Unit of Study Information

Code	Unit	Evaluation Method	Mode	Session options
MA72A	Differential And Integral Calculus 2	Grade and Attendance	Presencial	Semestral

Workload					
TC	PC	OA	SPA	PACC	Total
4	0	4	0	0	60

- 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 the student to master the techniques of Differential and Integral Calculus, aiming their application in the analysis and resolution of problems in the area of Science and Engineering.

Syllabus

Topological notions in R^2 and R^3. Real functions of several real variables. Limit and continuity of functions of several real variables. Differentiability and applications. Polar, cylindrical and spherical coordinates. Multiple integration and its applications.

Content

Order	Syllabus	Content
1	Topological notions in R^2 and R^3	1.1. Interior, exterior and border of a set. 1.2. Neighborhoods and accumulation points. 1.3. Open, closed and compact set.
2	Real functions of several real variables	2.1 Definition, domain, image and properties. 2.2 Graphs and contours of real functions of two variables. 2.3 Level surface functions of three variables.
3	Limit and continuity of functions of several real variables	3.1 Definition and examples. 3.2 Properties of limits. 3.3 Confrontation Theorem. 3.4 Continuity for compound functions.
4	Differentiability and applications	4.1 Partial Derivatives: definition, examples, notations, interpretation. 4.2 Higher order partial derivatives. 4.3 Differentiable function and the tangent plane. The differential. 4.4 Sufficient condition of differentiability 4.5 Chain rule. Implicit derivation. 4.6 Directional Derivative. 4.7 Maximum and minimum values. 4.8 Lagrange Multipliers
5	Polar, cylindrical and spherical coordinates	5.1 Polar coordinates: definition, graph, relationship with Cartesian coordinates, areas and lengths. 5.2 Cylindrical coordinates: definition, graphs, relationship to Cartesian coordinates. 5.3 Spherical coordinates: definition, graphs, relationship to Cartesian coordinates.
6	Multiple integration and its applications	6.1 Definitions and properties. 6.2 Fubini's theorem. 6.3 Change of Variable in Multiple Integrals. 6.4 Double integrals in polar coordinates. 6.5 Triple integrals in cylindrical and spherical coordinates. 6.6 Applications.

Basic Resources

STEWART, James. Cálculo. São Paulo, SP: Cengage Learning, c2014. 2 v. ISBN 8522112584 (v.1).

MUNEM, Mustafa A; FOULIS, David J. Cálculo. 2. ed. Rio de Janeiro: Guanabara Dois, 1982. 2 v. ISBN 85-7030-021-2 (obra comp

LEITHOLD, Louis. O cálculo com geometria analítica. 3. ed. São Paulo, SP: HARBRA, c1994. 2 v. ISBN 8529400941(v.1).

Aditional Resources

ANTON, Howard; BIVENS, Irl; DAVIS, Stephen. Cálculo. 8. ed. Porto Alegre, RS: Bookman, 2007. 2 v. ISBN 8560031634 (v.1).

GUIDORIZZI, Hamilton Luiz. Um curso de cálculo. 5. ed. Rio de Janeiro, RJ: LTC, 2001-2002. 4 v. ISBN 8521612591 (v.1).

SHENK, Al. Cálculo e geometria analítica. 3. ed. Rio de Janeiro: Campus, 1990. 2 v. ISBN 85-7001-122-9 (Obra comp

PISKOUNOV, N. S. (Nicolai Seminovich). Cálculo diferencial e integral. 11. ed. Porto: Lopes da Silva, 1986. 2 v.

THOMAS, George Brinton; WEIR, Maurice D.; HASS, Joel. Cálculo. 12. ed. São Paulo, SP: Pearson Education do Brasil, c2013. v. ISBN 9788581430867 (v.1).

APOSTOL, Tom M. Cálculo: cálculo com funções de várias variáveis e álgebra linear, com aplicações às equações diferenciais e as probabilidades . Rio de Janeiro: Reverte, c1985. 2 v. ISBN 84-291-5014-5 (obra comp