ipb
INSTITUTO POLITÉCNICO
DE BRAGANÇA

Course Unit	Software Architectures			Field of study	Information Systems		
Master in	Informatics			School	School of Technology and Management		
Academic Year	2023/2024	Year of study	1	Level	2-1	ECTS credits	6.0
Type	Semestral	Semester	2	Code	5060-710-1201-00-23		

Workload (hours)	162	Contact hours	T	-	TP	60	PL	-	TC	-	S	-	E	-	OT	-	O	-

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s)	Paulo Alexandre Vara Alves

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. Know how to model a NoSQL database
2. Know how to specify a service-oriented architecture
3. Develop a REST API
4. Develop Single Page Applications

Prerequisites

Before the course unit the learner is expected to be able to:
1. Carry out requirements gathering for a computer application
2. Develop a web application using a programming language

Course contents

NoSQL databases. RESTful architectures. Development of RESTful Web API. User security and authentication. Single Page Applications.

Course contents (extended version)

1. NoSQL Databases
    - SQL vs NOSQL
    - JSON
    - MongoDB Atlas
    - Data modeling
    - Querying
    - CRUD
    - Schema vs schemaless design
2. REST API
    - Microservices and services architectures
    - REST
    - FASTAPI REST Framework
    - Routing and EndPoints
    - Mocks
    - Models and Controllers
    - OpenAPI
    - PyMongo and Motor
    - Testing REST APIs with Insomnia
    - Deploy on Herokut
3. Single Page Applications
    - ReactJs
    - JSX
    - React components
    - Next.JS
    - Components frameworks
    - Static web apps
    - Dynamic web apps with REST APIs
    - JSON Web Tokens (JWT)
    - State management
    - Deploy of SPA applications

Recommended reading

1. Jackson, W. (2016). JSON Quick Syntax Reference. APress
2. Amundsen, M. (2022). RESTful Web API Patterns and Practices Cookbook. O'Reilly.
3. Lathkar, M. (2023). High-Performance Web Apps with FastAPI: The Asynchronous Web Framework Based on Modern Python. Apress
4. Riva, M. (2022). Real-World Next.js. Packt
5. Aleksendri, M. (2022). Full Stack FastAPI, React, and MongoDB. Packt

Teaching and learning methods

A project-based pedagogical methodology (PBL), with the initial definition of a problem, and the teacher will support the students in all the phases of the project development in order to maintain the motivation and help to frame the work of the students in the goals of the curricular unit.

Assessment methods

- Unique alternative - (Regular, Student Worker) (Final, Supplementary, Special)
    - Practical Work - 25% (Continuous assessment through practical work performed during classes)
    - Projects - 75% (Project)

Language of instruction

English

Electronic validation			
Paulo Alexandre Vara Alves	Tiago Miguel Ferreira Guimaraes Pedrosa	José Eduardo Moreira Fernandes	José Carlos Rufino Amaro
16-02-2024	14-03-2024	15-03-2024	16-03-2024

This document is valid only if stamped in all pages.