Universidad de La Sabana

SUBJECT SYLLABUS
ACADEMIC OVERVIEW
INTERNATIONAL SCHOOL OF ECONOMIC & ADMINISTRATIVE SCIENCES

COURSE NAME AND CODE: **Integral Calculus (21201)**
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**

<table>
<tr><th colspan="6">GENERAL ACADEMIC INFORMATION</th></tr>
<tr><td>LATEST UPDATE</td><td colspan="5">2020-2</td></tr>
<tr><td>ACADEMIC DEPARTMENT</td><td colspan="5">Mathematics & Statistics</td></tr>
<tr><td>SUBJECT TYPE</td><td colspan="5">Mandatory</td></tr>
<tr><td>LANGUAGE</td><td colspan="5">Spanish</td></tr>
<tr><td rowspan="6">SEMESTER</td><td>Programme</td><td colspan="2">Semester</td><td colspan="2"></td></tr>
<tr><td>BBA</td><td colspan="2">3</td><td colspan="2"></td></tr>
<tr><td>BA&S</td><td colspan="2">3</td><td colspan="2"></td></tr>
<tr><td>BIB</td><td colspan="2">3</td><td colspan="2"></td></tr>
<tr><td>BIMLA</td><td colspan="2">3</td><td colspan="2"></td></tr>
<tr><td>EIF</td><td colspan="2">2</td><td colspan="2"></td></tr>
<tr><td>NUMBER OF ACADEMIC CREDITS</td><td colspan="5">3</td></tr>
<tr><td>HOURS OF ACADEMIC WORK</td><td>144</td><td>Contact hours</td><td>64</td><td>Hours of independent/autonomous work</td><td>80</td></tr>
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LEARNING PREREQUISITES	• Read, write and interpret mathematical notation, tables, diagrams and graphs. • Apply algebraic operation properties to solve and evaluate problems in different contexts. • Model situations in different contexts with one variable functions • Analyze functions from their concepts and properties • Apply implicit derivation to solve problems of related rate of change and evaluate results. • Apply the criteria of first and second derivatives to optimize situations in different contexts and evaluate results. • Calculate derivatives applying properties.
INTERNATIONAL COMPONENT	• Vocabulary and technical language to communicate in different cultural contexts.
SUSTAINABLE DEVELOPMENT GOALS (SDG)	4. Quality Education
COURSE DETAILS	
COURSE DESCRIPTION	Integral Calculus develops and secures mathematical reasoning around the themes of one variable calculus, deepening in themes such as area under the curve, integrals, infinite sums, function representation, said concepts being foundational for the important applications of diverse branches of knowledge, engineer, management, economy, etc.
KEY WORDS:	Abstract reasoning, problem solving, calculus

COMPETENCES DEVELOPED

EICEA ILOS or Programme ILOS	Course ILOS	Type	Content	Teaching and Learning strategy	Assessment Method
ILO02 ILO03 ILO04 BBA ILO08 BIB ILO08	Understand the concept of a defined integral as an approximation of the area under a curve.	Knowledge	**Integrals** 1. Sigma notation 2. Areas and estimation with finite sums 3. Defined integral definition 4. Fundamental Theorem of Calculus	Theoretical Class	Progress in indicators of learning or performance are evaluated in different instances throughout the

		ILO02 ILO03 ILO04 BBA ILO08 BIB ILO08	Use integration techniques to calculate the volume of solids of revolution, and area between curves.	Skill	**Integrals** 5. Antiderivatives 6. Undefined integrals **Methods of integration** 1. Substitution method 2. Integration by parts 3. Trigonometric integrals 4. Partial fractions 5. Improper integrals **Applications** 1. Areas between curves 2. Volumes of solids of revolution	Problems Based Learning	semester with quizzes, workshops, homework, group projects, individual tests, and a final exam, in which the student must demonstrate the learning objectives of the course. Rubrics will be used to evaluate de learning evidence and the respective feedback of the process and final answer. Exam feedback will be individual and collective work feedback will be given in groups.
		ILO02 ILO03 ILO04 BBA ILO08 BIB ILO08	Use integration techniques to solve problems of Economy, Management, Engineering, and probability theory.	Skill	**Applications** 3. Integrals in science and economics 4. Integrals in physics and engineering	Projects Based Learning	
		ILO02 ILO03 ILO04 BBA ILO08 BIB ILO08	Use numeric methods to approximate the value of some defined integrals and their corresponding estimation error.	Skill	**Applications** 5. Simpsons Rule and Trapezium Rule	Problems Based Learning	
		ILO02 ILO03 ILO04 BBA ILO08 BIB ILO08	Use power series to approximate functions around a given point.	Skill	**Successions and series** 1. Series 2. Criteria of integrals 3. Alternating Series 4. Reason criteria and root n estimation 5. Series of powers 6. Taylor and Maclaurin series	Theoretical Class	

	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	• Stewart, J., *Cálculo en una variable Transcendentes tempranas* (Vol1), Cengage Learning, Edición 7, México. 2012. • THOMAS, JR., GEORGE B., *Cálculo. Varias variables*, PEARSON EDUCACIÓN, Décimo tercera edición, México, 2015. • Cano, R., *Cálculo Integral*, Universidad de la Sabana, 2ª edición, Colombia. 2017. • Edwards, Penney., *Cálculo con Geometría Analítica*. Prentice Hall. México. 1996. • Salas, S.L., Hille E., *Cálculo de una y varias variables con Geometría analítica*. Reverte.2000.