

## COURSE OUTLINE

### 1. GENERAL

<b>SCHOOL</b>	SCHOOL OF ENVIRONMENT AND AGRICULTURAL ENGINEERING		
<b>ACADEMIC UNIT</b>	DEPARTMENT OF NATURAL RESOURCES DEVELOPMENT AND AGRICULTURAL ENGINEERING		
<b>LEVEL OF STUDIES</b>	Postgraduate		
<b>COURSE CODE</b>	<b>630305</b>	<b>SEMESTER</b>	<b>2</b>
<b>COURSE TITLE</b>	OBJECT-ORIENTED PROGRAMMING		
<b>INDEPENDENT TEACHING ACTIVITIES</b> <i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i>	<b>WEEKLY TEACHING HOURS</b>	<b>CREDITS</b>	
Lectures and Practical Exercises	2	5	
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
<b>COURSE TYPE</b> <i>general background, special background, specialised general knowledge, skills development</i>	Scientific Area, Skill Development		
<b>PREREQUISITE COURSES:</b>			
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	No		
<b>COURSE WEBSITE (URL)</b>			

### 2. LEARNING OUTCOMES

<p><b>Learning outcomes</b></p> <p><i>The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.</i></p> <p><i>Consult Appendix A</i></p> <ul style="list-style-type: none"> <li>• <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i></li> <li>• <i>Descriptors for Levels 6, 7 &amp; 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i></li> <li>• <i>Guidelines for writing Learning Outcomes</i></li> </ul> <p><i>The familiarity of students with the concepts and characteristics of the object-oriented approach in programming will enable them to design and implement programs of large requirements and scale more effectively and economically, basing their development on the principles of object-oriented programming.</i></p> <p><i>Furthermore, students are given the opportunity to implement an application in practice, leveraging the advantages of the object-oriented approach, through an individual assignment they undertake during the semester.</i></p> <p><b>General Competences</b></p> <p><i>Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?</i></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i>  <i>Adapting to new situations</i>  <i>Decision-making</i>  <i>Working independently</i>  <i>Team work</i>  <i>Working in an international environment</i>  <i>Working in an interdisciplinary environment</i>  <i>Production of new research ideas</i> </td> <td style="width: 50%; vertical-align: top;"> <i>Project planning and management</i>  <i>Respect for difference and multiculturalism</i>  <i>Respect for the natural environment</i>  <i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i>  <i>Criticism and self-criticism</i>  <i>Production of free, creative and inductive thinking</i>    <i>.....</i>  <i>Others...</i>    <i>.....</i> </td> </tr> </table>	<i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i> <i>Adapting to new situations</i> <i>Decision-making</i> <i>Working independently</i> <i>Team work</i> <i>Working in an international environment</i> <i>Working in an interdisciplinary environment</i> <i>Production of new research ideas</i>	<i>Project planning and management</i> <i>Respect for difference and multiculturalism</i> <i>Respect for the natural environment</i> <i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i> <i>Criticism and self-criticism</i> <i>Production of free, creative and inductive thinking</i>  <i>.....</i> <i>Others...</i>  <i>.....</i>
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*Autonomous work*  
*Search, analysis, and synthesis of data and information*  
*Application of knowledge in practice*  
*Promotion of free, creative, and inductive thinking*

### 3. SYLLABUS

- Object-Oriented Programming, basic concepts (objects, classes, inheritance, reuse, polymorphism)
- Objects and classes, constructor functions, destructor functions
- Objects as function arguments, overridden constructor functions, returning objects from functions
- Arrays, class member data arrays, arrays of objects
- Operator overloading, operator arguments, return values of operators, binary operator overloading (arithmetic operators, comparison operators, assignment operators)
- Data conversion, conversions between basic types, conversions between objects and basic types, conversions between objects of different classes
- Inheritance, derived and base class, accessing base class members, derived class constructor functions, overloading member functions
- Class hierarchies, abstract base class, constructor functions and member functions
- Public and private inheritance, access specifiers, accessors
- Levels of inheritance, multiple inheritance, containment, classes within classes
- Pointers, new and delete operators, pointers to objects, reference to members, arrays of pointers to objects
- Virtual functions, friend functions, static functions, the this pointer
- Files and streams, object input/output, file pointers

### 4. TEACHING and LEARNING METHODS - EVALUATION

<b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i>	In classroom	
<b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i>	Support of the educational process through the e-class electronic platform, Use of ICT in Laboratory Education (specialized software), Alternative educational software, Use of ICT in communication with students.	
<b>TEACHING METHODS</b>  <i>The manner and methods of teaching are described in detail.</i>  <i>Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.</i>  <i>The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</i>	<b>Activity</b>	<b>Semester workload</b>
	Lectures	36 hours
	Practical exercises and case studies	50 hours
	Exercises and presentations	39 hours
	Course total (25 workload hours per credit unit)	<b>125</b>

<p><b>STUDENT PERFORMANCE EVALUATION</b></p> <p><i>Description of the evaluation procedure</i></p> <p><i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<p>1. Written final examination (60%)</p> <ul style="list-style-type: none"> <li>- Problem-solving with analysis and implementation of relevant methods</li> <li>- Short-answer questions</li> </ul> <p>2. Laboratory work (40%)</p>
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## 5. ATTACHED BIBLIOGRAPHY

**Proposed literature:**

- Savitch Walter, Πλήρης C++ 4η Έκδοση, Εκδόσεις Τζιόλα, 2011
- Νίκος Μ. Χατζηγιαννάκης, Η γλώσσα C++ σε βάθος, 1η Έκδοση Εκδόσεις Κλειδάριθμος, 2008

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- Robert Lafore, Αντικειμενοστραφής Προγραμματισμός με τη C++, μετάφραση Δ. Τσιλογιάννης, 4η Έκδοση Εκδόσεις Κλειδάριθμος, 2006
- Bjerne Stroustrup, Η γλώσσα προγραμματισμού C++, μετάφραση Π. Καναβός, 4η Έκδοση, Εκδόσεις Κλειδάριθμος, 2014
- Stephen Prata, Η βίβλος της C++ Primer Plus, μετάφραση Κ. Ιατρίδης, 3η Έκδοση, Εκδόσεις Γκιούρδας, 2000