the theoretical aspects of paper testing.

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Adam Sugden

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