



**CALCULUS**

**MTH 208 ^**

**Course Name**

**Course Number**

**TOTAL CREDIT HOURS: 64**

**PREREQUISITE(S): MTH220**

**SUBSTITUTE(S): MTH 551**

**L PHILOSOPHY/GOALS:**

This course provides an introduction to calculus. It begins with an introduction to derivatives and differentials and their applications and continues with indefinite and definite integrals of algebraic functions and their elementary applications, particularly to mechanics and fluid mechanics. It should be noted that logarithmic, exponential and trigonometric functions are not covered.

**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) Review of Plane Analytic Geometry, straight lines, circles and parabola, including equations, properties and graphing of each.  
6 hrs.
- (2) Derivative Calculus including functions, notations, limits, slopes of secants/tangents, delta method, derivative rules, and higher order differentiation.  
12 hrs.
- (3) Derivative Applications including slopes of tangents, normals to curves, curvilinear motion, curve sketching and maximum/minimum applications.  
10 hrs.
- (4) Integral Calculus involving differentials, anti-derivatives, indefinite, particular and definite integration.  
14 hrs.
- (5) Applications of Integration - determining area, volumes of solids of revolution, pressure on a submerged plate, work, flow over a weir.  
20 hrs.

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**IV. LEARNING ACTIVITIES:**

TOPIC	PERIODS	TOPIC DESCRIPTION	REFERENCE
1.		Plane Analytic Geometry Review	Ch. 20
	1.1	Straight line, slope, graphs, length, intersections	Ex. 20.1: 1,3,21,23,25,27,29, 31,37,39
	1.2	Circle	Ex. 20.2: Odds 1-39
	1.3	Parabola	Ex. 20.3: 1, 3-31 Ex. 20.4: 1-23,29 Ex. 20.7: 1,7,9,11,21,27
12		The Derivative	Ch. 22
	2.1	Functional notation	Para: 2-1, 2-2 Ex. 2.1
	2.2	Limits	Ex. 22.1, 1-47
	2.3	Slope of tangent to curve	Ex. 22.2 Para: 22-2 Ex. "C" 9,11,15,17,21
	2.4	Derivative - delta method - meaning	Ex. 22.3: 11,15, 17,19,26 Ex. 22.4: 9,11,13,17, 23,29
	2.5	Derivative of polynomial - by rule	Ex. 22.5: Odds 1-41
	2.7	Composite functions - chain rule	Ex. 22.7: Odds 1-21, 25,37,39
	2.9	Higher derivatives	Ex. 22.9: Odds 1-19, 29-35 Review Ex. Pg.689 as required
10		Applications of Derivatives	Ch. 23
	3.1	Tangents and Normals	Ex. 23.1: Odds 1-19
	3.2	Curvilinear motion	Ex. 23.3: Odds 1-17
	3.4	Curve sketching	Ex. 23.5: Odds 1-25
	3.5	Maximum/minimum applications	Ex. 23.7 and Hand Out Sheet, Review Ex. as Req'd

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TOPIC PERIODS	TOPIC DESCRIPTION	REFERENCE
14	Integration	Ch. 24
	4.1 Differentials	Ex. 24.1: Odds 1-25
	4.2 Antiderivatives	Ex. 24.2: Odds 1-29
	4.3 Indefinite particular integrals	Ex. 24.3: Odds 1-43
	4.4 Definite integrals	Ex. 24.5: Odds 1-33
		Review Ex. - as Req'd
20	Application of Integration	Ch. 25
	5.1 Application of Indefinite Integrals	Ex. 25.1: 3,7,11,17,27
	5.2 Areas	Ex. 25.2: Odds, 1-31
	5.3 Volumes of revolution, disc, washer <i>ic</i> shell methods	Ex. 25.3: Odds
	5.4 Work	Ex. 25.6: Odds
	5.5 Pressure on submerged plates	Hand Out Sheet
	5.6 Flow over weirs	Hand Out Sheet

The student will be expected to attend all classes punctually and do all the assigned work. Work will be assigned from the previously listed exercises in the textbook.

At the discretion of the instructor, other exercises in the textbook may be used and work may be assigned from handouts supplied by the instructor.

**V. EVALUATION METHODS: (INCLUDES ASSIGNMENTS, ATTENDANCE REQUIREMENTS ETC.)**

The student's progress will be assessed by periodic written tests. The student's final grade is based upon a weighted average of the test results. **ATTENDANCE AT ALL TESTS IS REQUIRED.** Unexcused absence from a test will result in a mark of zero for that test. A student may be prevented from attending a test by illness or bereavement. Upon return to classes, the student must see the instructor at the end of the first mathematics class attended to arrange a time and place for a make up test. In addition, if the absence is due to illness the student must present a note from the student's doctor or from the College nurse.

If, at the end of the semester, a student has an average between 45% and 54%, the instructor will consider permitting the student to do make up work in hope of raising his/her standing to a passing level. If a student has not written all of the topic tests, or if the student has attended fewer than 80% of the scheduled classes, or if the student has not done all of the assigned work during the semester, then the make up privilege will not be granted. At the discretion of the instructor a student who is granted the make up privilege may be required to write one topic test in hope of raising his/her average *QL* he/she may be required to write an examination on the whole course. Such tests and examinations are not provided for the purpose of obtaining grades higher than "C".

Due to circumstances beyond the control of the instructor, the time available for the student to prepare for the make up test or examination is usually so limited that the student has little opportunity to improve. Hence, the student should make diligent efforts to avoid any need for make up privileges.

Make up tests will not be made available in this course in any other circumstances than those described above.

The final mark (grade) will be based on the average results of several tests.

GRADING:	<b>A+</b>	= 90 to 100%
	A	= 80 to 89%
	B	= 65 to 79%
	C	= 55 to 64%
	R	= 0 to 54%

A passing grade will be based on a MINIMUM average of 55%.

**V. EVALUATION METHODS:** (cont'd)

As In any other subject the student is preparing for his working career as well as studying the subject. Hence, on tests the student is expected to produce neat, legible, well laid out solutions which show clearly how the answers were obtained. If anything less is required, this will be indicated in the test. Failure to show such solutions may render correct answers worthless. As happens in the workplace, if anything you put on paper can be misread it will be. In addition to loss of marks on individual questions, up to 25% of the marks available on a test can be subtracted as a penalty for untidiness. Marks lost in such penalties can be redeemed by a student willing to put forth the required effort. Proper solutions as described above should be produced for all your assigned work. Such practice will make it easier for you to produce the required quality of work on tests. If when you look at a page of your work it makes you feel proud of its appearance, than you are probably on target.

Marks allotted to each question on a test are usually shown. Please enquire if they are not. The questions on a test do not necessarily have equal values.

Full attendance at all scheduled classes is required. Any student with unexcused absences exceeding 10% of the classes will have his math grade reduced, provided that this does not reduce the grade below a "C".

**VI. REQUIRED STUDENT RESOURCES:**

1. TEXT: Basic Technical Mathematics with Calculus Washington, Alan J., 5th (metric) Ed., Benjamin Cummings.
2. CALCULATOR: (Recommended) SHARP Scientific Calculator EL-531G. The use of some kinds of calculators may be restricted during tests.

**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.