SAULT COLLEGE OF APPLIED ARTS *ic* TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE:
TECHNICAL MATHEMATICS

CODE **NO.:**
MTH 220-4   **SEMESTER:**   ii   .4 HRS/WK

PROGRAMS:
WATER RESOURCES/PULP & PAPER/ENVIRONMENTAL ENG

AUTHOR:
W. MACQUARRIE

DATE:
JUNE 1996   **PREVIOUS OUTLINE DATED:**   JAN 1996

APPROVED: C l j^.X<^^ '^'^-•_.   ᴿ ᵥ>
       ^"   DEAN   DATE

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

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TOTAL CREDIT HOURS: 64

PREREQUISITECS): MTH 120-4

SUBSTITUTE(S): MTH 143

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.

II. STUDE?JT PERFORMAi'^JCE CBJECTIVES:

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.

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

TOPIC # # OF PERIODS	TOPIC DESCRIPTION	REQUIRED RESOURCES (REFERENCES)

1.	SYSTEMS OF LINEAR EQUATIONS
	- Linear equations
	- Graphs of linear equations
	- Graphical solutions - two unknowns
	- Algebra solutions - two unknowns
	  - addition/subtraction method
	  - substitution method
	  - comparison method
	
	Three equations three unknowns
	Review exercises
		CHAPTER 5 p. 128-163
		Ex. 5.1 – odds
		Ex. 5.2 – odds
		Ex. 5.3 – odds
		Ex, 5.4 – odds 1–30
		Ex. 5.6 – 3,9,19,20
		
		Ex. 5.8 – 21,31,65,73
		
		Instructor's Option

	QUADRATIC EQUATIONS - Solution by factoring - Completing the square (emphasize) - Quadratic formula - Graph of the quadratic function - Review exercises	CHAPTER 7, P.199-217 Ex. 7.1 Odds Ex. 7.2 Odds Ex. 7.3 Odds Ex. 7.4 Odds &c review Ex, p. 215
	EXPONENTS AND RADICALS - Integral exponents - Fractional exponents - Simplest radical form - Add/subtract radicals - Multiply radicals - Divide radicals - Review exercises	CHAPTER 11 p.296-317 Ex. 11.1 Odds 1-51 Ex. 11.2 Odds 1-49 Ex. 11.3 Odds 1-63 Ex. 11.4 Odds 1-31 Ex. 11.5 Odds 1-57 Review Ex. 11.6 Instructor's Option

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

TOPIC #	# OF PERIODS	TOPIC DESCRIPTION	REQUIRED RESOURCES (REFERENCES)
4.	12	EXPONENTIAL &: LOGARITHMIC FUNCTIONS	CHAPTER 13 p.349-377
		- Exponential/log functions	Ex. 13.1 Odds 1-55
		- Graphs $y = b$ ^ $y = $ 'oSk^	Ex. 13.2 1,3,7,13,15
		- Logarithm properties	Ex. 13.3 Odds 1-51
		- Base 10 logarithms	Ex. 13.4 Odds 1-27
		- Natural logarithms	Ex. 13.5 Odds 1-35-45
		- Exponential and logarithmic equations	Ex. 13.6 Odds 1-45
			Ex. 13.7 Odds 1-23
		- Graphs on log and semilog paper	
		- Review exercises	Ex. 1-77 Instructor's Option
		RATIO, PROPORTION &i VARIATION	CHAPTER 18 p. 469-482
		- Ratio and proportion	Ex. 18.1 Odds 1-39
		- Variation	Ex. 18.2 Odds 1-41
		- Review exercises	Review Ex. Instructor's Option
	10	TRIGONOMETRY	CHAPTERS 8&9 p.205-260
			Ex. 8.1 odds
		- Signs of trig, functions	Ex. 8.2 odds 1-43
		- Trig, functions any size angle	Ex. 8.3-handout 1-53
		- Radians/grads (gons)	Ex. 8.4 Inst. Option
			Ex. 8.5 Inst. Option
		- Radian applications	Ex. 9.5
		- Chapter 7 review	1,3,5,15,17,19,23,27,29
		- Oblique triangles - sine law	Ex. 9.6 1,3,5,9,23,25
			Ex. 9.7 Inst. Option
		Oblique triangles - cosine law	
		Chapter 9 review	

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

TOPIC #	# OF PERIODS	TOPIC DESCRIPTION	REQUIRED RESOURCES (REFERENCES)
	16	PLANE ANALYTIC GEOMETRY	CHAPTER 21 p.536-560,567-569
		- Basic definitions	Ex. 21.1 Odds 1-39
		- The straight line - properties, equations, graphs	Ex. 21.2 Odds 1-39
		- The circle - properties, equations, graphs	Ex. 21.3 ^ 21.7
		- The parabola - properties, equations, . graphs	Ex. 21.4 &c 21.7
		- Translation of axes	
		- The general second degree equations	Done above (21.7)
		- Review exercises	Ex. 21.8 1-27
			Ex. 21.11 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:

$$
\begin{array}{lll}
A+ & = & 90 - 100\% \\
A & = & 80 - 89\% \\
B & = & 65 - 79\% \\
C & = & 55 - 64\% \\
R & \wedge & 0 - 54\% \\
\end{array}
$$

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

<u>A credit for this course</u> may be allowed upon presentation of proof of standing in any OA level math course.

VL REQUIRED STUDENT RESOURCES:

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

2. Calculator: (Recommended) SHARP Scientific Calculator EL-531G. The use of some kinds of calculators may be restricted during tests.

VIL 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.