

POLI ESCOLA SUPERIOR TECNOLOGIA GESTÃO TÉCNICO GUARDA	SUBJECT DESCRIPTION	MODELO PED.013.03
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Course	Computer Science					
Subject	Software Engineering I					
Academic year	2023-2024	Curricular year	1st	Study period	2nd semester	
Type of subject	Compulsory	Student workload (H)	Total: 168	Contact: 75	ECTS	6
Professor(s)	Maria Clara dos Santos Pinto Silveira (PhD)					
<input checked="" type="checkbox"/> Area/Group Coordinator <input type="checkbox"/> Head of Department		Maria Clara dos Santos Pinto Silveira (PhD)				

PLANNED SUBJECT DESCRIPTION

1. LEARNING OBJECTIVES

Upon completion of this course, students should be able to:

1. Provide the students with the basics of Software Engineering and Information Systems.
2. Know and apply the techniques for gathering facts during the requirements process.
3. Recognize basic principles of planning and project management. Analyze a system and elaborate the respective planning (resources and costs involved).
4. Model systems using entity relationship models, applying normalization. Design data models to deploy to a database.
5. Establish the technical documentation for a software project.

2. PROGRAMME

1. Software Engineering
 - 1.1. Definition and principles
 - 1.2. Paradigms for developing software
 - 1.2.1. Waterfall Model
 - 1.2.2. Spiral Model
 - 1.2.3. Prototype
 - 1.2.4. Agile Development
 - 1.3. Information Systems
2. Techniques for collecting facts to identify requirements
 - 2.1. Techniques
 - 2.2. Types of software requirements
 - 2.3. Requirement's identification and documentation

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3. *Feasibility study*

3.1. *Definition, objectives, and steps*

3.2. *Feasibility types*

4. *Project Management*

4.1. *Definition and rules*

4.2. *Practical Application*

5. *Software Modeling - Structured Analysis*

5.1. *Context Diagram and Data Flow Diagram*

5.2. *Data dictionary*

5.3. *Codification and check digit*

5.4. *Decision tables*

6. *Data Analysis: Entity Relationship Model (ERD)*

6.1. *Components and cardinality*

6.2. *Extensions to the ER model: Generalization / Specialization*

6.3. *Using a tool CASE (Computer Aided Software Engineering)*

6.4. *Defining content data structure*

6.5. *Functional dependencies and normalization*

6.6. *Complementarity between data analysis and process analysis.*

3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

Content 1 is consistent with objective 1 because they equip students with the basic concepts of Software Engineering and Information Systems.

Content 2 is consistent with objective 2 because it allows students to know and apply techniques for gathering facts and requirements.

Contents 3 and 4 are consistent with objective 3 because it allows students to know the basics of planning and project management, and a system to analyze and elaborate the respective planning (resources and costs involved).

Contents 5 and 6 are consistent with objective 4 because they provide modeling systems using the entity relationship models, applying standardization and for devising the implementation of data templates in

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a database. All contents are consistent with objective 5 as they allow the elaboration of the technical documentation of a software project.

4. MAIN BIBLIOGRAPHY

Booch, G. (1994). Object-Oriented Analysis and Design with Applications. The Benjamin/Cummings Publishing Company Inc.; Redwood City; Second Edition; California.

Elmasri, R., Navathe, S. (2015). Fundamentals of database systems, 5th edition, Addison-Wesley. ISBN 0-321-41506-X, 2007

Mamede, H. (2021). Automatização de processos com RPA. Lisboa: FCA. ISBN: 978-972-722-919-2.

Miguel, A. (2019). Gestão moderna de projetos - melhores técnicas e práticas. Lisboa, FCA Editora. ISBN: 978-972-722-888-1.

Pressman, R., Maxim, Bruce. (2014) Software Engineering: A Practitioner's Approach (8th edition); McGraw-Hill, 2014. ISBN: 978-0078022128.

Reis, L. Cagica, L., Silveira, C., Russo, N., & Marques A. (2021). Inovação e Sustentabilidade em Tecnologias de Informação e Comunicação. Lisboa: Silabo, ISBN: 978-989-561-146-1.

Rubin, K. (2013). Essential Scrum: A Practical Guide to the Most Popular Agile Process, Addison-Wesley Professional.

Sanches, P., & Silveira, C. (2022). Tecnologia de deteção de quedas: Contributos da engenharia de software sustentável. In Reis, L., Carvalho, L., Barbosa, V., Xara-Brasil, D., Cordeiro, J., Galvão, S., Mata, C., Dias, R., Nabais, J. & Simões, D. (Ed.), Temas Emergentes em Ciências Empresariais, Volume 1 - Novas abordagens nas áreas científicas da Contabilidade, Finanças, Sistemas de Informação, Metodologias e Práticas Pedagógicas, (pp. 135-144). Lisboa: Silabo. ISBN 978-989-561-227-7.

Santos, V. (2018). Criatividade em Sistemas de Informação. Lisboa: FCA. ISBN: 978-972-722-891.

Silveira, C. (2023). Apontamentos de Engenharia de Software I. Instituto Politécnico da Guarda.

Sommerville, I. (2016) Software Engineering (10th edition), Addison-Wesley Pearson Education. ISBN: 0133943038.

5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)

The teaching methodology privileges the interactive lesson with practical activities, problem-solving and project work, in addition to the lecture.

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Continuous evaluation and Normal season exams: *The student is required to attend at least 1/2 of the classes to be evaluated during the continuous assessment period. Students with worker-student status are not required to attend.*

*70% (14/20) - Activities carried out, preferably, during classes, most of them involving parts of the development of individual practical work (project) that will be carried out throughout the semester, together with the Programming Curricular Unit (UC). There will be **intermediate deliveries/presentations** throughout the semester. Students with working-student status will have to carry out these activities, even outside of classes, to be assessed in this component. The evaluation in each of the Curricular Units is done independently, based on information obtained in classes, where guidance, control, supervision and evaluation of the project developed and its progress are carried out. Students who have already approved/are not attending UC Programming will have to develop and deliver a prototype of the application (development platform chosen by the student and approved by the teacher). **Final delivery** of the report in PDF (**June 1, 2024**) relating to the practical work, its presentation and defense is mandatory (**presentations June 4 or 6, 2024**).*

30% (6/20) – written test (has a minimum of 6/20).

Exam (appeal season): *for the student who has not been successful in the continuous evaluation or has not taken it.*

50% (10/20) - Practical work carried out individually, in which the student must deliver a pdf report and make his presentation and defense.

50% (10/20) - Written test (minimum of 6/20).

6. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES

Lecture is consistent with the objectives due to the need to provide students with the theoretical aspects of all the chapters.

Interactive Lessons are consistent with the objectives for student/teacher interaction to help students learn the concepts in addition to the introduction of new ideas, perspectives and solutions that can be applied both in the analysis phase and in the implementation of distributed solutions.

Problem-solving is consistent with the objectives for the application of theoretical concepts to realistic practical exercises related to the subject matter taught to promote consolidation and enhance student know-how/expertise.

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Project work is consistent with the goals since the work covers the development of distributed systems, through all phases of software conception, by requiring the practical application of all concepts covered throughout the semester to a realistic new situation.

7. ATTENDANCE

The student is required to attend at least 1/2 of the classes to be evaluated in the continuous evaluation and in the normal season exam. Students with worker-student status are not required to attend.

8. CONTACTS AND OFFICE HOURS

Contacts: Office 21 | e-mail: mclara@ipg.pt

Office hours: Tuesday from 8:30 am to 10:30 am; Thursday from 8:30 am to 11 am; or schedule by email.

DATE

20 de fevereiro de 2024

SIGNATURES

Professor and Area Coordinator