

# Programming for Engineering Applications - opis przedmiotu

Informacje ogólne	
Nazwa przedmiotu	Programming for Engineering Applications
Kod przedmiotu	06.9-WM-ZiIP-ANG-D-08_22
Wydział	<a href="#">Wydział Mechaniczny</a>
Kierunek	Management and Production Engineering
Profil	ogólnoakademicki
Rodzaj studiów	drugiego stopnia z tyt. magistra inżyniera
Semestr rozpoczęcia	semestr zimowy 2022/2023

Informacje o przedmiocie	
Semestr	1
Liczba punktów ECTS do zdobycia	3
Typ przedmiotu	obowiązkowy
Język nauczania	angielski
Sylabus opracował	<ul style="list-style-type: none"><li>• dr inż. Grzegorz Pająk</li><li>• dr inż. Iwona Pająk</li></ul>

Formy zajęć					
Forma zajęć	Liczba godzin w semestrze (stacjonarne)	Liczba godzin w tygodniu (stacjonarne)	Liczba godzin w semestrze (niestacjonarne)	Liczba godzin w tygodniu (niestacjonarne)	Forma zaliczenia
Wykład	15	1	-	-	Zaliczenie na ocenę
Laboratorium	15	1	-	-	Zaliczenie na ocenę
Ćwiczenia	15	1	-	-	Zaliczenie na ocenę

## Cel przedmiotu

Familiarize with the object-oriented approach to system analysis and design, developing skills in using a modern programming environment to creation of simple elements of the IT system.

## Wymagania wstępne

Computer skills.

## Zakres tematyczny

### Lectures

L01. Introduction to object-oriented programming in Visual Basic for Applications: the concept of class and object, object-event model of the application on the example of Excel, object structure - methods and properties, basic Excel objects, data types, modifying object properties, using assignment statements, introduction to defining macros.

L02. Variables, error handling, procedures and functions: defining and using variables, arithmetic operators and standard functions, exception handling, defining macros of procedure and function types, macro parameters.

L03-04. Control statements: designing algorithms, conditional statement, relational and logical operators, loop statement, object collection processing.

L05. Dialog windows and user forms: standard dialogs in MS Excel, objects representing user interface components, properties, methods and events of formants, user interface designing, creating user forms.

L06: Events of Excel objects, add-ins: the concept of events in object-oriented programming, Application, Workbook, Worksheet and Range object events, defining event methods in the Visual Basic for Application, using events to automate selected activities, distribution of VBA code as add-ins.

L07: Final test.

### Exercises

E01. Defining VBA procedures using properties and methods of the basic Excel objects, assignment statement, arithmetic operators, and standard and sheet functions.

E02-03. Working with object of Range class, references to worksheets cells, modifying formats and values, writing formulas in A1 and R1C1 styles.

E04-05. Working with Shape, Picture and Chart objects, dynamic creation of charts.

E06. Designing user forms.

E07. Final test.

## Laboratory

L01: Recording and editing of macros in the environment of Visual Basic for Excel, using the debugger to track the program progress and detect errors.

L02: Implementation of simple VBA macros using the properties and methods of basic Excel objects, assignment statement, arithmetic operators, standard and worksheet functions.

L03: Implementation of complex macros with error handling.

L04: The use of conditional statements to check the correctness of data and program flow control.

L05: Processing collections of objects, using loop statements.

L06: Creating a user form as na interface to a macro.

L07. Final test.

## Metody kształcenia

*Lecture:* a conventional lecture

*Exercises:* problem tasks, case analysis, individual work

*Laboratory:* practical classes in the computer laboratory

## Efekty uczenia się i metody weryfikacji osiągnięcia efektów uczenia się

Opis efektu	Symbole efektów	Metody weryfikacji	Forma zajęć
The student is able to interact and work in a group accepting various roles	<ul style="list-style-type: none"><li><a href="#">K_K03</a></li></ul>	<ul style="list-style-type: none"><li>bieżąca kontrola na zajęciach</li><li>wykonanie sprawozdań laboratoryjnych</li></ul>	<ul style="list-style-type: none"><li>Laboratorium</li><li>Ćwiczenia</li></ul>
The student has detailed knowledge of selected issues of Mechanical Engineering, as broadly understood and associated with Production Engineering and computer-aided management.	<ul style="list-style-type: none"><li><a href="#">K_W06</a></li><li><a href="#">K_W09</a></li></ul>	<ul style="list-style-type: none"><li>bieżąca kontrola na zajęciach</li><li>kolokwium</li><li>wykonanie sprawozdań laboratoryjnych</li></ul>	<ul style="list-style-type: none"><li>Wykład</li><li>Laboratorium</li><li>Ćwiczenia</li></ul>
The student is able to think and act both creatively and entrepreneurially.	<ul style="list-style-type: none"><li><a href="#">K_K06</a></li></ul>	<ul style="list-style-type: none"><li>bieżąca kontrola na zajęciach</li></ul>	<ul style="list-style-type: none"><li>Laboratorium</li><li>Ćwiczenia</li></ul>
The student can work individually as well as in a team; he/she is also able to select team members for a specific task and assign tasks to the members and manage a small team.	<ul style="list-style-type: none"><li><a href="#">K_U03</a></li></ul>	<ul style="list-style-type: none"><li>bieżąca kontrola na zajęciach</li></ul>	<ul style="list-style-type: none"><li>Laboratorium</li><li>Ćwiczenia</li></ul>
The student is able to obtain information from literature, databases and other sources and is able to integrate, interpret and critically evaluate it, as well as draw conclusions, therefrom, both formulating it and sufficiently justify opinions on it.	<ul style="list-style-type: none"><li><a href="#">K_U01</a></li></ul>	<ul style="list-style-type: none"><li>bieżąca kontrola na zajęciach</li><li>kolokwium</li></ul>	<ul style="list-style-type: none"><li>Wykład</li><li>Laboratorium</li><li>Ćwiczenia</li></ul>

## Warunki zaliczenia

**Lecture:** a positive result of the assessment via a written test

**Exercises:** a positive result of the assessment via a written test

**Laboratory:** completion of laboratory tasks, assessment of the test conducted at the computer.

**Final grade:** the condition for passing the course is to pass all its forms, the final grade for the course is the arithmetic mean of the grades for individual forms of classes.

## Literatura podstawowa

- DeMarco J., Pro Excel 2007 VBA, Springer, 2008,
- Kofler M., Definitive Guide to Excel VBA, Springer, 2003,
- Morgado F., Programming Excel with VBA, Springer, 2016,
- Walkenbach J., Excel Vba Programming For Dummies, John Wiley & Sons; 4 edition, 2015.

## Literatura uzupełniająca

- Booch G., Rumbaugh J., Jacobson I., The Unified Modeling Language User Guide, Addison-Wesley Professional, 2 edition, 2005,
- Walkenbach J., Excel 2013 Bible, Wiley, 1 edition, 2018

## Uwagi

