INSTITUTO POLITÉCNICO DE BRAGANÇA

Course Unit	Application Development			Field of study	Computer Science										
Bachelor in	Informatics Engineering			School	School of Technology and Management										
Academic Year	2023/2024	Year of study	3	Level	1-3	ECTS credits	6.0								
Type	Semestral	Semester	1	Code	9119-706-3101-00-23										
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): José Luís Padrão Exposto, Daniel Jose Lopes Gouveia, Tiago Filipe Lino Santos

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. Use an application framework in the development of software applications
2. Identify the different application framework usages and understand their main component's operation
3. Use integrated development environments to create solutions, manage items, compile and debug applications
4. Understand the concepts of event and event handler, and apply them in the handling of events generated by the operating system and the user
5. Know how to organize the application development process into architectural layers
6. Use window controls and dialog boxes to visualize and interact with complex information
7. Use data binding in the user interaction elements
8. Manage team work with collaborative and version control tools

Prerequisites

Before the course unit the learner is expected to be able to:
1. Master the creation of object oriented programming models
2. Know the operation and utilization of abstract data structures

Course contents

Universal Windows Platform. C# Language. Software architectural patterns. Database access. XAML language. Windows 10 apps. Version control and collaboration.

Course contents (extended version)

1. Universal Windows Platform
   - Application development for Windows.
   - Windows APIs evolution.
   - Platform convergence.
   - Application targeting. Adaptive UI. Adaptive code. SDK extensions.
   - Namespaces and assemblies. . NET Standard libraries.
   - App planning. Goals. Functional requirements. Data representation. App map.
   - Design Windows UWP apps. Anatomy of an app.
   - Navigation Patterns. Command elements. Page patterns. Content elements.
2. C# language
   - Data input and output.
   - Data types. Entity allocation. Classification of data types. Boxing and unboxing.
   - Exception handling.
   - Arrays, string and enumerated data types.
   - Classes. Properties. Inheritance and interfaces. Aggregation. Destructors.
   - Collections and generics. List and Dictionaries. Element iteration. Queues and stacks.
   - Event handling. Events and delegates. Lambda expressions.
   - Asynchronous programming. I/O-bound and CPU-bound operations.
3. Software architectural patterns
   - Software Architectures. Software architectural principles.
   - Monolithic applications. Advanced microservices applications.
   - Classical layer architecture. Clean architecture.
   - Repository and Unit of Work patterns.
   - Model-View-ViewModel pattern.
4. Database access
   - SQL Server and Azure Databases.
   - EntityFramework Core.
5. XAML Language
   - Basic structure.
   - Schemas and namespaces.
   - Markup extensions.
   - Events.
   - Resource dictionaries. Resources and styles.
6. Devolopment of UWP apps
   - Creating projects.
   - Application lifecycle.
   - XAML Language. Schemas and namespaces. Markup extensions. Resource dictionaries. Styles.
   - Layout controls.
   - TextBlock, TextBox, ListView, GridView, Hub, CommandBar, Flyouts and Content Dialogs.
   - Navigation controls.
   - Collections controls. Data Templates. Data Context. Data Binding. {x: Bind} extensions.
   - File management.
   - User defined controls.
7. Version control and collaboration
   - Version control with Git. Git flow. Git with gitlab.
   - Installing Git.
   - Git commands.
   - Branching and merging.

Recommended reading

1. C# 7. 0 com Visual Studio - Curso Completo, Henrique Loureiro, FCA, 2017
2. Universal Windows Platform documentation. https: //docs. microsoft. com/en-us/windows/uwp/. 2020

Recommended reading

3. Windows universal samples, https: //github. com/Microsoft/Windows-universal-samples, 2020
4. Git HowTo, https: //githowto. com/, 2019

Teaching and learning methods

Project based learning with group software projects and theoretical explanations focused in key moments to engage the evolution of the project

Assessment methods

1. Final and supplementaty periods - (Regular, Student Worker) (Final)
   - Projects - 60% (Final project)
   - Final Written Exam - 40% (Minimum 7/20 points)
2. Supplementary and special periods - (Regular, Student Worker) (Supplementary, Special)
   - Final Written Exam - 100%

Language of instruction

1. Portuguese
2. English

Electronic validation

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16-10-2023	25-10-2023	25-10-2023	31-10-2023