SAULT COLLEGE

of Applied Ails and Technology

Sault Ste. Marie

COURSE OUTLINE

MATHEMATICS

MTH 113-4

(Mechanical/Electrical Technicians Only)

'cvised *E^TML

(K. Clarke!

MATHEMATICS

MTH 113-4

TEXT: "Essentials of Mathematics"; Fourth Edition (Person)

REFERENCES:

"Technical Mathematics"; Third Edition, (Rice and Knight).

" Elementary Technical Mathematics"; (Juszli and Rodgers).

"Examples in Practical Mathematics"; (Turner).

"National Certificate Mathematics"; Volume I and II, (Abbott et al)

"Basic Mathematics for Science and Engineering"; (Andres et al).

"Basic Mathematics for Technical Courses"; (Tuites).

"Senior Algebra for High Schools"; (Petrie et al).

"Problems in Practical Mathematics"; (William and Straka).

"Technical Mathematics with Calculus"; Second Edition, (Rice and Knight).

"Basic Technical Mathematics with Calculus"; (Washington).

MATHEMATICS

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NOTES:

The object of this course is to review such topics as basic algebra and trigonometry so that students coming from different schools with diverse mathematical backgrounds may all be brought more closely to the same academic plateau and further to cover topics which will be required in their respective major subject areas and in the mathematics of semester two.

The review of basic algebra should cover the rules of algebra in the operations involving polynomials as well as equations in one unknown. Dimensional analysis and conversion procedures are covered as an aid to students in their physics, mechanical and electrical courses. Both SI and English units are to be utilized.

The topic of Ratio and Proportion is well illustrated in the reference book by Petrie. Emphasis should be on course-related examples and use of SI units. (See page two - List of Reference Texts of this course outline.)

The use of natural Trig functions and the solution of right triangles, are covered as an aid to other subject areas.

MATHEMATICS (MTH 113-4)

TOPICAL OBJECTIVES

Topic No. 1

Scientific Notation, Estimation

The student is expected to be able to:

employ estimating methods, including the use of scientific notation to estimate the approximate answer to problems and to locate the correct position of the decimal point in answers.

Topic No. 2

Measurement and Dimensional Analysis

The student is expected to be able to:

a) learn and use a systematic dimensional analysis procedure to convert a quantity of given units into an equivalent value in terms of other related units, and

b) be familiar with systems of units andhow to handle exponential units. These systems of units should be equally divided in SI and the English systems of units.

Topic No. 3

Review of Elementary Algebra

The student will be required to:

a) distinguish between a constant and a variable and be able to perform the basic mathematical operations on them.

b) identify various algebraic expressions and be able to perform the basic mathematical operations on them.

c) recognize and use conventional symbols.

d) recognize and solve a linear equation in one unknown and to solve practical problems that require the use of such equations.

e) define and know the properties of a ratio and a proportion

f) understand the meaning of direct, inverse and joint variation and how to change a verbal variation statement into an algebraic or symbolic statement of variations.

g) solve various practical problems involving ratios, variations and/or proportionality concepts.

TOPICAL OBJECTIVES

Topic No. 4

Review of Basic Trigonometry

The student will be required to:

a) perform the basic arithmetic operations on angles measured in either tenths of degrees, or in degrees-minutes-seconds.

b) know what minimum data determines a triangle.

c) memorize, understand and use the 'definitions of the six trigonometric functions of an angle and be able to use a calculator to find any function of an acute angle.

d) solve right triangles and to apply this knowledge to the solution of practical problems. Apply SI units in some examples.

Topic No. 5

Further Review of Algebra

The student will be required to:

a) rapidly perform special algebraic products, recognize the type and be able to factor common algebraic expressions.

b) know the properties of algebraic fractions and be able to perform the basic mathematical operations on them.

c) solve equations which involve algebraic fractions.

d) use a graph (rectangular co-ordinates) to solve two simultaneous linear equations.

e) solve a system containing two linear equations with two unknowns by the following methods:

    1) elimination by addition and/or subtraction
    2) elimination by substitution
    3) elimination by comparison
    4) determinants (optional)

f) solve a system of equations with three or more unknowns.

g) understand and use functional notations.

h) become familiar with the Cartesian Co-ordinates plane and how to plot points on it.

i) plot a graph of a linear equation of two unknowns.

j) learn the definition of and how to calculate the slope of a line.

k) know the laws of positive integral exponents and apply them correctly to the operations of multiplication and division of algebraic monomials and polynomials.

Topic No. 5 (continued) *A*

1) know and use the laws of exponents (positive, zero, negative and fractional, and to perform the basic arithmetic operations on algebraic expressions that contain them.

m) know the relationship that exists between fractional exponents, radicals and roots.

n) understand and use fractional exponents and the laws of radicals to perform the basic arithmetic operations on algebraic expressions that contain them.

o) learn the various ways of rationalizing algebraic radical denominators.

p) perform operations on complex numbers.

MATHEMATICS (MTH 113-4)

TEXT: Essentials of Mathematics - Fourth Edition (Person)

TOPIC NO.	PERIODS	TOPIC DESCRIPTION	REFERENCES
1	6	Scientific Notation	Ch. 16-Sect. 10
		Estimation, Calculations	Ch. 54
		Approximate numbers and rounding off	
2	6	Measurment and Dimensioanl Analysis	
		British System	Ch. 32
		Metric System	
		Algebra of Dimensions	
		Reductions and Conversions	
		Formulas	
3	12	Review of Elementary Algebra	
		Signed Numbers	Chapters
		Algebraic Expressions	6 - 9 and 23
		Addition and Subtraction	
		Multiplication and Division	
		Simple Equations and Word Problems	
		Ratio, Proportion and Variation	
	7	Review of Right Triangle Trigonometry	
		Trigonometric Ratios	Ch. 36 & 38
		Right Triangles	
	21	Further Review of Algebra	
		Factoring	Chapters 10 - 1
		Fractions	and 19
		Fractional Equations	
		Systems of Equations	
		Graphing	
		Exponents, Powers, Roots, and Radicals	
		Complex Numbers	