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

COURSE OUTLINE

Course Title: HYDRAULICS
Code No.: HYD 220-5
Program: WATER RESOURCES/PULP AND PAPER ENGINEERING TECHNOLOGY
Semester: FALL
Date: SEPTEMBER, 1985
Author: SUBHASH C. VERMA

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New:

Revision:

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APPROVED:


Chairperson

Date/

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HYDRAULICS

HYD 220-5

Course Name

Course Number

PREREQUISITE: PHY 100, MTH 278

PHILOSOPHY/GOALS:

To introduce the basic principles of fluid mechanics and the application of these principles to practical and applied problems. After completing this course the student should have a firm foundation in the field to continue learning. This course will provide the understanding of basic concepts of fluid mechanics and application of these concepts to solve practical problems in the area of specialization.

On completion of the course, the student should be able:

- To work with both English and SI Units and modification of mathematical equation from one system of units to the other.
- To have a clear understanding of the properties of fluids, factors affecting, and their role in influencing the hydraulic design.
- To apply the energy equation to a given hydraulic system to derive the answer for the unknown parameter.
- To apply the principles of fluid mechanics to the computation of energy, power, and pressure within fluid.
- To apply the principles of hydraulics to understand the operation and working principles of flow control and flow measuring devices.
- To calculate water and power requirements and select such components as pumps and valves.
- To analyze open channel and pipe flow to such systems as water supply, water distribution, sanitary and storm sewers.
- To maintain a laboratory notebook.
- To interpret and analyze the data.

METHOD OF ASSESSMENT AND EVALUATION

The final mark will be assigned which is higher of either

- a) final examination mark
- b) weighted mark calculated as follows:

Problem assignments and Laboratory reports	25%
Mid-term examination (2)	25%
Final examination	50%

- To pass this course a minimum of 55% is required in the weighted average provided a pass grade is obtained in at least one of the tests.
- Eighty percent attendance is required for anyone to be considered for supplementary examination.
- Home assignments are due one week after. Late submissions will be penalized.
- This method of evaluation is subject to change. However students will be notified prior to any changes.

TEXTBOOK(S):

Mott, Robert, (1979), Applied Fluid Mechanics, Second Edition, Charles E. Merrill Publishing Company, Toronto.

REFERENCES;

Daugherty, R.L., and J.B. Franzini (1977), Fluid Mechanics With Engineering Applications, 7th Edition, McGraw-Hill Book Company, Toronto.

King, H.W., C.O. Wisler and J.G. Woodburn (1980), Hydraulics, 5th Edition, Robert E. Krieger Publishing Company, Huntington, New York.

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	<u>NO. OF WEEKS</u>
1. <u>Introduction, units and calculations</u>	(1)
2. <u>Properties of fluids</u>	(1)
3. <u>Fluid pressure and its measurement</u>	(2)
- fluid pressure	
- absolute and gauge pressure	
- relationship between pressure and elevation	
- manometers, barometers and pressure gauges	
4. <u>Fundamentals of fluid flow</u>	(4)
- types of flows	
- continuity equation	
- energy and head	
- Bernoulli's equation	
- applications of Bernoulli's equation	
- energy loss and gain	
- general energy equation	
- application of general energy equation	
15. <u>Fluid measurements</u>	(2)
- general methods of local velocity measurements	
- orifices, nozzles and tubes	
- weirs	
- other methods	
6. <u>Steady compressible flow in pressure conduits</u>	(2)
- laminar and turbulent flow	
- friction formulas	
- energy gradient and hydraulic gradient	
- minor losses	
- solution of pipe flow problems	
7. <u>Pumping systems</u>	(1)
- parameters involved in pump selection	
- types of pumps	
- static head and dynamic head	
8. <u>Steady uniform flow in open channels</u>	(3)
- open channel flow defined	
- equations of uniform flow	
- efficient cross-section	
- specific energy and critical flow	
- hydraulic pump	