

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

COURSE OUTLINE

COURSE TITLE: TECHNICAL MATHEMATICS

CODE NO.: MTH 221-4 **SEMESTER:** II

PROGRAM: ARCHITECTURAL/CIVIL ENGINEERING TECHNICIAN

AUTHOR: K. PELEW

DATE: JUNE 1991 **PREVIOUS OUTLINE DATED:** JUNE 1989

APPROVED: ^{^FZ'LZ/S*}_____
DEAN r " DATE

TECHNICAL MATHEMATICS

MTH 221-4

COURSE NAME

CODE NO.

TOTAL CREDIT HOURS: 64

FREREQUISITE(S): MTH 120

I. PHILOSOPHY/GOALS:

The review of secondary school algebra which is started in the previous math course is continued in this course. Coverage of algebra then continues with Quadratic Equations, Exponents, Powers and Roots and Ratio, Proportion and Variation. The course concludes with a review of Trigonometry, including analysis of right triangles and oblique triangles.

II. STUDENT PERFORMANCE OBJECTIVES:

The basic objectives are that the student develop an understanding of the methods studied, demonstrate a knowledge of the facts presented and show an ability to use these in the solution of problems. To accomplish these objectives, exercises are assigned. Test questions will be of near equal difficulty to questions assigned in the exercises. 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 below.

III. TOPICS TO BE COVERED:

1. Fractions, Fractional Equations, Formulas
2. Algebraic and Graphical Solution of Systems of Equations
3. Exponents, Powers and Roots, Quadratic Equations
4. Ratio, Proportion and Variation
5. Trigonometry and Radian Measure

TECHNICAL MATHEMATICS

MTH 221-4

COURSE NAME

CODE NO.

IV. LEARNING ACTIVITIES:

REQUIRED RESOURCES;

	EXERCISES	
1.0 <u>FRACTIONS, FRACTIONAL EQUATIONS, FORMULAS</u>		
1.1 Reducing fractions to lowest terms	14-1	(pg. 241-242)
1.2 Multiplication and division of fractions	14-2	(pg. 245-246)
1.3 Addition and subtraction of fractions	14-3	(pg. 253-254)
1.4 Complex Fractions	14-4	(pg. 256-257)
1.5 Solving fractional equations	15-1 15-2 15-3 15-4	(pg. 262-263) (pg. 265-266) (pg. 267-268) (pg. 270-271)
i.6 Solving formulas	15-5	(pg. 275-277)
1.7 Solving word problems involving fractional equations	15-6	(pg. 277-281)

TECHNICAL MATHEMATICS

MTH 221-4

COURSE NAME

CODE NO.

IV. LEARNING ACTIVITIES:

REQUIRED RESOURCES:

2.0 <u>ALGEBRAIC AND GRAPHICAL SOLUTION OF SYSTEMS OF EQUATIONS</u>	EXERCISES	
2.1 Solving systems of equations by addition or subtractions	16-1	(pg. 289-290)
2.2 Solving systems of equations by substitution	16-2	(pg. 291-292)
2.3 Solving systems of equations by comparison	16-3	(p. 293)
2.4 Solving word problems by using systems of equations in two unknowns'	16-4	(pg. 296-297)
2.5 Solving systems of equations in three or more unknowns	16-5	(pg. 299-300)
2.6 Solving word problems by using systems of equations in three unknowns	16-6	(pg. 301-302)
2.7 Solving systems of equations by determinants (if needed)	16-6	
2.8 Graphing a linear equation	17-2	(pg. 322)
2.9 Solving systems of equations graphically	17-3	(pg. 326)
2.10 The slope of a line (if needed)	17-4	(pg.330)

TECHNICAL MATHEMATICS

MTH 221-4

COURSE NAME

CODE NO.

IV. **LEARNING ACTIVITIES:**

REQUIRED RESOURCES;

	EXERCISES	
3.0 <u>EXPONENTS, POWERS AND ROOTS</u> <u>QUADRATIC EQUATIONS</u>		
3.1 Multiplication and Division Power of a power Power of a product Power of a fraction	18-1	(pg. 338-339)
3.2 Zero exponent Negative exponent	18-2	(pg. 343-344)
3.3 Roots of numbers Fractional exponents	18-3	(pg. 348-349)
3.4 Scientific Notation	18-5	(pg. 353-354)
3.5 Solving a pure quadratic equation	20-1	(pg. 380-381)
3.6 Solving a quadratic equation by factoring	20-2	(pg. 385)
3.7 Solving a quadratic equation by completing a square	20-3	(pg. 388)
3.8 Solving a quadratic equation by use of the quadratic formula	20-4	(pg. 392)
3.9 Solving word problems involving quadratic equations	20-5	(pg. 395-396)
3.10 Graphical solution to systems involving quadratics (if needed)	23-1 23-2	(pg. 451-452) (pg. 454)

TECHNICAL MATHEMATICS

MTH 221-4

COURSE NAME

CODE NO.

IV. LEARNING ACTIVITIES!

REQUIRED RESOURCES:

	EXERCISES	
4.0 <u>RATIO, PROPORTION AND VARIATION</u>		
4.1 Write the ratio of numbers or quantities in simplest form	25-1	(pg. 477)
4.2 Solve a proportion for an unknown term	25-2	(pg. 480-431)
4.3 Proportional Division	25-3	(pg. 482-483)
4.4 Direct, Joint and Inverse Variation	25-4 25-5 25-6	(pg. 486-487) (pg. 488-489) (pg. 491-493)

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

5.0 <u>TRIGONOMETRY AND RADIAN MEASURE</u>	EXERCISES	
5.1 Standard position of an angle	37-1	(pg. 648-649)
5.2 Trigonometric Ratios or Functions	37-2	(pg. 651)
5.3 Find trigonometric and inverse functions using calculators	38-1 38-2	(pg. 656-657) (pg. 659)
5.4 Find the function values in any right triangle	39-1	(pg. 665)
5.5 Solve right triangles	39-2	(pg. 668)
5.5 Solve word problems by using trigonometry	39-4	(pg. 674-675)
5.7 Find the functions of angles of any size	40-1	(pg. 685)
5.8 Find an angle from a given function value	40-2	(pg. 687)
5.9 Find the values of all the functions of an angle, given one function value	40-3	(pg. 688-689)
5..10 The Sine Law	45-1	(pg. 748-749)
5.,11 The Cosine Law	45-2	(pg. 752-754)
5..12 Measurement of angles in radians	42-1	(pg. 706)
5..13 Change from degrees to radians and vice versa	42-2	(pg. 709)
5.,14 The solid angle	42-3	(pg. 716)

TECHNICAL MATHEMATICS

MTH 221-4

COURSE NAME

CODE NO.

V. METHOD OF EVALUATION:

The final grade will be derived from the weighted 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: "Essentials of Mathematics"; Fifth Edition. Person
Electronic calculator which includes trigonometric functions

VII. ADDITIONAL RESOURCE MATERIALS

Consult the clerk(s) in the Learning Resource Centre and/or the Learning Assistance Centre.

VIII. 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. / '\