



Unit of Study Information

Code	Unit	Evaluation Method	Mode	Session options
MA71A	Differential and Integral Calculus 1	Grade and Attendance	Presencial	Semestral

Workload					
TC	PC	OA	SPA	PACC	Total
6	0	6	0	0	90
<ul style="list-style-type: none">• TC: Theorethic Classes (per week);• PC: Practical Classes (per week);• OA: Out-of-class Activities (hours per session);• SPA: Supervised Practical Activities (classes per session);• PACC: Practical Activities as Curricular Components (classes per session, included in OA and SPA);• Total: total workload in hours.					

Learning Outcomes		
Develop mathematical reasoning and enable students to master the techniques of Differential and Integral Calculus, aiming at their application in the analysis and resolution of problems in the area of Science and Engineering.		
Syllabus		
Numerical sets. Real functions of one Real variable. Limits and Continuity. Derivatives, Differentials and Applications. Definite and Indefinite Integrals and Applications. Integration Techniques.		
Content		
Order	Syllabus	Content
1	Numerical sets	1.1 Numeric Sets. 1.2 Module of a real number. 1.3 Interval Operations.
2	Real functions of one Real variable	2.1 Cartesian Coordinate System. 2.2 Definition of Binary Relationship. 2.3 Definition of function. 2.4 Domain, Counter Domain and Image. 2.5 Injective, surjective and bijective function 2.6 Reverse function. 2.7 Compound Function. 2.8 Polynomial Functions. 2.9 Exponential and Logarithmic Functions. 2.10 Trigonometric Functions.
3	Limits and Continuity	3.1 Intuitive Notion and Definition of Limit. 3.2 Limits Properties. 3.3 Lateral limits. 3.4 Continuity of Functions. 3.5 Properties of Continuous Functions. 3.6 Infinite limits and limits in Infinity. 3.7 Asymptotes. 3.8 Fundamental Limits.
4	Derivatives, Differentials and Applications	4.1 Definition of Derivative. 4.2 Geometric Interpretation of Derivatives. 4.3 Tangent Straight Equation. 4.4 Rate of Change. 4.5 Higher Order Derivatives. 4.6 Derivation Rules. 4.7 Chain Rule. 4.8 Inverse Function Derivative. 4.9 Derived from Implicit Function. 4.10 Differential of a Function and Linear Approximations. 4.11 Rolle's Theorem, Mean Value Theorem. 4.12 Growth, Decrease, and Extreme Function Values 4.13 L'Hospital Rule. 4.14 Applications: Maximization and Minimization Problems.
5	Definite and Indefinite Integrals and Applications.	5.1 Primitives. 5.2 Indefinite Integral. 5.3 Riemann Sum. 5.4 Definite Integrals. 5.5 Properties of Definite Integrals. 5.6 Fundamental Theorem of Calculus. 5.7 Applications of Definite Integrals.
6	Integration Techniques	6.1 Integration by Substitution. 6.2 Integration by Parts. 6.3 Integration by Substitution of Trigonometric Variables. 6.4 Integration of Rational Functions. 6.5 improper integrals.

Basic Resources
STEWART, James. Cálculo. São Paulo, SP: Cengage Learning, c2017. 2 v. ISBN 852212583X (v.1).
GUIDORIZZI, Hamilton Luiz. Um curso de cálculo. 5. ed. Rio de Janeiro, RJ: LTC, 2001-2002. 4 v. ISBN 8521612591 (v.1).
ANTON, Howard; RORRES, Chris. Álgebra linear com aplicações. 10. ed. Porto Alegre, RS: Bookman, 2012. 768 p. ISBN 978-85-407-0169-4.

Additional Resources
SHENK, Al. Cálculo e geometria analítica. 3. ed. Rio de Janeiro: Campus, 1990. 2 v. ISBN 85-7001-122-9 (Obra comp
ANTON, Howard. Cálculo: um novo horizonte. 6. ed. Porto Alegre, RS: Bookman, 2006. 2 v. ISBN 85-7307-652-6.
MUNEM, Mustafa A; FOULIS, David J. Cálculo. 2. ed. Rio de Janeiro: Guanabara Dois, 1982. 2 v. ISBN 85-7030-021-2 (obra comp
SWOKOWSKI, Earl Willian. Cálculo com geometria analítica. 2. ed. Rio de Janeiro, RJ: Makron, c1995. 2 v. ISBN 8534603103.
PISKOUNOV, N. S. (Nicolai Seminovich). Cálculo diferencial e integral. 11. ed. Porto, PO: Lopes da Silva, 1986. 2 v
LEITHOLD, Louis. O cálculo com geometria analítica. 3. ed. São Paulo, SP: HARBRA, c1994. 2 v. ISBN 8529400941(v.1).
STEWART, James. Cálculo. São Paulo, SP: Cengage Learning, 2009. 2 v. ISBN 8522106606 (v.1).