

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

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COURSE OUTLINE

FINISHING AND CONVERTING OPERATIONS

COURSE TITLE:

PPE 368-4

VI

CODE NO.:

SEMESTER:

PULP AND PAPER ENGINEERING TECHNOLOGY

PROGRAM:

JACK BETHUNE

AUTHOR:

MAY 1994

NEW

DATE:

PREVIOUS OUTLINE DATED:

APPROVED:

DEAN

DATE

**FINISHING AND CONVERTING  
OPERATIONS**

**PPE 368-4**

**COURSE NAME**

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**TOTAL CREDIT HOURS: 64 HRS**

**PREREQUISITE(S): NONE**

**I. PHILOSOPHY/GOALS:**

The purpose of this course is to introduce the final steps in the manufacture of paper and paperboard and the variety of end-use processes that paper and paperboard are subjected to before they are used as consumer products. Firstly, students will deal with unit processes and product qualities related to calendering, supercalendering, winding, coating, sheeting, wrapping and storage. The second part of the course deals with processes involved in letter press, offset and gravure printing and in the manufacture of corrugated board and cartons, folding cartons, specialty papers and absorbent products. End-use qualities and appropriate tests will also be covered.

**II. STUDENT PERFORMANCE OBJECTIVES (OUTCOMES):**

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

1. Describe and compare different techniques for calendering.
2. Analyze the different variables involved in calendering.
3. Demonstrate knowledge of the different components of reeling.
4. Compare various sizing and coating systems in terms of economy and effectiveness.
5. Describe various types of sizing and coating apparatus and their operating principles.
6. Discuss the various smoothness measuring devices such as Bendtsen, Sleaffield and Parker Print-Surf.
7. Plot winder time Vs paper velocity for a variety of winder situations.
8. Describe the processes of winding, slitting, sheeting, wrapping and storage as well as analyze their importance in the whole papermaking operation.
9. Describe the important printing processes (including letterpress, gravure, and lithographic offset) including the equipment used and the paper and paperboard and ink qualities needed for each printing process.

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II. STUDENT PERFORMANCE OBJECTIVES (OUTCOMES): (continued)

10. Describe the basic features of thermal, electrosensitive, magnetic, electrophotographic and ink jet printing.
11. Differentiate between contact and non-contact printing processes.
12. Describe the print quality differences between non-impact and impact printing processes.
13. Outline the important paper qualities needed for non-impact printing.
14. Describe the differences between characteristics that control runnability and printability of paper.
15. Describe the important runnability attributes of paper for sheet and web-fed presses.
16. Describe how coated and uncoated papers differ in terms of printability.
17. Describe tests that are used to measure ink receptivity.
18. Describe the engineering principles of corrugated board.
19. Relate the important properties of raw materials used in the manufacture of corrugated board.
20. Describe the construction and properties of different types of corrugated board.
21. Describe the various stages of board and carton manufacture.
22. Describe the specific tests used for corrugated boards and cartons.
23. Differentiate between solid and multi-ply paperboards.
24. Describe various processes involved in boxboard converting and box making.
25. Explain the underlying theory of water absorption.
26. Define furnish requirements for absorbent papers.
27. Describe some typical converting operations used on absorbent papers and products.
28. Describe tests used specifically for absorbent papers.

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**III. TOPICS TO BE COVERED:**

**Approximate Time Frames**

- 1) Introduction Weeks 1 - 6
- 2) Calendering
- 3) On-Line Control Equipment
- 4) Reeling
- 5) Sizing and Coating Systems
- 6) Paper Machine Drive Systems

TEST #1 During Week 6

- 7) Winding, Slitting, and Sheeting Weeks 7 - 11
- 8) Wrapping and Storage
- 9) Quality Control
- 10) Why Printing and Converting
- 11) Printing Terminology and Equipment
- 12) Non Contact Printing Processes

TEST #2 During Week 11

- 13) Performance Characteristics of Paper and Paperboard Week 12 - 16
- 14) Tests for Printing Quality of Paper
- 15) Corrugated Board and Cartons
- 16) Paperboard and Packages
- 17) Absorbent Paper Products

TEST #3 During Week 16

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**IV. EVALUATION METHODS:**

Students will be graded on the basis of their performance on three tests. Each one is worth one third of the final grade for the course. Letter grades will be assigned as follows:

A+ = 90% or higher

A = 80 - 89%

B = 70 - 79%

C = 60 - 69%

R = 59% or less

Students having a final standing of "R" and who have at least a 55% average will be permitted to write a full course supplementary test provided they have attended at least 80% of the scheduled lecture hours.

**V. REQUIRED STUDENT RESOURCES:**

Bethune, J. and Sugden, A. Course Manual for PPE 368, (Available in College Bookstore)

Sugden, A. Course manual for PPE162, Paper Finishing (Available in College Bookstore)

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

Smook, G.A., Handbook for Pulp and Paper Technologists, Joint Textbook Committee of the Paper Industry, TAPPI, 1982.

**VIII. 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.

Sault College

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