

## COURSE DESCRIPTION – ACADEMIC YEAR 2024/2025

<b>Course title</b>	<b>Design and Development of Business Software</b>
<b>Course code</b>	47559
<b>Scientific sector</b>	ING-INF/05
<b>Degree</b>	Master in Industrial Mechanical Engineering (LM-33)
<b>Semester</b>	2
<b>Year</b>	1
<b>Credits</b>	5
<b>Modular</b>	No
<b>University</b>	UniBZ

<b>Total lecturing hours</b>	40
<b>Total exercise hours</b>	20
<b>Attendance</b>	Recommended
<b>Prerequisites</b>	Knowledge of Office automation software and operating systems (Windows, MacOS, Linux)
<b>Course page</b>	<a href="https://ole.unibz.it/">https://ole.unibz.it/</a>

<b>Specific educational objectives</b>	<p>The course belongs to the type "affine o integrative" and is part of Advanced Topics in Software / Systems Engineering.</p> <p>The course belongs to the scientific area of Management Engineering and is focused on Business software, like Enterprise Resource Planning Systems, Business Intelligence, and in general on software that help decision makers to take decisions in technical and management areas. It represents one of the related topics (affine/verwandt) for the study programme on Software Engineering for Information Systems.</p> <p>The course gives a general overview of the scientific basics of business software and its objectives as well as the role data management can play in it. The course will also provide a deep understanding of business software solutions and data management with a "hands-on" approach, using data management and business intelligence tools and techniques. Business applications are presented introducing the theoretical foundations about data organization and management and will be integrated with targeted application-oriented exercises and use cases concerning the business environment, especially the manufacturing sector.</p> <p>The learning objectives are to introduce students to the fundamentals of business data analysis and software solutions. Based on this, decision making and operational tools such as Business Intelligence and Enterprise Resource Planning Systems will be discussed in detail alongside presentations of their real-world application in business. The students should acquire the competences to extract, clean, transform and represent data to create a business solution for different scenarios, from operational context (OLTP systems) to more decision-oriented ones (OLAP systems).</p>
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<b>Lecturer</b>	<b><a href="#">Andrea Molinari</a></b>
<b>Contact LA</b>	

<b>Scientific sector of lecturer</b>	
<b>Teaching language</b>	English
<b>Office hours</b>	TBA, arranged beforehand by email.
<b>Lecturing Assistant</b>	
<b>Contact LA</b>	--
<b>Office hours LA</b>	--
<b>List of topics</b>	<ul style="list-style-type: none"> <li>• Introduction to Business Software</li> <li>• Enterprise software applications: ERP, CRM, SCM</li> <li>• Modelling business data and processes</li> <li>• Transactional systems (OLTP) vs analytical systems (OLAP)</li> <li>• Modeling data for OLTP: the relational model</li> <li>• Modeling data for OLAP: multi-dimensional models</li> <li>• The use of Business Intelligence in Business software</li> <li>• Extracting data from relational datasources: the SQL language</li> <li>• Modeling, Extracting, cleaning and transforming data for OLAP solutions: the business intelligence (BI) tools</li> <li>• Creating business solutions with BI Tools (PowerBI, Kibana, Graphana, Qlik)</li> </ul>
<b>Teaching format</b>	Frontal lectures, case studies presentation and exercises

<b>Learning outcomes</b>	<p><b>Knowledge and understanding:</b></p> <p>D1.2 To be able to analyze and solve even complex problems in the area of Software Engineering for Information Systems with particular emphasis on the use of studies, methods, techniques and technologies of empirical evaluation.</p> <p>D1.4 To know in depth the principles, structures and use of computer systems for the automation of information systems.</p> <p>D1.8 To be able to read and understand specialist scientific documentation, such as conference proceedings, articles in scientific journals, technical manuals.</p> <p><b>Applying knowledge and understanding:</b></p> <p>D2.3 To know how to apply the principles of software engineering to domains of different complexity, both IT and non-IT, in which software technology is of great importance, such as, for example, in the transport sector or in the medical field;</p> <p><b>Making judgments:</b></p> <p>D3.1 To be able to autonomously select documentation from a variety of sources, including technical books, digital libraries, technical scientific journals, web portals or open-source software and hardware tools;</p> <p><b>Communication skills:</b></p> <p>D4.6 To be able to interact and collaborate during the implementation of a project or research with peers and experts;</p>
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	<p><b>Learning skills:</b>          D5.3 In the context of a problem solving activity, to be able to extend knowledge, even if incomplete, taking into account the final objective of the project;</p>
<b>Assessment</b>	<p>The assessment is based on two components:</p> <ol style="list-style-type: none"> <li>1) A practical session consisting of SQL queries on real-world datasource (relational databases, Excel files, web pages, open data etc.);</li> <li>2) A practical exam on the lab parts on Business Intelligence analysis, to apply ETL processes to datasources and create dashboards and appropriate data visualizations</li> </ol>
<b>Assessment language</b>	English
<b>Assessment typology</b>	Monocratic commission
<b>Evaluation criteria and criteria for awarding marks</b>	<p>The final mark is the sum of the scores of the different parts of the summative assessment (presentation and exam)</p> <p>The assessment is based on</p> <ol style="list-style-type: none"> <li>1) Laboratory exam on data extraction (SQL): 50%</li> <li>2) Laboratory exam on Business Intelligence tools and techniques: 50%</li> </ol>
<b>Required readings</b>	<p>Subject Librarian:</p> <ul style="list-style-type: none"> <li>• Lecture slides and notes</li> <li>• Lab exercise slides and notes</li> </ul>
<b>Supplementary readings</b>	<ul style="list-style-type: none"> <li>• Laudon, J. P, Laudon, K. C., (2018): Management Information Systems: managing the digital firm, 15<sup>th</sup> ed., Pearson Education, Upper Saddle River.</li> <li>• Magal, R. S., Word, J. (2009): Essentials of business processes and information systems, Wiley, New York.</li> <li>• Rainer, R. K., Watson, H., (2016): Management information systems: moving business forward, 4<sup>th</sup> ed., Wiley, Chichester.</li> <li>• Sauter, V. L., (2011): Decision support systems for business intelligence, 2<sup>nd</sup> ed., Wiley, Hoboken</li> </ul>
<b>Software used</b>	<ul style="list-style-type: none"> <li>- A free cross-platform database tool for developers, administrators, analysts to manipulate data through SQL.</li> <li>- Software for Business analysis and Business Intelligence available for any computer or through the use of the virtualization service provided by Unibz (VMWare Horizon)</li> </ul>