UNIVERSIDAD TECNICA FEDERICO SANTA MARIA
MATHEMATICS DEPARTMENT

Subject: **MATHEMATICS I**		Acronym: **MAT-021**
Prerequisites: **First Year Admission**	Credits: **5**	Exam: **Does not have**
Weekly hours Lecture**: 8**	Weekly hours Assistantship: **2**	Weekly hours Laboratory: **Does not have**

OBJECTIVES:
Upon passing the course, the student will be able to use mathematical language and properly handle the basic notions of differential calculus to solve problems from physical, engineering, economic or other fields.

CONTENTS:

1) Fundamentals of mathematical language: notions of logic and set theory. Mathematical induction. Real numbers. Inequalities, absolute value, intervals, linear and quadratic inequalities, simple linear programming problems.
2) Basic analytical geometry: the line, circle, parabola, ellipse, and hyperbola.
3) Functions: fundamental notions about functions and their graphical representation. Domain and path, injectivity, epijectivity, bijectivity, composition of functions, inverse function, polynomial functions. Applications: polynomial equations.
4) Trigonometry: trigonometric functions, their graphs, and their inverses. Fundamental identities and trigonometric equations. Applications.
5) Complex Numbers: binomial and polar forms, algebra of complex numbers, roots of complex numbers.
6) Limits and continuity: limit of a function, algebraic properties, calculus of limits, continuous functions, intermediate value theorem and its applications.
7) The derivative: geometric and physical interpretation. Algebra of derivatives and basic theorems. Implicit and parametric differentiation. Applications: rate of change, approximation, maximums and minimums, graph of curves, setting problems.
8) Antiderivative: notions and applications of the antiderivative, problems with initial values.

METHODOLOGY:
Expository classes combined with cooperative learning techniques.
Experimentation with short teaching-learning cycles.
Exercise guides with notes from the Mathematics Department and use of appropriate software.

GUIDE TEXT:
STEIN, S., BARCELLOS, A. "*Calculus and Analytic Geometry*", McGraw-Hill Publishing House 1995.

BIBLIOGRAPHY:
STEWART, J. "CALCULUS*"*, Grupo Editorial Iberoamérica, 1994.

EVALUATION:
At least four tests and at least four partial evaluations.

Prepared: ISN
Approved: CC.DD. Agreement 43/97
Date: 01/20/98

Observation: