University of Bielsko-Biala

The title of the course	**Advanced Programming (Advanced Programming Techniques)**
Faculty	Faculty of Mechanical Engineering and Computer Science
The level of studies	Undergraduate (BA) Postgraduate (MA) Engineer (BSc)
Semester	Winter
The form of classes and number of hours	Laboratory/Project
Language of instruction	English
The number of ECTS	3
Teacher	dr hab. Mirosław Kordos, prof. UBB
The aims of the course (maximum 500 characters)	In this course the students will learn to create programs with readable, easy to maintain and extend code and to optimize them for using the computer resources effectively. The students attending this course are expected to have completed Programming in C# (Programming III) course or have equivalent knowledge from C# or another object-oriented programming language.
The content of the course: main topics and key ideas	1. Object programming: inheritance and composition 2. Inversion of control and dependency injection 3. SOLID Principles 4. Creational design patterns 5. Structural design patterns 6. Behavioral design patterns 7. Optimization of memory and CPU usage 8. Optimization of Garbage Collector in .NET 9. Diagnostic tools: PerfView, dotTrace, dotMemory. 10. Software Testing. Live Unit Testing, dotCover.
Didactics methods	Lectures with practical demonstrations, students write programs on computers.
Course requirements	Computer laboratory
Literature (basic and supplementary)	1. Design Patterns in .NET: Reusable Approaches in C# and F# for Object-Oriented Software Design, Dmitri Nesteruk,

	Apress 2. Writing High-Performance .NET Code, Ben Watson 3. C# 8.0 and .NET Core 3.0 – Modern Cross-Platform Development, Mark J. Price, Packt Publishing
The effects of the education - knowledge - skills - social competences	knowledge: student knows the good programming practices, the SOLID principles, the design patterns, optimization and testing techniques. skills: student is able to use the good practices to write code that is readable, efficient and easy to maintain. social competences: student working in a group is able to solve programming problems.