SUBJECT SYLLABUS
ACADEMIC OVERVIEW
INTERNATIONAL SCHOOL OF ECONOMIC & ADMINISTRATIVE SCIENCES

COURSE NAME AND CODE: **Differential Calculus (21101)**
PROGRAM:

Bachelor of Business Administration (BBA)
Bachelor of Administration & Service (BA&S)
Bachelor of International Business (BIB)
Bachelor of International Marketing & Logistics Administration (BIMLA)
Bachelor of Economics & International Finance (EIF)

LEVEL OF STUDY: **Undergraduate Programme**

GENERAL ACADEMIC INFORMATION					
LATEST UPDATE	2020-2				
ACADEMIC DEPARTMENT	Mathematics & Statistics				
SUBJECT TYPE	Mandatory				
LANGUAGE	Spanish				
SEMESTER	Programme	Semester			
	BBA	2			
	BA&S	2			
	BIB	2			
	BIMLA	2			
	EIF	1			
NUMBER OF ACADEMIC CREDITS	3				
HOURS OF ACADEMIC WORK	144	**Contact hours**	96	**Hours of independent/autonomous work**	48

Universidad de La Sabana

LEARNING PREREQUISITES	• Apply inductive and/or deductive reasoning to set-up, solve and evaluate solutions in different contexts. • Apply algebraic operation properties to set-up, solve, and evaluate problems in different contexts.
INTERNATIONAL COMPONENT	• Research and/or projects with international and intercultural components.
SUSTAINABLE DEVELOPMENT GOALS (SDG)	4. Quality Education
COURSE DETAILS	
COURSE DESCRIPTION	Differential calculus is a course which promotes the usage of methods and applications of one variable calculus, the development of mathematical thinking and the communication of ideas in a mathematical language. The student will acquire the mathematical knowledge and skills which concern changes and movement through the modeling of real-life scenarios with the fundamental object of calculus: functions. Learning will be developed with mathematical reasoning of functions in the real numbers, limits and continuity, derivatives and their applications. Problem solving exercises plays an important role in learning Calculus, which is why the student will apply theorical concepts to applied problems in specific contexts. It is fundamental for an alumnus to be able to model situations which happen in their professional life to be able to determine possible patters and generate valid inferences in said situations. In this course all the basic tools are provided in order to solve said processes, from a mathematical context.
KEY WORDS:	Mathematical thinking, Abstract reasoning, Functions, Differentiation

COMPETENCES DEVELOPED

EICEA ILOS or Programme ILOS	Course ILOS	Type	Content	Teaching and Learning strategy	Assessment Method
ILO01 ILO02 ILO03 BBA ILO08 BIB ILO09	**Represent** different situations in multiple contexts with one variable functions.	Knowledge	REAL NUMBER FUNCTIONS - Real number functions - Combination of functions - Operations with functions - Types of functions and some special functions	Theoretical Class	Evaluation of learning will be done using written and oral methods in regards of declarative

	ILO01 ILO02 ILO03 BBA ILO08 BIB ILO09	**Understand** the concept of continuity in math with regards to the mathematical limits of calculus.	Skill	LIMITS AND CONTINUITY - Rate of change and limits - Limit of a function - Properties of limits - Lateral limits - Infinite limits - Limits to the power of infinity - Continuity	Thinking Based Learning	knowledge. Evaluation techniques will be used in group or individual work. Rubrics will be used to evaluate the learning evidence of the students, and thus proceed to give feedback of the final answer and the process.
	ILO01 ILO02 ILO03 BBA ILO08 BIB ILO09	**Solve** problems in different contexts applying rate of change concepts.	Skill	DERIVATION - Tangents and the derivative of a point - Derivative as a function - Rules of derivatives - Derivative as a rate of change. - Derivatives of trigonometric functions - Derivatives of logarithmic and exponential functions - Chain rule - Implicit derivation - Rate of change and related rates	Challenge Based Learning	
	ILO01 ILO02 ILO03 BBA ILO08 BIB ILO09	**Apply** derivatives of a function to solve optimization problems in different contexts, evaluate results and/or make inferences.	Skill	APPLICATIONS OF DERIVATIVES - Extreme values of a function - Mean value theorem - Criteria of the first and second derivative - Curve tracing - Undetermined forms - Application problems	Challenge Based Learning	

				- Multiple variable functions		

ILO02: Critical Thinking: Evaluate information using critical and analytical reasoning to address changing economic and business situations.

ILO03: Teamwork: Understand and work with others of different backgrounds to solve problems, develop meaningful relationships, and share knowledge.

ILO04: Ethics & Social Responsibility: Demonstrate awareness of ethical issues in business environments and contribute to the improvement of social conditions.

BBA ILO08: Communication: Communicate effectively in written and spoken manner in Spanish and English.

BIB ILO08: International Business Plan: Develop and apply entrepreneurial spirit and creative thinking through a business plan associated with an established company or a student start-up.

BIBLIOGRAPHY

- THOMAS, George B. Cálculo una variable. George Jr. Editorial Pearson.
- STEWART, James. Cálculo Trascendentes Tempranas. (Texto Guía)
- LEITHOLD, Louis El Cálculo. Harla SA Editores.
- PURCELL, J Edwin y Varberg, Dale. Cálculo con Geometría Analítica.
- PISKUNOV, N. Cálculo Diferencial e Integral. Grupo Noriega Editores. ISBN 84- 274-0296-1. 1993. México
- BUDNICK, Frank. Matemáticas Aplicadas Para Administración y Economía. McGraw-Hill.
- HUGHES, Deborah. Cálculo Aplicado.
- HAEUSSLER, Ernest F, Jr. Matemática para Administración y Economía. Décima edición.