

## SYLLABUS

### COURSE DESCRIPTION – ACADEMIC YEAR 2023/2024

<b>COURSE TITLE</b>	<b>Programming Project</b>
<b>COURSE CODE</b>	76204
<b>SCIENTIFIC SECTOR</b>	INF/01
<b>DEGREE</b>	Bachelor in Computer Science
<b>SEMESTER</b>	2nd
<b>YEAR</b>	1st
<b>CREDITS</b>	9

<b>TOTAL LECTURING HOURS</b>	60
<b>TOTAL LAB HOURS</b>	30
<b>ATTENDANCE</b>	<p>Attendance to course lectures and labs is optional. However, non-attending students have to contact the lecturer at the start of the course to discuss the modality of their independent study.</p> <p>The exam modality for both attending and non-attending students is the same, which is described in the fields "Assessment" and "Evaluation criteria and criteria for awarding marks" below.</p>
<b>PREREQUISITES</b>	Students should be familiar with the basic knowledge of object-oriented programming and Java, as taught in the course "Computer Programming"
<b>COURSE PAGE</b>	<a href="https://ole.unibz.it/">https://ole.unibz.it/</a>

<p><b>SPECIFIC EDUCATIONAL OBJECTIVES</b></p>	<p>Type of course: "caratterizzanti" for L-31          Scientific area: "Discipline informatiche" for L-31</p> <p>The course is designed to provide generic and object-oriented programming skills, as well as a first experience of software development within a team.</p> <p>Students will program in Java, but a large part of the acquired knowledge can be transferred to other programming languages.</p> <p>After completing this course, students should be able to:</p> <ul style="list-style-type: none"> <li>- design and develop a prototype application in Java,</li> <li>- develop algorithms to solve simple programming problems (and select appropriate data structures),</li> <li>- write readable, concise, modular and documented code,</li> <li>- collaborate with other programmers.</li> </ul>
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<p><b>LECTURER</b></p>	<p><a href="#">Julien Corman</a></p>
<p><b>SCIENTIFIC SECTOR OF THE LECTURER</b></p>	<p>INF/01</p>
<p><b>TEACHING LANGUAGE</b></p>	<p>English</p>
<p><b>OFFICE HOURS</b></p>	<p>Mondays 16:00-18:00 by prior email appointment.          Office POS 2.06, Faculty of Engineering, Piazza Domenicani 3.  <a href="mailto:corman@inf.unibz.it">corman@inf.unibz.it</a></p>
<p><b>TEACHING ASSISTANT</b></p>	<p><a href="#">Albulen Pano</a></p>
<p><b>OFFICE HOURS</b></p>	<p>Mondays 16:00-18:00 by prior email appointment.          Office POS 2.08, Faculty of Engineering, Piazza Domenicani 3.  <a href="mailto:albulen.pano@unibz.it">albulen.pano@unibz.it</a></p>
<p><b>LIST OF TOPICS COVERED</b></p>	<ul style="list-style-type: none"> <li>• Memory models in Java</li> <li>• Virtual functions, late binding, overriding, and overloading</li> <li>• Exception handling</li> <li>• Reflection and runtime type identification</li> <li>• Generics and collections</li> <li>• I/O, serialization and XML/JSON processing</li> <li>• Designing large applications: design patterns</li> <li>• Multithreading</li> <li>• Code optimization</li> </ul>

<b>TEACHING FORMAT</b>	Frontal lectures, lab exercises, group projects.
<b>LEARNING OUTCOMES</b>	<p><b>Knowledge and understanding</b></p> <ul style="list-style-type: none"> <li>• Know in details the fundamental principles of programming.</li> <li>• Have a solid knowledge of the most important data structures and programming techniques.</li> </ul> <p><b>Applying knowledge and understanding</b></p> <ul style="list-style-type: none"> <li>• Be able to develop small and medium size programs using different programming languages and paradigms.</li> <li>• Be able to solve problems through the application of programming methodologies.</li> </ul> <p><b>Making judgments</b></p> <ul style="list-style-type: none"> <li>• Be able to collect and interpret useful data and to judge information systems and their applicability.</li> <li>• Be able to work autonomously according to the own level of knowledge and understanding.</li> </ul> <p><b>Communication skills</b></p> <ul style="list-style-type: none"> <li>• Be able to use one of the three languages English, Italian and German, and be able to use technical terms and communication appropriately.</li> <li>• Be able to structure and write scientific documentation.</li> </ul> <p><b>Learning skills</b></p> <ul style="list-style-type: none"> <li>• Have acquired learning capabilities to pursue further studies with a high degree of autonomy.</li> </ul>
<b>ASSESSMENT</b>	<p>The assessment is based on:</p> <ul style="list-style-type: none"> <li>• <b>lab exercises</b>, which are focused on specific topics taught in the course. They are meant to motivate students to study throughout the semester and consolidate the theoretical concepts taught in class;</li> <li>• a <b>group project</b>, which evaluates if students acquired the expected programming knowledge and skills; and</li> <li>• an <b>oral exam</b>, which evaluates if students assimilated of the theoretical concepts taught in class by reviewing and discussing the group project.</li> </ul>
<b>ASSESSMENT LANGUAGE</b>	English
<b>EVALUATION CRITERIA AND CRITERIA FOR AWARDING MARKS</b>	<p>Final marks will be calculated in the following way:</p> <ul style="list-style-type: none"> <li>• up to 30 points will be awarded to assignments;</li> <li>• up to 60 points will be awarded to the group project;</li> </ul>

	<ul style="list-style-type: none"> <li>• up to 10 points will be awarded to the oral exam;</li> </ul> <p>To enroll in the oral exam, a student must:</p> <ul style="list-style-type: none"> <li>• Deliver the group project;</li> <li>• Have earned 40 points from the weekly assignments and the group project combined.</li> </ul>
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<b>TEXTBOOK</b>	<ul style="list-style-type: none"> <li>• Paul Deitel, Harvey Deitel. <b>Java How to Program, Early Objects, Eleventh Edition</b>, Pearson, 2017, ISBN 9780134751962. Permanent link: <a href="http://ubz-primو.hosted.exlibrisgroup.com/UNIBZ:All:39UBZ_ALMA_DS51129685850001241">http://ubz-primو.hosted.exlibrisgroup.com/UNIBZ:All:39UBZ_ALMA_DS51129685850001241</a></li> <li>• Lecture notes handed out during the course</li> </ul>
<b>SUPPLEMENTARY READINGS</b>	<ul style="list-style-type: none"> <li>• Jon Loeliger, Matthew McCullough. <b>Version Control with Git, 2nd Edition</b>, 2012, O'Reilly Media, Inc., ISBN 9780596520120. Permanent link: <a href="https://ubz-primو.hosted.exlibrisgroup.com/permalink/f/pok0fm/39UBZ_ALMA_DS51185432710001241">https://ubz-primو.hosted.exlibrisgroup.com/permalink/f/pok0fm/39UBZ_ALMA_DS51185432710001241</a></li> <li>• Robert C. Martin. <b>Clean Code</b>, 2008, Prentice Hall, ISBN 9780136083238. Permanent link: <a href="https://ubz-primو.hosted.exlibrisgroup.com/permalink/f/1t65344/39UBZ_ALMA_DS51208133560001241">https://ubz-primو.hosted.exlibrisgroup.com/permalink/f/1t65344/39UBZ_ALMA_DS51208133560001241</a></li> <li>• Jeff Friesen. <b>Java I/O, NIO and NIO.2</b>, Apress, 2015, ISBN 9781484215654. Permanent link: <a href="https://ubz-primو.hosted.exlibrisgroup.com/permalink/f/pok0fm/39UBZ_ALMA_DS51184522190001241">https://ubz-primو.hosted.exlibrisgroup.com/permalink/f/pok0fm/39UBZ_ALMA_DS51184522190001241</a></li> <li>• Brian Goetz, Tim Peierls, Joshua Bloch, Joseph Bowbeer, David Holmes, Doug Lea. <b>Java Concurrency in Practice</b>, 2006, Addison-Wesley Professional, ISBN 0321349601. Permanent link: <a href="https://ubz-primو.hosted.exlibrisgroup.com/permalink/f/pok0fm/39UBZ_ALMA_DS51184497210001241">https://ubz-primو.hosted.exlibrisgroup.com/permalink/f/pok0fm/39UBZ_ALMA_DS51184497210001241</a></li> <li>• Shekhar Gulati, Rahul Sharma. <b>Java Unit Testing with JUnit 5: Test Driven Development with JUnit 5</b>, 2017, Apress, ISBN 9781484230152. Permanent link: <a href="https://ubz-primو.hosted.exlibrisgroup.com/permalink/f/pok0fm/39UBZ_ALMA_DS51208247310001241">https://ubz-primو.hosted.exlibrisgroup.com/permalink/f/pok0fm/39UBZ_ALMA_DS51208247310001241</a></li> <li>• Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides. <b>Design Patterns: Elements of Reusable Object-Oriented Software</b>, 1994, Addison-Wesley Professional, ISBN 0201633612. Permanent link: <a href="https://ubz-primو.hosted.exlibrisgroup.com/permalink/f/1t65344/39UBZ_ALMA_DS51184149850001241">https://ubz-primو.hosted.exlibrisgroup.com/permalink/f/1t65344/39UBZ_ALMA_DS51184149850001241</a></li> </ul>
<b>SOFTWARE USED</b>	<ul style="list-style-type: none"> <li>• IDE for Java programming, e.g. Eclipse (<a href="https://www.eclipse.org/">https://www.eclipse.org/</a>), IntelliJ (<a href="https://www.jetbrains.com/idea/">https://www.jetbrains.com/idea/</a>), Visual Studio</li> </ul>

(<https://code.visualstudio.com/>) or NetBeans  
(<https://netbeans.apache.org/>)

- JDK 17
- Git
- Linux or macOS recommended.