DOC #236

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE:	PULP TECHNOLOGY I
CODE NO.	PPE 230-4
SEMESTER:	II
PROGRAM:	PULP AND PAPER ENGINEERING TECHNOLOGY
AUTHOR:	K. PEVATO
DATE:	JANUARY 1991
PREVIOUS OUTLINE DATED:	JANUARY 1987

APPROVED: _____
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TOTAL CREDIT HOURS: 60

PREREQUISITE(S): None

I. PHILOSOPHY/GOALS:

Pulp Technology I is the first of a series of three courses that deal with the technology of pulp manufacture. This course covers the science and technology of full chemical pulping and includes the sulphite, bisulphite and kraft processes. Topics covered include a study of pulping terms, digestion, heat and chemical recovery, equipment, material balances and applicable control tests.

II. STUDENT PERFORMANCE OBJECTIVES:

Upon successful completion of this course the student will:

1. List and explain the chemical components of wood.
2. Explain sulfite and bisulfite pulping terminology and concepts.
3. Explain kraft pulping methods and associated chemistry.
4. Explain heat and chemical recovery for sulphite, bisulphite, and kraft processes.

III. TOPICS TO BE COVERED:

1. CHEMICAL COMPOSITION OF WOOD

   Introduction
   Polysaccharides
      Cellulose
      Hemicelluloses
   Lignin
   Extractives
   Inorganics

2. OVERVIEW OF PULPING METHODOLOGY

   Introduction to various pulping methods

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III. TOPICS TO BE COVERED: (cont'd)

3. SULPHITE AND BISULPHITE PULPING

    Introduction
    Process Flow
    Cooking Chemicals
    Sulphur Burning
    Choice of Base
    Acid Making in Packed Towers
    Digester Operations
    Environmental Concerns

4. KRAFT PULPING

    Introduction
    Process Flow
    Definition of chemical terms used in kraft pulping
    Digester Operations
    Effects of cooking temperature and time
    Digester control
    Environmental concerns *

5. PRINCIPLES OF CHEMICAL RECOVERY PROCESSES

    Introduction
    A brief introduction to pulp washing
    Evaporators
    Kraft Recovery furnace
    Kraft chemical regeneration
    Sulphite recovery process
    Environmental Impact of heat and chemical recovery

6. IMPORTANCE OF CHEMICAL PULPING IN CANADA

    Pulp produced
    Number of mills by type

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IV. EVALUATION METHODS:

Evaluation will be based on:

a) three (3) tests, each one of equal value 30% X 3 = 90%
b) mid-term report = 10%

Letter grades will be assigned as follows:

A = 80% or more
B = 70 - 79%
C = 60 - 69%
R = 59% or less

Students having a final mark of 50 - 59% may be permitted to write a supplementary test covering the ENTIRE course.

V. REQUIRED STUDENT RESOURCES:

Smook, G.A. (1982), Handbook for Pulp & Paper Technologists.

Joint Textbook Committee of the Paper Industry, Atlanta.

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

There are many sources of reference materials available in the Library.
Some of these are listed below:

1. Rydholm, S.A. (1965). Pulping Processes, Interscience, New York.

2. MacDonald, R.G. & Franklin,'J.N. eds, (1969). Pulp and Paper Manufacture, Vol. 1. The Pulping of Wood. McGraw-Hill, New York.

3. Ingruber, 0., Kocurek, M.J. & Wong, A. Eds. (1985) Pulp & Paper Manufacture, 3rd Edition, Vol. 4. Sulphite Science and Technology, Joint Textbook Committee of the Paper Industry, Atlanta.

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VI. ADDITIONAL RESOURCE MATERIALS: (cont'd)

4. Britt, K.W. (1964), Handbook of Pulp and Paper Technology, Reinhold, New York.

5. Casey, J.P. (1981), Pulp and Paper Chemistry and Chemical Technical Technology, 3rd. edition, Interscience, New York.

6. Sjostrom, E. (1981), Wood Chemistry: Fundamentals and Application, Academic Press, New York.

7. TAPPI Journal (1983 - present)

8. Pulp & Paper Canada (1983 - present)

9. Pulp & Paper (1983 - present)

10. Canadian Pulp & Paper Journal (1983 - present)

11. Hough, G. Ed. (1985), Chemical recovery in the Alkaline Pulping Process, TAPPI Press, Atlanta.

12. Kocurek, M.J., Grace T.m., Malcolm, E.W. Eds, (1989), Pulp and Paper Manufacture, Vol. 5. Alkaline Pulping. Joint Textbook Committee of the Paper Industry, Atlanta.

13. Adams, Terry N. and Frederick, Wm. James, (1988), Kraft Recovery boiler Physical and Chemical Processes. The American Paper Institute, Inc., New York.

14. Hermann, F.J. Wenzl (1965), Sulphite Pulping Technology, Lockwood Trade Journal Co., Inc., New York.

15. Libby, C. Earl Ed. (1962), Pulp and Paper Science Technology, Vol. I Pulp Joint Textbook Committee of the Paper Industry, New York.

16. Browning, B. J. Ed. (1963), The Chemistry of Wood, Robert E. Krieger Publishing Company, Florida.

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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.