SAULT COLLEGE OF APPLD2D ARTS AND TECHNOLOGY

SAULT STE. MARIE, ON

COURSE OUTLINE

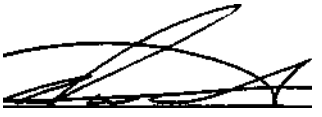
COURSE TITLE: FINISHING AND CONVERTING OPERATIONS

CODE NO.: PPE 368-4 **SEMESTER:** IV or VI

PROGRAM: PULP & PAPER ENGINEERING TECHNOLOGY

AUTHOR: JACK BETHUNE

DATE: MAY 1997 **PREVIOUS OUTLINE DATED:** MAY 1994

APPROVED:  *S '9 ?7*

DEAN ^ **DATE**

TOTAL CREDITS: 4

PREREQUISITES: N/A

LENGTH OF COURSE: 16 WEEKS **TOTAL CONTACT HOURS:** 3HRS/WK

I. COURSE DESCRIPTION:

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.

H. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course the student will demonstrate the ability 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, Sleffield and Parker Print-Surf.
7. Plot winder time vs paper velocity for a variety of winder.
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.
10. Describe the basic features of thermal, electrosensitive, magnetic, electrophotographic and ink jet printing.
11. Differentiate between contact and non-contact printing processes.

n **LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE**

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.

2 5. 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.

FINISHTNG AND CONVERTING CONVERTING — PPE 368-4
COURSE NAME — CODE NO.

	TOPICS TO BE COVERED	**Appropriate Time Frame**
	1) Introduction 2) Calendering 3) Calender Controls and Defects 4) Supercalendering Theory & Equipment 5) Supercalendering Operations	Weeks 1-4
	Test #1	Late Week 4 or during Week 5
	6) Winding Theory and Equipment 7) Winder Operations 8) Sheeting and Packaging 9) Paper Coating 10)Coating Preparations and Applications	Weeks 5-8
	Test #2	During Week 8
	11)Why Printing and Converting 12)Printing Terminology and Equipment 13)Non Contact Printing Processes 14)Performance Characteristics of Paper and Paperboard 15)Tests for Printing Quality of Paper	Weeks 9-12
	Test #3	During Week 12
	16)Corrugated Board and Carton 17)Paperboard and Packages 18)Absorbent Paper Products	Weeks 13-15
	Test #4	During Week 15

IV. EVALUATION METHODS:

Students will be graded on the basis of their performance on four tests and several assignments. Each test and all assignments will be worth 20% of the final mark, as follows:

Test No. 1	20%
Test No. 2	20%
Test No. 3	20%
Test No. 4	20%
All Assignments	20%
Total	100%

All assignments are due on the date specified in class. If a class is scheduled on the due date they must be handed in at the start of the class. If no class is scheduled on the due date, they are automatically due at noon.

Late assignments are subject to a 10% penalty per college operating day (when classes are scheduled). Technically, after an assignment is 10 days late, it has no value towards grades, but it is strongly recommended that all assignments be completed and handed in since some test questions could be similar to assignments and should be supplementary exam be necessary, a student MUST have completed ALL assignments to be eligible.

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, who have at least a 55% average and who have completed all the assignments will be permitted to write a full course supplementary exam.

V. REQUIRED STUDENT RESOURCES:

Bethune, J. and Sugden, A. COURSE MANUAL for PPE 368. (available in College Bookstore)

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

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

Vffl. SPECIAL NOTES:

Special Needs
If you are a student with special needs (eg. physical limitations, visual impairments, hearing impairments, learning disabilities), you are encouraged to discuss required accommodations with the instructor and/or contact the Special Needs Office, Room E1204, Ext. 493, 717, 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 post-secondary institutions.

- Substitute Course Information is available at the Registrar's Office.

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