



CURRICULAR

Código:	Fundamentos De Matemática Para Computação -	Tipo de Unidade Curricular	
000000000	3c	Optativa	
Ano Lectivo	Curso:	Ciclo Estudos:	
2013-2014	Doutoramento em Arquitetura	1º <input type="checkbox"/> 2º <input type="checkbox"/> 3º <input checked="" type="checkbox"/>	
Créditos:	Idioma leccionado	Ano Curricular:	
5,0 ECTS	<input checked="" type="checkbox"/> Português <input type="checkbox"/> Inglês <input type="checkbox"/> Outro idioma	1º <input type="checkbox"/> 2º <input type="checkbox"/> 3º <input type="checkbox"/> 4º <input type="checkbox"/> 5º <input type="checkbox"/>	
Área Científica:	<input type="checkbox"/> Arq. ^a <input type="checkbox"/> Urb. ^o <input type="checkbox"/> Design <input type="checkbox"/> DCV <input type="checkbox"/> CST <input checked="" type="checkbox"/> TAUD <input type="checkbox"/> HTAUD	Anual:	Semestral:
		<input type="checkbox"/>	1º <input type="checkbox"/> 2º <input checked="" type="checkbox"/>
Pré-requisitos:		Trimestral:	
Sim <input checked="" type="checkbox"/> Não <input type="checkbox"/>	Matemática e Estatística	1º <input type="checkbox"/> 2º <input type="checkbox"/> 3º <input type="checkbox"/>	

Docente(s) Responsável(eis) pela U.C.

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Docente(s) da U.C.

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Categoria:	Email:	URL:
Categoria:	Email:	URL:

Horas de Contacto:

Teóricas:	Práticas:	Teórico-Práticas:	Laboratoriais:	Seminários:	Tutoriais:	Outras:	Total Horas de Contacto:
0,0 H	0,0 H	21,0 H	0,0 H	0,0 H	0,0 H	0,0 H	21,0 Horas

Estimativa de Horas Totais de Trabalho:

Inclui o total de horas de contacto mais as horas extra dedicadas à unidade curricular.	Horas Totais de Trabalho: 140,0 Horas
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Objectivos (tópicos) limite 900 caracteres

Sensibilizar e desenvolver a consciência para a necessidade do conhecimento e utilização de modelos de optimização geométrica e topológica, bem como ferramentas de design automático e interativo.
Desenvolver a capacidade de análise de novas situações com recurso ao cálculo rigoroso e de pormenor para apoio à investigação a desenvolver.

Conteúdos Programáticos / Programa limite 1500 caracteres

1. Introdução;
2. Programação linear;
3. Modelos de optimização geométrica;



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- 4. Modelos de optimização topológica;
- 5. Aplicações e exemplos.

Competências a adquirir pelo discente (tópicos) limite 3000 caracteres

Espírito crítico e metódico de análise de um problema sendo capaz de o colocar de forma sistemática identificando "função objectivo" e "restrições".

Abordagem de resolução de um problema aplicando noções topológicas e raciocínio lógico e pragmático.

Bibliografia Principal limite 3000 caracteres

- Papalambros, Panos Y., and Douglass J. Wilde. Principles of Optimal Design - Modeling and Computation - Second Edition; Cambridge, England: Cambridge University Press, 2000;
- Michalek, J.J., Interactive Layout design optimization – an interactive optimization tool for architectural floorplan layout design, MScThesis, University of Michigan, 2001;
- Michalek, J.J., Choudhary, R., Papalambros, Panos Y., Architectural Layout Design Optimization, Engineering Optimization, vol.34(5), 2002, pp461-484.
- Mourão, M.C.; Pinto, L.S.; Simões, O.; Valente, J.; Pato, M.V. (2011). Investigação Operacional: exercícios e aplicações. Verlag Dashöfer

Bibliografia Complementar limite 3000 caracteres

- Jian L. Zhou, Andr_e L. Tits, and Craig T. Lawrence , User'ss Guide for FFSQP Version 3.7: A FORTRAN Code for Solving Constrained Nonlinear(Minimax) Optimization Problems, Generating Iterates Satisfying All Inequality and Linear Constraints, University of Maryland, 1989-1997;
- Bentley, Peter J. Evolutionary Design by Computers. San Francisco, CA: Morgan Kaufmann Publishers, Inc., 1999;
- Tappeta, Ravindra, and John E. Renaud. "Interactive Multiobjective Optimization Design Strategy for Decision Based Design."Proceedings of the 1999 ASME International Design Engineering Technical Conferences and Computers and Information in Engineering Conference;
- Arvin, Scott A., and Donald H. House. "Modeling Architectural Design Objectives in Physically Based Space Planning." ACADIA (1999): 212-25.

Avaliação (elementos e critérios) limite 900 caracteres

A Partir Do Programa De Um Pequeno Edifício, Aplicar Os Temas Abordados Na Unidade Curricular E Desenvolver As Especificações Topológicas Para Explicitação Do Problema, Apresentando Propostas De Plantas Alternativas.

Data de actualização

Última actualização em: quinta-feira, 1 de Agosto de 2013



UNIT FORM

Code:	Mathematical Bases For Computation - 3c		Curricular Unit Type	
000000000			Elective	
Academic Year	Degree:	Cycle of Studies:		
2013-2014	PhD in Architecture	1° <input type="checkbox"/> 2° <input type="checkbox"/> 3° <input checked="" type="checkbox"/>		
Unit Credits:	Lecture Language	Curricular Year:		
5,0 ECTS	<input checked="" type="checkbox"/> Portuguese <input type="checkbox"/> English <input type="checkbox"/> Specify Other language	1° <input type="checkbox"/> 2° <input type="checkbox"/> 3° <input type="checkbox"/> 4° <input type="checkbox"/> 5° <input type="checkbox"/>		
Scientific Area:		Annual:	Semester:	
<input type="checkbox"/> Archit. <input type="checkbox"/> Urban. <input type="checkbox"/> Design <input type="checkbox"/> DCV <input type="checkbox"/> CST <input checked="" type="checkbox"/> TAUD <input type="checkbox"/> HTAUD		<input type="checkbox"/>	1° <input type="checkbox"/> 2° <input checked="" type="checkbox"/>	
Prerequisites:		Trimester:		
Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Mathematics and Statistics	1° <input type="checkbox"/> 2° <input type="checkbox"/> 3° <input type="checkbox"/>		

Responsible Professor(s)

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Lecture(s)

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Rank:	Email:	URL:
Rank:	Email:	URL:

Contact Hours:

Lectures:	Practical:	Lectures-Practical:	Laboratory:	Seminary:	Tutorials:	Others:	Total Contact Hours:
0,0 H	0,0 H	21,0 H	0,0 H	0,0H	0,0 H	0,0 H	21,0 Hours

Estimated Workload

Includes the total contact hours plus overtime devoted to the course unit

Total Workload: 140,0 Hours

Goals (topics) limit 900 characters

The practice of architecture involves the integration of information from technical, legal, and commercial matters, as well as the production of visualization and specification systems shared by the various knowledge areas that participate in design process.

The concept of BIM is currently a fundamental research line undertaken by government institutions worldwide with the aim of vertically integrating the computing systems used in the sustainable regulation and exploration of the construction industry.

Agents and goals, standardization initiatives, degrees of automation and creation of machine readable contents are some of the issues covered in this course.

The exploration of BIM platforms with institutional validation in order to understand the design process beyond the traditional geometric systematization is proposed to students. The goal is to explore design information models that



UNIT FORM

Programmatic contents / Programme limit 1500 characters

1. Introduction;
2. Linear programming;
3. Geometric optimization models;
4. Topological optimization models;
5. Applications and examples.

Competencies to be acquired by students (topics) limit 3000 characters

Critical thinking and methodical analysis of a problem being able to systematically identify "objective function" and "restrictions".

Approach to solving a problem by applying topological notions and logical and pragmatic thinking.

Main Bibliography limit 3000 characters

- Papalambros, Panos Y., and Douglass J. Wilde. Principles of Optimal Design - Modeling and Computation - Second Edition; Cambridge, England: Cambridge University Press, 2000;
- Michalek, J.J., Interactive Layout design optimization – an interactive optimization tool for architectural floorplan layout design, MScThesis, University of Michigan, 2001;
- Michalek, J.J., Choudhary, R., Papalambros, Panos Y., Architectural Layout Design Optimization, Engineering Optimization, vol.34(5), 2002, pp461-484.
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Additional Bibliography limit 3000 characters

- Jian L. Zhou, Andr_e L. Tits, and Craig T. Lawrence , User'ss Guide for FFSQP Version 3.7: A FORTRAN Code for Solving Constrained Nonlinear(Minimax) Optimization Problems, Generating Iterates Satisfying All Inequality and Linear Constraints, University of Maryland, 1989-1997;
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Assessment limit 900 characters

Given the functional program of a small building, apply the topics covered in the course and develop specifications for topological description of the problem, presenting proposals for alternative layouts.

Last updated

Last updated on: Thursday, 1 August 2013