Unit of Study Information

Code	Unit	Evaluation Method	Mode	Session options
MA70G	Ordinary Differential Equations	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 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

First order differential equations. First order and higher order linear differential differential equations. Systems of linear ordinary differential equations. Resolution of differential equations in power series.

Content

Order	Syllabus	Content
1	First order differential equations	1.1 Autonomous Differential Equations. 1.2 Differential Equations of Separable Variables. 1.3 First Order Homogeneous Differential Equations. 1.4 Reducible Equations to Differential Equations of Separable Variables. 1.5 Reducible Equations to Homogeneous Differential Equations. 1.6 Integration Factors. 1.7 Exact Differential Equations. 1.8 Differential Equations Reducible to Exact Differential Equations. 1.9 Linear Differential Equations. 1.10 Bernoulli Differential Equations. 1.11 Riccati Differential Equations. 1.12 Definition of Wrap, Wrapped, and Evolute. 1.13 Singular Solution of a Differential Equation. 1.14 Clairaut Differential Equation. 1.15 Lagrange Differential Equation.
2	First order and higher order linear differential differential equations	2.1 Second Order Differential Equations. 2.2 Linear and Homogeneous Differential Equations of Constant Coefficients. 2.3 Nonhomogeneous Differential Equations. 2.4 Coefficient Determination Method (Descartes Method). 2.5 Parameter Variation Method (Lagrange Method). 2.6 Operators Method. Simplification in Operators' Employment. 2.7 Definition of Linear Differential Equations of Variable Coefficients. 2.8 Cauchy-Euler Differential Equation. 2.9 Applications.
3	Systems of linear ordinary differential equations	3.1 Definition of Canonical System. 3.2 Definition of Normal System. 3.3 Differential Equation Systems in Symmetrical Form 3.4 Homogeneous Linear Systems 3.5 Non-Homogeneous Linear Systems 3.6 Notions of Stability
4	Resolution of differential equations in power series	4.1 Power Series. 4.2 Power Series Method for Solving Second Order Differential Equations

Basic Resources

BOYCE, William E.; DIPRIMA, Richard C. Equações diferenciais elementares e problemas de valores de contorno. 9. ed. Rio de Janeiro, RJ: LTC, c2010. xiv, 607 p. ISBN 9788521617563.

ABUNAHMAN, Sérgio Antônio. Equações diferenciais. 2. ed. Rio de Janeiro, RJ: Didática e Científica, 1989. 321 p. ISBN 85-85514-11-6.

ZILL, Dennis G. Equações diferenciais com aplicações em modelagem. 2. ed. São Paulo, SP: Cengage Learning, 2011. xii, 410 p. ISBN 9788522110599.

Aditional Resources

IÓRIO, V. de M. EDP: um curso de graduação. Rio de Janeiro: IMPA, 2001.

ZILL, Dennis G.; CULLEN, Michael R. Equações diferenciais. 3. ed. São Paulo, SP: Pearson Makron Books, c2001. 2 v. ISBN 8534612919 (v.1).

MACHADO, Kleber Daum. Equações diferenciais aplicadas à física. 2.ed. . Ponta Grossa: Ed. UEPG, 2000. 598 p. ISBN 8586941042.

AYRES, Frank. Equações diferenciais: resumo de teoria, 560 problemas resolvidos, 509 problemas propostos. São Paulo, SP: McGraw-Hill, 1973. 397 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).

SIMMONS, George Finlay; KRANTZ, Steven G. Equações diferenciais: teoria, técnica e prática . São Paulo, SP: McGraw-Hill, 2008. 529 p. ISBN 9788586804649.

FIGUEIREDO, Djairo Guedes de; NEVES, Aloisio Freiria. Equações diferenciais aplicadas. 3. ed. Rio de Janeiro, RJ: IMPA, 2008. 307 p. (Matemática universitária). ISBN 9788524402821.

KREYSZIG, Erwin. Advanced engineering mathematics. 8th ed. New York: J. Wiley, c1999. 1 v. (várias paginações) ISBN 0-471-15496-2