Unit of Study Information

Code	Unit	Evaluation Method	Mode	Session options
MA73A	Differential And Integral Calculus 3	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

Provide students with the knowledge of Differential and Integral Vector Calculus concepts and Complex Variable Functions necessary for the analysis and resolution of problems in the area of Science and Engineering.

Syllabus

Vector functions. Vector calculus. Sequences and numerical series. Power series. Complex variables.

Content

Order	Syllabus	Content
1	Vector functions	Point vector field or position vector field. Point vector functions or position vector functions. Relations between position scalar functions and position vector functions.
2	Vector calculus	Limit and continuity of position vector functions. Derivatives of position vector functions. Differentials of position vector functions. Integrals involving position vector functions. Directional derivatives. Gradient. Vector notation of directional derivatives. Maximum and minimum directional derivatives. Divergent, rotational, laplacian and binary compounds. Solenoid, irrotational, harmonic and conservative fields. Curvy Integral or Line Integral. Vector notation of line integrals. Green's theorem. Stokes theorem. Divergence theorem. Surface integral.
3	Sequences and numerical series	Sequences and numerical series. Sequences and series of functions. Convergence and convergence criteria.
4	Power series	Power series. Resolution of differential equations by power series.
5	Complex variables	Complex numbers. Simple and multiple connected regions. Functions with complex variables. Limits of complex variable functions. Continuity of complex variable functions. Derivatives of complex variable functions. Differentials of complex variable functions. Analytical Functions. Cauchy-Riemann equations. Laplace conditions for identification of analytical function. Curvy integrals in the complex plane. Complex form of Green's theorem. Cauchy-Goursat integral theorem. Cauchy Integral Formula.

Basic Resources

ÁVILA, Geraldo. Variáveis complexas e aplicações. 3. ed. Rio de Janeiro, RJ: LTC, 2000. 271p. ISBN 9788521612179.

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

KREYSZIG, Erwin. Matemática superior. 2. ed. Rio de Janeiro, RJ: LTC, 1983-85. 4 v. ISBN 8521601808 (obra complet

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

Aditional Resources

SPIEGEL, Murray R. Análise vetorial: com introdução a análise tensorial . São Paulo: McGraw-Hill do Brasil, c1972. 300 p. (Coleção Schaum)

HONIG, Chaim Samuel. Introdução as funções de uma variável complexa. 4. ed. Rio de Janeiro, RJ: Guanabara Dois, 1981. 168 p.

SPIEGEL, Murray R. Cálculo avançado: resumo de teoria, 925 problemas resolvidos, 892 problemas propostos. Rio de Janeiro, RJ: McGraw-Hill, c1971. 500 p. (Coleção Schaum).

SOARES, Márcio Gomes. Cálculo em uma variável complexa. 5. ed. Rio de Janeiro, RJ: IMPA, 2009. 196p. (Matemática universitária). ISBN 9788524401442.

CHURCHILL, Ruel V. Variáveis complexas e suas aplicações. São Paulo, SP: McGraw-Hill do Brasil, 1975. 276 p.

KREYSZIG, Erwin. Matemática superior para engenharia. 9. ed. Rio de Janeiro, RJ: LTC, 2009. 3 v. ISBN 978-85-216-1643-6 (v.1).