

## DESCRIPTION OF THE STUDY SUBJECT

### Title

|                                    |
|------------------------------------|
| <b>OBJECT-ORIENTED PROGRAMMING</b> |
|------------------------------------|

### Scope of the subject

| Semester | Mode of studies | Structure* |    |    |    | Total number of hours | Number of credits | Group and type of subjects             |
|----------|-----------------|------------|----|----|----|-----------------------|-------------------|--|
|          |                 | L          | Lw | C  | S  |                       |                   |  |
| III      | Full-time       | 16         | 39 | 10 | 75 | 225                   | 8                 | Compulsory subjects of the study field |
| IV       |                 | 8          | 25 | 6  | 46 |                       |                   |  |
| IV       | Part-time       | 8          | 22 | 35 | 75 | 225                   | 8                 |  |
| V        |                 | 4          | 14 | 21 | 46 |                       |                   |  |

\*L – lectures, PS – practical activities, seminars, LW – laboratory work, PR – practice, CP – course paper, C – consultations, S – self-study

### Aim of the subject

To know and understand the differences between procedural (structured) and object-oriented programming, to be able to use basic object-oriented programming language commands, components and structures, software design tools and to prepare programs using object-oriented programming tools.

### Necessary background knowledge for studying the subject

Students shall have heard subjects basics of algorithmization, basics of programming, database management.

### Content of the subject

| Title of the topic and description of the content   | Number of contact hours |           |           | S          | Total number of hours |
|---|-------------------------|-----------|-----------|------------|-----------------------|
|   | L                       | Lw        | C         |            |                       |
| 1.Characteristics and principles of object-oriented programming. Classes, methods, objects, their arrays.   | 2                       | -         | 2         | -          | <b>4</b>              |
| Laboratory work No. 1. To prepare a program code, in which classes, class methods, objects and their arrays would be used.  | -                       | 6         | -         | 10         | <b>16</b>             |
| 2. Constructors, destructors, variable <i>this</i> .  | 2                       | -         | 2         | -          | <b>4</b>              |
| Laboratory work No. 2. To prepare a program code, in which constructors, destructors, variable <i>this</i> would be implemented.  | -                       | 6         | -         | 10         | <b>16</b>             |
| 3. Modifiers <i>private</i> , <i>public</i> , <i>protected</i> , <i>static</i> .  | 4                       | -         | 2         | -          | <b>6</b>              |
| Laboratory work No. 3. To prepare a program code, in which modifiers would be employed.   | -                       | 7         | -         | 10         | <b>17</b>             |
| 4. Inherited classes.   | 4                       | -         | 2         | -          | <b>6</b>              |
| Laboratory work No. 4. To prepare a program code, in which at least 3 hereditary classes would be implemented.  | -                       | 10        | -         | 12         | <b>22</b>             |
| 5. Encapsulation.   | 4                       | -         | 2         | -          | <b>6</b>              |
| Laboratory work No. 5. To prepare a program code, in which the encapsulation principle would be implemented.  | -                       | 10        | -         | 14         | <b>24</b>             |
| <b>III semester. Preparation for the examination and taking the examination.</b>  | -                       | -         | -         | <b>19</b>  | <b>19</b>             |
| <b>III semester. Total number of hours.</b>   | <b>16</b>               | <b>39</b> | <b>10</b> | <b>75</b>  | <b>140</b>            |
| 6. Polymorphism.  | 4                       | -         | 2         | -          | <b>6</b>              |
| Laboratory work No. 6. To prepare a program code, in which the principle of polymorphism would be implemented.  | -                       | 10        | -         | 10         | <b>20</b>             |
| 7. Abstract classes, abstract methods, <i>interface</i> classes.  | 4                       | -         | 2         | -          | <b>6</b>              |
| Laboratory work No.7. To prepare a program code, in which at least one abstract class and one <i>interface</i> class would be implemented.  | -                       | 15        | -         | 10         | <b>25</b>             |
| Individual work. To prepare the program, in which inherited, abstract, <i>interface</i> class, <i>private</i> , <i>public</i> , <i>protected</i> , <i>static</i> modifiers, principles of polymorphism and encapsulation, at least one of each, would be implemented. | -                       | -         | 2         | 14         | <b>16</b>             |
| <b>IV semester. Preparation for the examination and taking the examination.</b>   |                         |           |           | <b>12</b>  | <b>12</b>             |
| <b>IV semester. Total number of hours</b>   | <b>8</b>                | <b>25</b> | <b>6</b>  | <b>46</b>  | <b>85</b>             |
| <b>Total number of hours</b>  | <b>24</b>               | <b>64</b> | <b>16</b> | <b>121</b> | <b>225</b>            |

### Assessment of learning outcomes

Ten-point criteria-based assessment system as well as cumulative assessment using individual cumulative index (ICI) are applied. The overall grade is the sum of grades for intermediate accountings and examination (E) multiplied by weighted coefficients.

III semester. ICI1 = 0,6 Lw + 0,4 E  
 IV semester. ICI2 = 0,4 Lw + 0,2 ID + 0,4 E; where Lw – laboratory works, IND – individual work.  
 The overall grade ICI = 0,6 ICI1 + 0,4 ICI2

### Recommended literature

| Key literature        |                    |   |                                       |                                       |                |                   |
|-----------------------|--------------------|---|---------------------------------------|---------------------------------------|----------------|-------------------|
| No.                   | Year of publishing | Author(s) and title of the publication  | Publishing house                      | Number of copies and/or internet link |                |                   |
|                       |                    |   |                                       | ŠSC library                           | Other premises | Other libraries * |
| 1.                    | 2011               | Matulis D. Duomenų struktūrų objektinio programavimo praktikumas Mokomoji knyga | Technologija                          | 4                                     | -              | 10                |
| 2.                    | 2008               | Sinkevičius S. PHP 5 pradmenys  | Smaltija                              | 4                                     | -              | 13                |
| 3.                    | 2008               | Blonskis J., Bukšinė V. ir kt. Programavimas C++                                | Technologija                          | 4                                     | -              |                   |
| 4.                    | 2008               | Vidžiūnas A. C++ ir objektinis programavimas: programuotojo vadovas             | Smaltija                              | 4                                     | -              | 11                |
| 5.                    | 2007               | Julie Mezony, PHP, MySQL ir Apache  | Smaltija                              | 1                                     | -              | 15                |
| Additional literature |                    |   |                                       |                                       |                |                   |
| No.                   | Year of publishing | Author(s) and title of the publication  | Publishing house and/or internet link |                                       |                |                   |
| 1.                    | 2015               | Lockhart J. Modern PHP: New Features and Good Practices                         | O'Reilly Media                        |                                       |                |                   |
| 2.                    | 2013               | Ullman L. PHP Advanced and Object – Oriented Programming                        | Pearson Education                     |                                       |                |                   |
| 3.                    | 2015               | Milašauskas S. Objektinio programavimo dalyko kompendiumas                      |                                       |                                       |                |                   |

\* ŠAVB – Šiauliai Region Povilas Višinskis Public Library, ŠU – library of Šiauliai University

### Required material resources and their short description

- **Equipment (devices):** computers (16 units), computers connected to the local network and connected to the Internet, multimedia projector, printer.
- **Software:** Windows 10 or later versions, PHP editor and script interpreter *NuSphere PhpED*, MS Visual C++ 2010 or a later version.

### The description prepared by:

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