DOC.#97

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE: TECHNICAL MATHEMATICS

CODE NO.: MTH 220-4 **SEMESTER:** II

PROGRAM: WATER RESOURCES/PULP & PAPER/ENVIRONMENTAL ENG

AUTHOR: W. MACQUARRIE

DATE: JULY 1992 **PREVIOUS OUTLINE DATED** JAN. 1992

APPROVED *DEI^,* SCHOOL OF SCIENCES & NATURAL RESOURCES DATE ^,f>^^

TECHNICAL KATHEMATICS | MTH 220-4

COURSE NAME | **COURSE NXJMBER**

TOTAL CREDIT HOURS: 68

PREREQUISITE(S): MTH 120-4

I - PHILOSOPHY/GOALS:

This course consists of Algebra, Trigonometry and Analytic Geometry. Topics studied included: Simultaneous and Quadratic Equations, Exponents, Radicals, Exponential and Logarithmic Functions, Ratio, Proportion and Variation, Also included is a review of Trigonometry including an analysis of oblique triangles. The course concludes with a study of Analytic Geometry.

The course prepares the student for the study of Calculus in the subsequent mathematics course, MTH 208,

XI STUDENT PERFORMANCE OBJECTIVES:

The basic objective is for the student to develop an understanding of the methods studied, knowledge of the facts presented and an ability to use these in the solution of problems. For this purpose, exercises are assigned. Tests will reflect the sort of work contained in the assignments. The level of competency demanded is the level required to obtain an overall passing average on the tests. The material to be covered is listed on the'following pages.

Ill- TOPICS TO BE COVERED:

(1)	Algebraic and Graphical Solutions of Systems of Equations	8 hours
(2)	Quadratic Equations	6 hours
(3)	Exponents and Radicals	8 hours
(4)	Exponential and Logarithmic Functions	12 hours
(5)	Ratio, Proportion and Variation	5 hours
{6)	Trigonometry	10 hours
(7)	Analytic Geometry	16 hours

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COURSE NAME | **COURSE NUMBER**

IV. LEARNING ACTIVITIES: | **REQUIRED RESOURCES**

TOPIC NUMBER NUMBER OF PERIODS	TOPIC DESCRIPTION	REQUIRED RESOURCES (REFERENCES)
1.	SYSTEMS OF LINEAR EQUATIONS	CHAPTER 4 p. 109-148
	- Linear equations	Ex. 4.1 - odds
	- Graphs of linear equations	Ex. 4.2 - odds
	- Graphical solutions - two unknowns	Ex. 4.3 - odds
	- Algebra solutions - two unknowns	
	- addition/subtraction method	Ex. 4.4
	- substitution method	Ex. 4.4
	- comparison method	Instructor Handout or Ex. 4.4
	- Three equations three unknowns	Ex. 4.6 - 3,9,19,20
	- Review exercises	Ex. 4.8 (21,31,65,73) Instructor's Option
	QUADRATIC EQUATIONS	CHAPTER 6, P.185-204
	- Solution by factoring	Ex. 6.1 Odds
	- Completing the square (emphasize)	Ex. 6.2 Odds
	- Quadratic formula	Ex. 6.3 Odds
	- Graph of the quadratic function	Ex. 6.4 Odds
	- Review exercises	Ex. 6.5 Instructor's Opt.ion
	EXPONENTS AND RADICALS	CHAPTER 10 p.288-314
	- Integral exponents,	Ex. 10.1 Odds 1-51
	- Fractional exponents	Ex. 10.2 Odds 1-51
	" Simplest radical form	Ex. 10.3 Odds 1-63
	- Add/subtract radicals	Ex. 10.4 Odds 1-31
	- Multiply radicals	Ex.. 10.5 Odds 1-43
	- Divide radicals	Ex. 10.6 Odds 1-51
	- Review exercises	Ex. 10.7 Instructor' Option

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IV. LEARNING ACTIVITIES — **REQUIRED RESOURCES**

TOPIC NUMBER	TOPIC DESCRIPTION	NUMBER OF PERIODS	REQUIRED RESOURCES (REFERENCES)
12	EXPONENTIAL & LOGARITHMIC FUNCTIONS - Exponential/log functions - Graphs y = b & Y = logj_^x - Logarithm properties - Base 10 logarithms - Natural logarithms - Exponential and logarithmic equations - Graphs on log and semilog paper - Review exercises		CHAPTER 12 p.349-380 Ex.12.1 Odds 1-41 Ex. 12.2 1,3,7,13,19 Ex. 12.3 Odds 1-51 Ex. 12.3 Odds 1-35 Ex. 12.5 Odds 1-37 Ex. 12.6 Odds 1-45 Ex. 12.7 Odds 1-23 Ex. 12,8 p.1-77 Instructor's Option
	RATIO, PROPORTION & VARIATION - Ratio and proportion - Variation - Review exercises		CHAPTER 17 p. 486-500 Ex. 17.1 Odds 1-35 Ex. 17.2 Odds 1-41 Ex. 17.3 Instructor's Option
10.	TRIGONOMETRY - Signs of trig. functions - Trig, functions any size angle - Radians/grads (gons) - Radian application,s - Chapter 7 review - Oblique triangles - sine law - Oblique triangles cosine law - Chapter 8 review		CHAPTERS 7&8 p.205-260 Ex. 7.1 odds Ex. 7.2 odds 1-43 Ex. 7.3 & handout 1-53 Ex. 7.4 Inst. Option Ex. 7.5 Inst. Option Ex. 8.5 1,3,5,15,17,19,23,27,29 Ex. 8.6 1,3,5,9,23,25 Ex. 8.7 Inst. Option

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IV. LEARNING ACTIVITIES: — **REQUIRED RESOURCES**

TOPIC NUMBER	NUMBER OF PERIODS	TOPIC DESCRIPTION	REQUIRED RESOURCES (REFERENCES)
7.	16	PLANE ANALYTIC GEOMETRY	CHAPTER 20 p.558-601,608-612
		- Basic definitions	Ex. 20.1 Odds 1-39
		- The straight line - properties, equations, graphs	Ex. 20.2 Odds 1-39
		- The circle - properties, equations, graphs	Ex. 20.3 & 20.7
		- The parabola - properties, equations, graphs	Ex. 20.4 & 20.7
		- Translation of axes	Done above (20.7)
		- The general second degree equations	Ex. 20.8 1-27
		- Review exercises	Ex. 20.11 Instructor's Option

NOTE: Additional analytic geometry problems, including the ellipse and/or hyperbola may be provided in a handout.

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V, METHOD OF EVALUATION:

The final grade will be derived from the average of the results from the periodic tests given.

The grading system used will be as follows:

A+	=	90 - 100%
A	=	80 - 89%
B	=	65 - 79%
C	=	55 - 64%
R	=	0 - 54%

A passing grade will be based on a minimum grading of 55%.

VI, REQUIRED STUDENT RESOURCES:

TEXTBOOK: "BASIC TECHNICAL MATHEMATICS WITH CALCULUS", Fifth (Metric) " edition, Washington.

Electronic calculator which includes trigonometric functions

SUGGESTION: SHARP EL-9000 Super Scientific Calculator or equivalent

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.