SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE:	**Technical Mathematics II**		
CODE NO. :	**MTH146-5**	**SEMESTER:**	**Three**
PROGRAM:	**Engineering Technician and Technology Programs**		
AUTHOR:	**Mathematics Department**		
DATE:	**January 2010**	**PREVIOUS OUTLINE DATED:**	**June 2008**
APPROVED:	"B. Punch"		
	CHAIR		**DATE**
TOTAL CREDITS:	**5**		
PREREQUISITE(S):	**MTH 145**		
HOURS/WEEK:	**4**		

I. COURSE DESCRIPTION:

This course is a continuation of MTH 145 (from Semester One) . Topics of study include a more detailed view of exponents and radicals, plane analytic geometry, geometry, trigonometric functions, exponential and logarithmic functions. This course also includes an introduction to statistics.

The goals of this course are, first to show that mathematics does play a most important role in the development and understanding of the various fields of technology and, secondly to ensure that students acquire the mathematical and critical thinking skills necessary to analyze and solve engineering technology problems.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

Topic 1: Geometry

1. Solve practical problems to find the sides and angles of right triangles
2. Solve practical problems to find the areas of a triangle or quadrilateral
3. Solve problems involving the circumference, diameter, area or tangent to a circle
4. Compute surface areas and volumes of spheres, cylinders, cones and other solid figures

Topic 2: Exponents and Radicals

1. Use the laws of exponents to simplify and combine expressions having integral exponents
2. Simplify radicals by removing perfect powers

Topic 3: Graphs of Trigonometric Functions ***(Mechanical Only)***

1. Find the amplitude, period, frequency and phase angle for a sine wave or cosine wave
2. Write the sine function or cosine function, given the amplitude, period and phase
3. Graph the sine function, cosine function or tangent function

Topic 4: Exponential and Logarithmic Functions

1. Define the logarithmic and exponential function
2. Graph logarithmic and exponential functions
3. Convert expressions between exponential and logarithmic form
4. Evaluate, manipulate and simplify logarithmic expressions
5. Solve exponential and logarithmic equations

Topic 5: Variation
1. Review ratio and proportion
2. Study direct, inverse and joint variation

Topic 6: Plane Analytic Geometry
1. Write the equation of a line using the slope-intercept form, the point-slope form or the two-point form

Topic 7: Statistics
1. Organize data into frequency distributions, frequency histograms or frequency polygons
2. Calculate the mean, median and mode
3. Calculate the range and standard deviation
4. Calculate the best fit curve (linear regression)
5. Coefficient of correlation (r) – from class notes
6. Sampling applications: estimation of population mean and population percentage
7. Sampling applications: testing hypotheses and making decisions

III.

1. Geometry	10 hours
2. Exponents and Radicals	5 hours
3. Graphs of Trigonometric Functions	5 hours
4. Exponential and Logarithmic Functions	5 hours
5. Variation	8 hours
6. Plane Analytic Geometry	8 hours
8. Statistics	20 hours

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III a. LEARNING ACTIVITIES:

TOPIC NUMBER	TOPIC DESCRIPTION	REFERENCE CHAPTER ASSIGNMENTS
1.0	**Geometry**	**Chapter 2**
1.1	Lines and angles	Questions 1-40, p. 52
1.2	**Triangles**	Questions 1-54, p. 58
1.3	**Quadrilaterals**	Questions 1-40, p. 62
1.4	**Circles**	Questions 1-48, p. 65
1.5	**Measurement of irregular areas**	Questions 1-20, p. 70
1.6	**Solid geometric Figures**	Questions 1-40, p. 73
2.0	**Exponents and Radicals**	**Chapter 11**
2.1	Simplifying expressions with integral exponents	Questions 1-70, p. 316
2.2	Fractional exponents	Questions 1-68, p. 320
3.0	**Graphs of Trigonometric Functions**	**Chapter 10**
3.1	Graphs of $y = a \sin x$ and $y = a \cos x$	Questions 1-40, p. 291
3.2	Graphs of $y = a \sin bx$ and $y = a \cos bx$	Questions 1-64, p 294
3.3	Graphs of $y = a \sin (bx + c)$ and $y = a \cos (bx + c)$	Questions 1-44, p. 298

4.0	**Exponential and Logarithmic Functions**	**Chapter 13**
4.1	Exponential functions	Questions 1-38, p. 364
4.2	Logarithmic functions	Questions 1-76, p. 368
4.3	Properties of logarithms	Questions 1-68 p. 373
4.4	Logarithms to Base 10	Questions 1-44, p. 376
4.5	Natural logarithms	Questions 1-56, p. 379
4.6	Exponential and logarithmic equations	Questions 1-60, p. 382
4.7	Graphs on Log and semi-log paper	Questions 1-40, p. 386
5.0	**Variation**	**Chapter 18**
5.1	Ratio and proportion	Questions 1-48, p. 493
5.2	Variation	Questions 1-60, p. 498

6.0	**Plane Analytic Geometry**	**Chapter 21**
6.1	Basic definitions	Questions 1-62, p. 562
6.2	The straight line	Questions 1-68, p. 567
7.0	**Basic Statistics**	**Chapter 22**
7.1	Frequency distributions	Questions 1-30, p. 612
7.2	Measures of central tendency	Questions 1-40, p. 616
7.3	Standard deviation	Questions 1-14, p. 621
7.4	Normal distribution	Questions 1-24, p. 626
7.5	Linear Regression including coefficient of correlation	Questions 1-12, p. 636 and hand out
7.6	Non-Linear Regression	Questions 1-12, p. 644

7.6	Estimation of pop. Mean and pop. percentage	handout
7.7	Testing hypotheses and making decisions	handout

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

1. Basic Technical Mathematics with Calculus (9th Edition) Washington, SI Version, Addison-Wesley, Pearson, 2010
2. Scientific calculator

Note: The use of some kinds of calculators and other electronic devises may be restricted during tests.

V. EVALUATION PROCESS/GRADING SYSTEM:

Evaluation will consist of two components:
i) four in class term tests worth 70%
ii) assignments and quizzes worth 30%

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The following semester grades will be assigned to students in postsecondary courses:

Grade	Definition	*Grade Point Equivalent*
A+	90 – 100%	4.00
A	80 – 89%	
B	70 - 79%	3.00
C	60 - 69%	2.00
D	50 – 59%	1.00
F (Fail)	49% and below	0.00

CR (Credit)	Credit for diploma requirements has been awarded.
S	Satisfactory achievement in field /clinical placement or non-graded subject area.
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.
NR	Grade not reported to Registrar's office.

VI. SPECIAL NOTES:

Course Outline Amendments:
The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Retention of Course Outlines:
It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Prior Learning Assessment**:**
Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question. Please refer to the Student Academic Calendar of Events for the deadline date by which application must be made for advance standing.

Credit for prior learning will also be given upon successful completion of a challenge exam or portfolio.

Substitute course information is available in the Registrar's office.

Disability Services:
If you are a student with a disability (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Disability Services office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

Communication:
The College considers ***WebCT/LMS*** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of the ***Learning Management System*** communication tool.

Plagiarism:
Students should refer to the definition of "academic dishonesty" in *Student Code of Conduct*. A professor/instructor may assign a sanction as defined below, or make recommendations to the Academic Chair for disposition of the matter. The professor/instructor may (i) issue a verbal reprimand, (ii) make an assignment of a lower grade with explanation, (iii) require additional academic assignments and issue a lower grade upon completion to the maximum grade "C", (iv) make an automatic assignment of a failing grade, (v) recommend to the Chair dismissal from the course with the assignment of a failing grade. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Student Portal:
The Sault College portal allows you to view all your student information in one place. **mysaultcollege** gives you personalized access to online resources seven days a week from your home or school computer. Single log-in access allows you to see your personal and financial information, timetable, grades, records of achievement, unofficial transcript, and outstanding obligations, in addition to announcements, news, academic calendar of events, class cancellations, your learning management system (LMS), and much more. Go to https://my.saultcollege.ca.

Electronic Devices in the Classroom:
Students who wish to use electronic devices in the classroom will seek permission of the faculty member before proceeding to record instruction. With the exception of issues related to accommodations of disability, the decision to approve or refuse the request is the responsibility of the faculty member. Recorded classroom instruction will be used only for personal use and will not be used for any other purpose. Recorded classroom instruction will be destroyed at the end of the course. To ensure this, the student is required to return all copies of recorded material to the faculty member by the last day of class in the semester. Where the use of an electronic device has been approved, the student agrees that materials recorded are for his/her use only, are not for distribution, and are the sole property of the College.

Attendance:
Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session.