EFFECTIVE: SEPTEMBER 2004
CURRICULUM GUIDELINES

A.	Division:	**Instructional**	Effective Date:		**September 2004**
B.	Department / Program Area:	**Mathematics/ Science & Technology**	Revision	**X**	New Course

M: Course Objectives / Learning Outcomes

General comments: MATH 1220 is a second course in calculus. The four-semester sequence of MATH 1120, 1220, 2321, and 2421 provides the foundation for continued studies in science, engineering, computer science, or a major in mathematics.

Specific objectives:

At the conclusion of this course, the student should be able to:

- compute finite Riemann sums and use to estimate area
- form limits of Riemann sums and write the corresponding definite integral
- recognize and apply the Fundamental Theorem of Calculus
- evaluate integrals involving exponential functions to any base
- evaluate integrals of reciprocal functions
- evaluate integrals involving basic trigonometric functions and integrals whose solutions require inverse trigonometric functions
- be able to choose an appropriate method and apply the following techniques to finding antiderivatives and evaluate definite integrals:
  - a) integration by parts
  - b) trigonometric and rationalizing substitution
  - c) completing the square for integrals involving quadratic expressions
  - d) partial fractions
  - e) integrals of products of trigonometric functions
- apply integration to problems involving areas, volumes, arc length, work, velocity and acceleration

trigonometric integrals (products and powers)
partial fractions (linear factors and distinct quadratic factors)
rationalizing substitutions
improper integrals

3. Applications of Integration
   - areas between curves
   - volumes by slicing and cylindrical shells
   - work
   - separable differential equations
   - arc length

4. Infinite Series
   - sequences
   - sum of a geometric series
   - absolute and conditional convergence
   - comparison tests
   - alternating series
   - ratio and root test
   - integral test
   - power series
   - differentiation and integration of power series
   - Taylor and Maclaurin series
   - polynomial approximations; Taylor polynomials

5. Parametric Equations and Polar Coordinates
   - areas and arc lengths of curves in polar coordinates
   - areas and arc lengths of functions in parametric form

6. Optional Topics (included at the discretion of the instructor)
   - tables of integrals
   - approximation of integrals by numerical techniques
   - Newton's law of cooling, Newton's law when force is proportional to velocity, and logistics curves
   - a heuristic "proof" of the Fundamental Theorem of Calculus
   - the notion of the logarithm defined as an integral
   - further applications of Riemann sums and integration
   - binomial series

Q: Means of Assessment

Evaluation will be carried out in accordance with Douglas College policy. The instructor will present a written course outline with specific evaluation criteria at the beginning of the semester. Evaluation will be based on the following criteria:

1.	Weekly quizzes	0 – 40%
2.	Tests	20 – 70%
3.	Assignments	0 – 15%
4.	Attendance	0 – 5%