1   UC

Português	Tópicos de Engenharia de Software
English	Software Engineering Topics

2   Team

Name	Research Unit	Institution	Email	ORCID
Jácome Cunha	HASLab/INESC TEC	FEUP	jacome@fe.up.pt	0000-0002-4713-3834
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Research area(s) (related to the UC)		Software Engineering Model-driven Software Engineering Green Computing		
Projects in which you participated relevant to the UC		• Sustrainable – Promoting Sustainability as a Fundamental Driver in Software Development Training and Education • GreenSoftwareLab: Towards an Engineering Discipline for Green Software • Spreadsheet Models for the Real World		
Recent publications (relevant to the UC)		• Ranking programming languages by energy efficiency. Rui Pereira, Marco Couto, Francisco Ribeiro, Rui Rua, Jácome Cunha, João Paulo Fernandes, and João Saraiva. Sci. Comput. Program., pp 102609 doi:10.1016/j.scico.2021.102609 • A Two-Level Model-Driven Approach for Reengineering CI/CD Pipelines. André Flores, Vasco Amaral, Hugo Gião, Jácome Cunha. To be submitted. 2024.		

Name	Research Unit	Institution	Email	ORCID
João Miguel Fernandes	Algoritmi	Universidade do Minho	jmf@di.uminho.pt	0000-0003-1174-1966
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Research area(s) (related to the UC)		• Software Engineering • Requirements Engineering • Software Modelling • Software Process and Management • Embedded Software		
Recent publications (relevant to the UC)		• Requirements in engineering project. João M. Fernandes and Ricardo J. Machado. Lecture Notes in Management and Industrial Engineering, Springer, 2016. Springer. • MLOps for developing machine-learning-enhanced automotive applications. A. L. Ferreira, J. M. Fernandes. IEEE Software. 2024. • An industrial experience of using reference architectures for mapping features to code. K. Ignaim, J. M. Fernandes, A. L. Ferreira. Science of Computer Programming, 234, 103087. 2024.		

Name *	Research Unit	Institution	Email	ORCID
João Saraiva	HASLab/INESC TEC	Universidade do Minho	saraiva@di.uminho.pt	0000-0002-5686-7151
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Research area(s) (related to the UC)		• Software Engineering		

	● *Green Computing* ● *Mobile Green Computing*
Recent publications (relevant to the UC)	● *A large-scale empirical study on mobile performance: energy, runtime and memory. R. Rua, J. Saraiva. Empirical Software Engineering 29 (1), 31. 2024.* ● *Green software lab: Towards an engineering discipline for green software. Rui Abreu, Marco Couto, Luís Cruz, Jácome Cunha, João Paulo Fernandes, Rui Pereira, Alexandre Perez, João Saraiva, arXiv preprint arXiv:2108.03028. 2024.*

3   Syllabus

Module[1]	Teacher(s)	Topics
1 – Requirements Engineering	*João Miguel Fernandes*	● *Requirements engineering process* ● *Requirements elicitation* ● *Modelling*
2 – Model-Driven Software Engineering	*Jácome Cunha*	● *Introduction to model-driven engineering* ● *Models, metamodels and meta-metamodels* ● *Code generation and other model transformations*
3 – Green Computing	*João Saraiva*	● *Introduction to green computing* ● *Red smells and green refactorings*

4   Objectives

At the end of the course, each student should be able to...

O1	*Apply the process of requirements engineering*
O2	*Define and prioritize software requirements*
O3	*Define an architecture that copes with a given set of requirements*
O4	*Design domain-specific models/meta-models*
O5	*Apply automatic code/behavior derivation/generation techniques from high-level specifications*
O6	*Identify code with high energy demand*
O7	*Refactor code to improve its energy efficiency*
O8	*Map energy code problems to the architectural level*

5   Bibliography

Num	Year	Type	Description	Link
1		*Book*	*Marco Brambilla, Jordi Cabot, Manuel Wimmer. Model-driven software engineering in practice. ISBN 9781627056953. 2017.*	*https://link.springer.com/book/10.1007/978-3-031-02549-5*
2		*Book*	Fernandes JM *e Machado RJ; Requirements in engineering projects, Springer,* series Lecture Notes in Management and Industrial Engineering, 2016	*https://link.springer.com/book/10.1007/978-3-319-18597-2*
3		*Book*	*Coral Calero, María Ángeles Moraga, Mario Piattini: Software Sustainability. Springer 2021, ISBN 978-3-030-69970-3*	*https://link.springer.com/book/10.1007/978-3-030-69970-3*