POLITECHNIKA KRAKOWSKA
IM. TADEUSZA KOŚCIUSZKI

KARTA PRZEDMIOTU

obowiązuje studentów rozpoczynających studia w roku akademickim 2020/2021

Wydział Inżynierii Materiałowej i Fizyki

Kierunek studiów: Fizyka Techniczna w Języku Angielskim   Profil: Ogólnoakademicki

Forma sudiów: stacjonarne   Kod kierunku: FTja

Stopień studiów: II

Specjalności: Computer modelling (modelowanie komputerowe w języku angielskim)

1 INFORMACJE O PRZEDMIOCIE

NAZWA PRZEDMIOTU	Application programming
NAZWA PRZEDMIOTU W JĘZYKU ANGIELSKIM	
KOD PRZEDMIOTU	WIMiF FTJA oIIS D5 20/21
KATEGORIA PRZEDMIOTU	Przedmioty specjalnościowe
LICZBA PUNKTÓW ECTS	2.00
SEMESTRY	2

2 RODZAJ ZAJĘĆ, LICZBA GODZIN W PLANIE STUDIÓW

SEMESTR	WYKŁAD	ĆWICZENIA	LABORATORIUM	LABORATORIUM KOMPUTERO-WE	SEMINARIUM	PROJEKT
2	15	0	0	45	0	0

3 CELE PRZEDMIOTU

Cel 1 Familiarizing students with the latest Microsoft Visual Studio development environment and the .NET platform, including C#.

Cel 2 Introduction of concepts regarding threads and parallel calculations on the MS Visual Studio .NET platform.

Cel 3 Introduction of concepts related to programming web applications on the MS Visual Studio .NET platform, including those connecting to the database management system.

Cel 4 Introduction of baseline issues regarding: elements of drawing and computer image processing on the MS Visual Studio .NET platform.

4 Wymagania wstępne w zakresie wiedzy, umiejętności i innych kompetencji

1 Basic knowledge regarding Microsoft Windows or Linux operating system support.

5 Efekty kształcenia

EK1 Wiedza The student gets familiar with the programming possibilities of the Microsoft Visual Studio environment and how it works. A course participant moves smoothly around the main elements that make up its functionality.

EK2 Umiejętności The student is able to use the Microsoft Visual Studio environment for advanced calculations on the input data set, implementing their own mathematical and physical formulas and using ready-made mathematical functions available in the environment. Student is able to output results in the form of charts and save the results in files.

EK3 Kompetencje społeczne The graduates are ready to: self-assess their own competences in the field of programming elements discussed, set directions for their own development and education in the above mentioned field, because theyare mindful of the need for continuous professional training and personal development.

EK4 Umiejętności The student is able to create a program using parallel computing technology in the Microsoft Visual Studio environment to optimize calculations.

6 Treści programowe

Laboratorium komputerowe		
Lp	Tematyka zajęć Opis szczegółowy bloków tematycznych	Liczba godzin
K1	Creating a new project. Project properties. Overview regarding the basic windows of the development environment. Adding forms to the project. Placing controls on forms. Control properties settings.	2
K2	Basic operations on selected controls. Event programming on embedded controls. Discussion of selected parameters of procedures for handling the most important events. Dynamic creation of controls from the source code level, parameterization and embedding on the form.	2
K3	Declaration of variables with different availability ranges. Data operations through selected mathematical, string and date as well as time functions. Declaration of tables (including multidimensional arrays). The use of tables in programming, for example.	4
K4	Programming using conditions and choices. Presentation of all logical operators available in C# on examples.	2

Laboratorium komputerowe		
Lp	Tematyka zajęć Opis szczegółowy bloków tematycznych	Liczba godzin
K5	Class declaration with constructor, range of classes in the project. Creating objects and performing operations on objects that are instances of the created classes. Declaration and use of functions and procedures on examples. Discussion of recursion on examples (e.g. creation of the factorial function, Catalan, Farey, Fibonacci number sequence generation).	4
K6	Declaration of structures. The use of structures for calculations. Presentation of the concept of iteration (e.g. based on the declaration of the sine function created on the basis of the Taylor series, Catalan, Farey, Fibonacci number sequence generation). Overview of how all types of loops work, for examples. Creating applications calculating definite integrals, fields bounded by curves (trapezoidal method, Monte Carlo). Drawing function graphs.	6
K7	Creating sample applications with the possibility of a runtime error. Scanning exceptions (errors) and their software capabilities. Creating your own mistakes and their handling.	3
K8	Discussion on examples of the most essential drawing functions. Creating animation effects using mathematical formulas. Discussion on examples of basic issues related to computer image processing. Pixel operations. Using the RGB color palette to modify images, e.g. removing the sky from images, creating a grayscale image based on an existing one. Saving images (including work effects) as image files with various extensions.	5
K9	Discussion on examples of topics related to threads. Thread creation and management. Running threads with parameters. Discussion regarding the most important variables and methods of threads. Introduction of the concept of critical section.	5
K10	Discussion on examples of issues related to parallel computing in the Visual Studio environment. Overview of examples of functions (including their parameters): Parallel.For and Parallel.ForEach. Examples of terminating loop iterations and handling errors inside a loop.	4
K11	File and directory operations (create, delete, move, copy, rename, etc.). Software errors due to lack of access to data resources. Calculations on data from files. Saving calculation results.	3
K12	Designing network applications communicating using the UDP and TCP protocols (e.g. drawing on a common canvas, simple chat, remote calculations, downloading data from a database).	5

Wykład		
Lp	Tematyka zajęć Opis szczegółowy bloków tematycznych	Liczba godzin
W1	.NET overview. Installation of the programming environment. Creating a new project. Visual elements - selected controls and their properties. Handling event occurrence on the object.	2

Wykład		
Lp	Tematyka zajęć Opis szczegółowy bloków tematycznych	Liczba godzin
W2	A detailed discussion regarding data types in C #. Declaration of variables. Selected operations on variables. The scope of variables in the project. Discussion of selected mathematical, string and date as well as time functions.	2
W3	Tables. Use of tables for calculations. Conditions (if) and choices (case). Discussion regarding logical operators. Class. Class declaration, range of classes in the project, constructors. Creating procedures and functions.	2
W4	Declaration of structures. The use of structures for calculations. Loops, types of loops. Scanning exceptions (errors) and their recovery options	2
W5	Drawing elements, image processing, pixel operations, color palettes. File and directory operations.	2
W6	Introduction to threads. Thread management and synchronization. Introduction to parallel calculations. The most important concepts related to parallel calculations. Practical application of parallel calculations.	3
W7	General information about computer networks and possibilities of building applications communicating via the network using the TCP and UDP protocols. Establishing connection to the MySQL / MariaDB database management system.	2

7 Narzędzia dydaktyczne

N1 Lectures

N2 Laboratory exercises

N3 Debates

N4 Group work

8 Obciążenie pracą studenta

Forma aktywności	Średnia liczba godzin na zrealizowanie aktywności
Godziny kontaktowe z nauczycielem akademickim, w tym:	
Godziny wynikające z planu studiów	60
Konsultacje przedmiotowe	0
Egzaminy i zaliczenia w sesji	2
Godziny bez udziału nauczyciela akademickiego wynikające z nakładu pracy studenta, w tym:	
Przygotowanie się do zajęć, w tym studiowanie zalecanej literatury	0
Opracowanie wyników	0
Przygotowanie raportu, projektu, prezentacji, dyskusji	4
Sumaryczna liczba godzin dla przedmiotu wynikająca z całego nakładu pracy studenta	**66**
Sumaryczna liczba punktów ECTS dla przedmiotu	2.00

9 Sposoby oceny

Ocena formująca

F1 Test

Ocena podsumowująca

P1 Weighted average of grades based on the algorithm adopted and disclosed to the public

Warunki zaliczenia przedmiotu

W1 Positive summary evaluation

Kryteria oceny

Efekt kształcenia 1	
Na ocenę 3.0	Student independently installs the Microsoft Visual Studio environment. A participant is able to present the most important controls in the environment and list their basic properties and use in programming. The student can embed controls on the form and assign their appropriate properties. The student knows how to perform basic operations on controls.
Efekt kształcenia 2	

Na ocenę 3.0	The student knows the basic types of data. Student is able to list the basic mathematical and string functions available in the MS .NET environment and use them for simple calculations and operations on data. The student can output the result. Students is able to declare their own functions and procedures.
Efekt kształcenia 3	
Na ocenę 3.0	The student can work on a task in a team. The participant is able to use the documentation of the software manufacturer / programming environment / libraries to solve the task (write a computer program).
Efekt kształcenia 4	
Na ocenę 3.0	The student knows the definitions regarding processes and threads. The student is able to characterize the baseline functions and variables of the Parallel class. The student can create and run a thread.

10 Macierz realizacji przedmiotu

Efekt kształcenia	Odniesienie danego efektu do szczegółowych efektów zdefiniowanych dla programu	Cele przedmiotu	Treści programowe	Narzędzia dydaktyczne	Sposoby oceny
EK1		Cel 1 Cel 2 Cel 3 Cel 4	K1 K2 K3 K4 K5 K6 K7 K8 K9 K10 K11 K12 W1 W2 W3 W4 W5 W6 W7	N1 N2 N3 N4	F1 P1
EK2		Cel 1 Cel 2 Cel 3 Cel 4	K1 K2 K3 K4 K5 K6 K7 K8 K9 K10 K11 K12 W1 W2 W3 W4 W5 W6 W7	N1 N2 N3 N4	F1 P1
EK3		Cel 1 Cel 2 Cel 3 Cel 4	K1 K2 K3 K4 K5 K6 K7 K8 K9 K10 K11 K12 W1 W2 W3 W4 W5 W6 W7	N1 N2 N3 N4	F1 P1
EK4		Cel 1 Cel 2 Cel 3 Cel 4	K1 K2 K3 K4 K5 K6 K7 K8 K9 K10 K11 K12 W1 W2 W3 W4 W5 W6 W7	N1 N2 N3 N4	F1 P1

11 Wykaz literatury

Literatura podstawowa

[1] **Joseph Albahari, Ben Albahari** — *C# 7.0 w pigułce*, , 2019, Wydanie VII, Helion

Literatura uzupełniająca

[1] **Microsoft** — *Visual Studio tutorials*, , 2019, Microsoft

12 Informacje o nauczycielach akademickich

Osoba odpowiedzialna za kartę

mgr inż. Artur Niewiarowski (kontakt: `aniewiarowski@pk.edu.pl`)

Osoby prowadzące przedmiot

1 mgr inż. Artur Niewiarowski (kontakt: `aniewiarowski@pk.edu.pl`)

13 Zatwierdzenie karty przedmiotu do realizacji

(miejscowość, data)	(odpowiedzialny za przedmiot)	(dziekan)

Przyjmuję do realizacji (data i podpisy osób prowadzących przedmiot)

....