Objectives
The master program targets two types of audience and aims to develop two categories of complementary competences: (a) **scientific work competences** for those aiming to pursue a doctoral degree or a research-oriented academic career; (b) **development competences** for industry-oriented practitioners and industrial researchers.

Core topics
Both competence categories will be focused on the highly relevant topics of **Business Modeling** (including the management of business processes and workflows, the design and use of modeling tools for various aspects of a business, the analysis of business models) and **Distributed Computing** (including Big Data and Web content analysis, Data Science and parallel programming).

Graduate profile – specific competences
A. With respect to **scientific competences**, the program aims to prepare master students for the type of work that is expected during Ph.D. programs and scientific research projects. This is intended to reduce the learning curve at the beginning of a research-based project or program, by developing earlier an experience with research methodologies and with various approaches to research problems, as well as with communicating and publishing research results for maximum impact and in a convincing manner. The graduates will be prepared for the opportunities and open positions provided by international research projects, both industrial and academic, as well as mixed projects focusing on technological transfer. Familiarity with emergent technologies (provided by international cooperation and projects) will be gained. Professors with significant international research experience will be involved to share lessons learned and best practices.

B. With respect to **industry-oriented competences**, the program extends bachelor-level competences in several directions converging under the program orientation:
- **business analysts** will gain skills and practice in the field of enterprise modeling and the use of modeling tools for gathering requirements and knowledge regarding an application scenario or business;
- **programmers** will extend their skills with aspects regarding parallel algorithms, Data Science and computing in high performance environments;
- **software designers** will acquire knowledge on how to design semantics-based or model-driven systems, as well as architectures built on intelligent agents and services;
- **software consultants** will acquire knowledge on emerging or niche technological paradigms such as the Big Data, Semantic Web, Meta-modeling for enterprises;
- **network administrators** will extend their knowledge with aspects pertaining to the management of Cloud and High Performance architectures;
- **Web programmers** will gain knowledge on how to include intelligent algorithms for scalable processing of Web content, Linked Data, Big Data, NoSQL or weakly structured and non-traditional types of content.

Expected starting skills and prerequisites:
An admission exam will guarantee that all students enrolling in this program are familiar with general programming, Web programming and the processing of common data structures. The ideal candidates are graduates of bachelor programs in Business Information Systems, Computer Science and Software Engineering. All lectures and materials will be provided in English, therefore all candidates must prove fluency in English.

**Master Program Coordinator:**
Assoc. Prof. Dr. Robert Buchmann
Contact: robert.buchmann@econ.ubbcluj.ro

**Further details:**
Prof. Habil. Dr. Gheorghe Cosmin Silaghi
(head of BIS department)
Contact: gheorghe.silaghi@econ.ubbcluj.ro

www.econ.ubbcluj.ro
Curricular structure
The curriculum will be structured on three synchronized tracks and a research-oriented meta-track, each providing multiple subjects:
(a) the Business Modeling Track includes topics focused on the management and analysis of business processes within the context of an enterprise;
(b) the Distributed Computing track will develop skills for working with Cloud and High Performance environments;
(c) the Web content and analysis track will focus on state-of-the-art methods emerging from paradigms such as Data Science, Big Data and Natural Language Processing;
(d) The meta-track aims to develop researcher skills, covering methodologies, best practices for communication of scientific results, as well as simulated experience with research projects development.

The last semester will be dedicated to the development of a guided research project involving internship experience and a publishable dissertation. The master students will study all tracks, and will elect one of the three main tracks as a focus of their final semester and dissertation.

<table>
<thead>
<tr>
<th>Sem.</th>
<th>Business Modeling Track</th>
<th>Distributed Computing Track</th>
<th>Web Content Analysis Track</th>
<th>The „Meta” Track</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Business Process Modeling</td>
<td>Parallel Programming</td>
<td>Data Science</td>
<td>Research Methodologies, Academic Writing</td>
</tr>
<tr>
<td>IV</td>
<td></td>
<td></td>
<td></td>
<td>Research project, Internship, Dissertation preparation</td>
</tr>
</tbody>
</table>

Available Infrastructure
The students will have the chance to work with the highest performance supercomputer in a Romanian university, particularly for topics which require exceptional computing capabilities (high performance computing, distributed systems, Big Data analysis). Babeș-Bolyai University is currently acquiring (through the MADECIP program for research infrastructure development) a high performance cluster with 68 nodes, delivering more than 1300 cores on Intel Xeon processors, including GPU and IntelPhi accelerators.