Bertelsmann Tech Curricula
FAQs for Bertelsmann Employees

Overview

What are the Bertelsmann Tech Curricula ............................................................... 2
This is the Bertelsmann Data Curriculum ............................................................. 5
This is the Bertelsmann Cloud Curriculum .......................................................... 6
This is the Bertelsmann AI Curriculum ............................................................... 7

How is the Bertelsmann Tech Curricula structured? ............................................. 8

Which Role profiles and majors are there? ....................................................... 10
The Business Partner ......................................................................................... 11
The Business Analyst ....................................................................................... 12
The Data Steward .............................................................................................. 13
The Data Analyst .............................................................................................. 14
The Data Engineer ............................................................................................ 15
The Data Scientist ............................................................................................ 16
The Cloud Product Manager ......................................................................... 17
The Cloud Architect ....................................................................................... 18
The Cloud DevOps Engineer ....................................................................... 19
The Machine Learning Engineer ................................................................. 20
Major: Computer Vision .............................................................................. 21
Major: Natural Language Processing ............................................................ 22
Major: Time-Series Analysis .......................................................................... 23
Was sind die Bertelsmann Tech Curricula?

What are the Bertelsmann Tech Curricula?

Data, Cloud and Artificial Intelligence are top of the Tech & Data agenda at Bertelsmann – become one of the much sought-after experts!

Data, Cloud and Artificial Intelligence make up the three pillars of the Bertelsmann Tech & Data Agenda. They have become an integral part of how we develop and deliver business now and in the future. This requires specialists with the respective skills and knowledge of data, cloud and AI technologies and products.

The development of Tech and Data competencies is key for Bertelsmann!

With the Bertelsmann Tech Curricula, Bertelsmann University and Corporate IT provide all Bertelsmann employees with a premium-quality, flexible online learning experience that sets out to convey these skills and helps Bertelsmann transform and accelerate its businesses.

The contents are provided by top universities, leading cloud companies and experts. Upon successful completion of a course, participants can obtain a corresponding award or, depending on the chosen provider, take an exam leading to a professional industry certificate.

The Bertelsmann Tech Curricula offer learners the opportunity to develop their individual skill profile independent of time and place, to build up tech & data competencies and knowledge and thus qualify for current and new professional tasks.

What can participants expect from the Tech Curricula?

The Bertelsmann Tech Curriculum is a flexible online learning experience with premium-quality standards and many interactive elements.

Learners benefit from a selected, well-structured and quality-assured digital learning curriculum with great practical relevance. Participants have a chance to exchange information about challenges and best practices in communities powered by the respective learning provider. Also, they get the opportunity to work on their own projects. Thanks to the strong practical relevance, the learning content can be used in everyday professional life.
Bertelsmann Tech Curricula
FAQs for Bertelsmann Employees

What are the learning objectives?
The learning objectives for the new role profile and each major were formulated together with experts from the Bertelsmann IT community - these objectives are reflective of the requirements that practice places on to employees in the corresponding roles.
Detailed learning objectives for each role / major can be found in the detailed profile descriptions below (pp. 10 - 23).

Who is the Tech Curriculum for?
The Bertelsmann Tech Curriculum is open to all Bertelsmann employees who would like to continue their training or deepen their knowledge in the field of technology. For selected roles, prior knowledge of Data Science is strongly recommended. The respective prerequisites can be found in the detailed information (p.10 - 23).

What are the requirements for successful participation?
The basic requirement for successful participation is a high level of engagement and the desire to continuously learn and explore new things. Furthermore, for some roles in the Cloud and AI Curriculum, sound prior knowledge within the subject area of either Data Science, Data Engineering or Machine Learning is strongly recommended. Participants can build this knowledge by starting with the Bertelsmann Data Curriculum and work their way towards the technology end of the technology-to-business spectrum.
The Bertelsmann Tech Curricula offers many opportunities to learn according to one’s individual learning needs. Each learner has the chance to choose and calibrate the learning path that best suits their situation. Extensive information material and advice is available from Bertelsmann University. As a starting point, anyone interested should ask themselves the following questions for orientation:
• Which role or which major is right for me given my prior experience?
• How much time can I invest in my professional training?
• Which learning provider will suit me best?
• Which courses within a learning path do I need?
• How much money can I invest?
Bertelsmann Tech Curricula
FAQs for Bertelsmann Employees

What types of training are available?

• Web-based trainings (WBT): Both, Coursera and Udacity mainly use web-based training courses which take place in a platform environment. Participants can work through courses and lectures by themselves and at their own pace. In addition, quizzes, project work and networks of fellow students help promote students exchanging ideas about learning content and challenges and help deepen practical skills. When purchasing a license for Coursera or Udacity, participants receive access to the provider's training platform for a fixed period in order to complete their training.

• (Virtual) “Instructor-led” trainings (vILT): As for Microsoft, learners will usually go through live trainings in which they are instructed by certified trainers in a fixed cohort at a selected date. The training courses always consist of a mixture of theory and practical exercises. Those who want to deepen what they have learned also have access to complementary free learning materials. This is particularly recommended in preparation for a certificate exam.

How can I book a license?
Bertelsmann employees can book their chosen training format independently via peoplenet and via Bertelsmann University website. The supervisor’s approval is automatically requested during registration. Once the supervisor has given his or her approval, the employee will receive further information on how to start the license or course.

Where does the program take place?
All programs take place 100% online. Please note that all instructor-led trainings take place virtually. Hence, participants can work from anywhere, if they have a stable internet connection.

What topics do the tech curricula cover?
On the one hand, the selection of topics covers the most diverse learning paths per provider towards the respective tech role. On the other hand, there are three practice-oriented specialization subjects with which Bertelsmann employees can learn how to develop solutions in the areas of computer vision, natural language processing or time-series analysis.
Bertelsmann Tech Curricula
FAQs for Bertelsmann Employees

Below, please find the curricula break down into three curricula: Cloud, Data and AI

This is the Bertelsmann Data Curriculum

Data is everywhere. The amount of data we generate will increase exponentially in the coming years. More and more business models are based on collecting, structuring, analyzing and interpreting relevant data and making decisions or recommendations on this basis.

With the Data Curriculum, the Bertelsmann University is providing a digital qualification program designed to teach this data expertise. With this extensive range of courses, those skills and abilities can be acquired which are necessary to help develop Bertelsmann in becoming a data-driven company.

What is the Data Curriculum’s objective?

With the Data Curriculum, Bertelsmann University – in close cooperation with Corporate IT - provides a digital qualification program that is designed to impart this data competence. With this comprehensive learning offer, the skills and abilities can be acquired that are necessary to develop Bertelsmann into a data-driven company.

The aim of the Data Curriculum is to build up data expertise at Bertelsmann; this includes the skills of gathering, managing, evaluating and using data in a critical way.

What topics does the Data Curriculum cover?

The selection of topics covers the entire ‘Data-to-Business’ process, and ranges from Software Development, to Data Management, to Data Visualization. Furthermore, courses on theoretical bases, such as statistics and mathematics, are also offered.

Is there also a suitable offer for executives?

For managers, and any interested Bertelsmann employees who would like to have a more general overview of this area, there is a learning path entitled ‘Digital and Data for Executives’ from the learning provider, Coursera. This comprises two course collections:

- **Data expertise**: An understanding of data terminology and functions
- **Supporting soft skills**: The building of skills to succeed in today’s digital landscape, (e.g. change management, management of agile teams, etc.)

Further offers for managers are in development.
This is the Bertelsmann Cloud Curriculum

The cloud is literally ubiquitous today. In addition to Data and Artificial Intelligence, cloud computing is one of the three pillars of the Bertelsmann Tech & Data Agenda. Especially in times of accelerated virtual networking, it connects us and allows us to access information and applications from anywhere. The cloud has become an integral part of how we collaborate, share data and do business now and in the future. The development of cloud expertise is therefore the way ahead for Bertelsmann.

The Bertelsmann Cloud Curriculum is a curated digital learning offer for all Bertelsmann employees who want to either expand their existing competencies or acquire new expertise in the field of cloud computing. The Cloud Curriculum structures the field of cloud technology into three roles: Cloud DevOps Engineer, Cloud Solutions Architect and Cloud Product Owner. For every role, a requirements profile listing specific skills has been defined and a matching learning program (‘learning path’) designed and constructed. The content is provided by top universities, leading cloud companies and subject experts. Upon successful completion of a course, participants can obtain a corresponding award or, depending on the chosen provider, take an exam leading to a professional industry certificate. The Cloud Curriculum offers every participant the opportunity to undertake further professional training in line with their current knowledge and to thus build upon their tech expertise and gain qualifications for both, their current but also new professional tasks and responsibilities.

What is the Cloud Curriculum’s objective?
The aim of the Bertelsmann Cloud Curriculum is to build up cloud competencies at Bertelsmann; this includes capabilities involved with managing, designing, developing and deploying cloud-based solutions.
This is the Bertelsmann AI Curriculum

Artificial intelligence (AI) is one of the fastest growing technologies of our time. Exponentially growing amounts of data enable the transformation of business processes and entire markets with the help of AI-based solutions. In addition to Data Science and Cloud Computing, AI rounds off the three pillars of the Bertelsmann Tech & Data strategy. The three topics are inextricably linked.

Thus, the Bertelsmann AI Curriculum builds strongly on the Bertelsmann Data Curriculum and also takes up parts of the Bertelsmann Cloud Curriculum. With the AI Curriculum, Bertelsmann University offers all Bertelsmann employees with appropriate prior knowledge another high-quality and flexibly configurable online learning experience. With the help of this curriculum, knowledge in the area of Machine and Deep Learning can be advanced and practical skills can be acquired in specific AI application areas that support Bertelsmann in leading its businesses into the digital future with the help of AI technology.

What topics does the AI Curriculum cover?

The selection of topics covers, on the one hand, a designated learning path for the role of Machine Learning Engineer, and on the other hand, three practical major subjects which Bertelsmann employees can take on in order to learn how to develop solutions in the practical areas of Computer Vision, Natural Language Processing or Time-Series Analysis.

Who is the AI Curriculum for?

The Bertelsmann AI Curriculum is open to all Bertelsmann employees who would like to continue their training or deepen their knowledge in the field of AI. To ensure a successful learning experience, sound prior knowledge in Data Science or Data Engineering is strongly recommended for most of the content. The respective requirements can be found in the profile details (pp. 20 - 23).
How is the Bertelsmann Tech Curricula structured?

All Bertelsmann Tech curricula are structured according to a uniform principle, which we break down in more detail below:

1) Who am I?

In close cooperation with AI experts from various corporate divisions, Bertelsmann University has defined requirement profiles for the role of Machine Learning Engineer as well as for the major subjects Computer Vision, Natural Language Processing and Time-Series Analysis. As with the other Bertelsmann Tech Curricula, as a first step, learners should select the target role or target specialization that fits best with their career or personal aspirations. If unsure, they can read through the detailed descriptions that are provided on pages 12 - 23 or on the Bertelsmann University website for further guidance.
Bertelsmann Tech Curricula
FAQs for Bertelsmann Employees

2) Which provider suits me best?
As a second step, participants choose a learning provider. For the AI Curriculum, Bertelsmann University works with two well-established learning partners whose learning platforms are at the same time leading the market for AI and Data learning:

- Coursera Inc.
- Udacity Inc.
- Microsoft
- Amazon Web Services (AWS)
- Google
- Reportingimpulse

Each learning provider has its own profile and differs, for example, in terms of content, the time invested and the price. This diversity allows interested participants to choose the offer which suits them best. You can find the most important characteristics of each learning partner in this comprehensive overview.

Attention: Not all providers offer courses in every curriculum!

3) What do I need?
In order to provide the knowledge and skills required for a role, our learning partners have built learning paths on the basis of each role profile. Each learning path contains a curated collection of online courses.
The potential learning effort depends on the level of knowledge of each learner. An overview of the learning paths of the respective providers, among further information, can be found on the website of the Bertelsmann University: www.bertelsmann-university.com
Bertelsmann Tech Curricula
FAQs for Bertelsmann Employees

Which role profiles and majors are there?
Below is an overview and detailed descriptions, requirements and learning objectives for each role and the three majors.

Übersicht

The Tech Curricula tap into a so-called technology-to-business spectrum, i.e., from a very technological and technical focus to roles in the context of business strategy/business transformation. Entry-level roles tend to be in the data space, but also move into the technical space depending on the focus. The Cloud Curriculum assumes a certain level of basic knowledge and has a variable range depending on depth of knowledge. The Bertelsmann AI Curriculum follows the Bertelsmann Data Curriculum on the technology side of the technology-to-business spectrum. It complements the curriculum with the role of the Machine Learning Engineer and three specialized specializations: Computer Vision, Natural Language Processing, and Time-series Analysis.

In order to find a suitable role or the right major subject, interested participants can use the following detailed descriptions and the specified requirements for orientation.
The Business Partner

**Role description:** The Business Partner understands ‘Data-to-Business’ process and its domain-specific meaning. The Business Partner has in-depth business know-how and interest in the field of data visualization, information design and storytelling. Against this background, he or she makes direct recommendations for action to the management. His or her role is that of a communicator who convinces through targeted information design and storytelling and motivates action on the basis of use-case and analysis results.

**Prerequisites:** Very good data-driven business understanding with a strong interest in data visualization and story-telling, coupled with communication and project or change management skills.

**Learning targets:**
- Formulation of business-relevant use-cases
- Advanced information design
- Dashboarding
The Business Analyst

Role description: The Business Analyst is, as a rule, not a proven technology expert, but rather works at the interface between business stakeholders and the more technically-orientated roles of the Data Analyst, Data Engineer or Data Scientist. In this context, he or she helps to identify and formulate business-relevant use-cases – this can involve improving existing data products, or developing new ones. In addition to the domain expertise, substantiated with business administration skills, his or her particular skills are, above all, in communication and creativity.

Prerequisites: Domain expertise, communication skills and creative energy. In addition, business know-how with application expertise in the area of business intelligence and/or data visualization tools, as well as a basic knowledge of data management and/or data analysis is also required.

Learning targets:
- Formulation of business-relevant use-cases
- Software development for beginners (SQL)
- Data management for beginners and with previous knowledge (Database Technology, Big Data)
- Advanced data visualization (Information Design, Dashboarding, Visual Analytics)
- Theoretical basics for beginners (Statistics, Mathematics)
Bertelsmann Tech Curricula
FAQs for Bertelsmann Employees

The Data Steward

**Role description:** The Data Analyst prepares data, analyses it exploratively and visually prepares his or her findings to communicate them to business partners or stakeholders. To realize this, the Data Analyst uses his or her special knowledge of visualization and storytelling.

The work is similar to that of a Data Scientist, although it is less technical and more focused on the tool-supported, SQL-based analysis of structured data sets.

**Prerequisites:** A very sound knowledge of relational and partially non-relational database systems, as well as very good visual reporting skills.

**Learning targets:**

- Software development (Python, R, SQL, etc.)
- Data management (Database Technology, Data, Machine Learning, Big Data)
- Data visualization (Information Design, Dashboarding, Visual Analytics)
- Theoretical basics (Statistics, Mathematics, Statistical & Machine Learning)
The Data Analyst

**Role description:** The Data Analyst prepares data, analyses it exploratively and visually prepares his or her findings to communicate them to business partners or stakeholders. To realize this, the Data Analyst uses his or her special knowledge of visualization and storytelling. The work is similar to that of a Data Scientist, although it is less technical and more focused on the tool-supported, SQL-based analysis of structured data sets.

**Prerequisites:** A very sound knowledge of relational and partially non-relational database systems, as well as very good visual reporting skills.

**Learning targets:**
- Software development (Python, R, SQL, etc.)
- Data management (Database Technology, Data, Machine Learning, Big Data)
- Data visualization (Information Design, Dashboarding, Visual Analytics)
- Theoretical basics (Statistics, Mathematics, Statistical & Machine Learning)
The Data Engineer

**Role description:** The Data Engineer is occupied with data extraction, transformation and integration, as well as the continuous operation of data science models. His or her objective is – typically in close collaboration with a Data Analyst or Data Scientist – to provide evaluable data sets for their analyses and to bring the resulting models into continuous operation.

**Prerequisites:** A very sound knowledge in the areas of standard and big data management, as well as expertise in machine learning engineering and software development, e.g. in Python or Java.

**Learning targets:**
- Advanced software development (Python, R, SQL, etc.)
- Advanced data management (Database Technology, Big Data, Machine Learning Engineering, etc.)
The Data Scientist

Role description: The Data Scientist is occupied with the preparation, processing and explorative analysis of data. His or her primary objective is to develop data products, e.g. in the form of machine learning models and dashboards, for business stakeholders, in particular to support decision-making and process automation or optimization. To realize this, the data Scientist models connections or relationships, searches for patterns and anomalies, and uses tools, such as statistical and/or machine learning methods. He or she visualizes his or her findings and makes them available to others, for example, a business partner.

Prerequisites: A pronounced technical mathematical background with a very sound previous knowledge in the subject areas of Statistics & Machine Learning, Software Development (e.g. R or Python), as well as Data Management Technology and/or Querying-Expertise.

Learning targets:
- Advanced knowledge of Mathematics & Statistics
- Extraction, administration and use of large data sets
- Programming knowledge for data analysis
- Effective design of data results
- Creation of statistical and AI-/machine learning models
The Cloud Product Manager

Role description: Cloud Product managers understand and promote the acceptance of the cloud. They observe the market with regard to competitors, trends and customers and use them to derive strategies for portfolio development and motivate technological transformation. They are able to communicate effectively and convince on the basis of business-relevant use cases and analysis results.

Cloud product managers guide strategic portfolio developments and are in contact with various analysts and consulting companies in order to identify technology trends at an early stage.

They drive product and service development and involve cloud solution architects for technical implementation. They take care of the overall organization of processes and applications and optimize their interaction.

Prerequisites: Very good customer-driven business understanding with strong communication and marketing skills.

Learning targets:
- Profound understanding of the potential of digital technologies
- Knowledge of cloud-based business models
- Alignment of business and cloud strategy
- Cloud fundamentals
- Management of requirements
- Storytelling and visualization
- Project and stakeholder management
The Cloud Solutions Architect

**Role description:** Cloud Solution Architects are responsible for solving complex business problems using cloud technologies. They translate the technical requirements of a project into the architecture and design of a solution.

Cloud Solution Architects work closely with other roles of the technology teams to ensure that the best possible cloud technology is used.

**Prerequisites:** Pronounced knowledge of IT infrastructures: Server virtualization, network and storage technologies

**Learning targets:**
- Cloud security
- Software-defined networking
- Containerization and orchestration
- Holistic understanding of IT infrastructures
- Cloud adoption
- Automation tools
The Cloud DevOps Engineer

Role description: A professional Cloud DevOps Engineer is responsible for efficient development operations that aim to optimize service reliability and delivery speed.

Using Cloud platforms, they ensure continuous development and deployment of software. They monitor CPU and memory usage as well as services and are able to manage incidents and learn from them.

Cloud DevOps Engineers aim to continuously deliver value in end-to-end process automation.

Prerequisites: Distinct knowledge of software development and scripting, knowledge of various server systems, data management skills, the ability to use a variety of open source technologies and tools.

Learning targets:
- Cloud fundamentals
- Knowledge of different types of cloud
- Cloud security and data security
- Software-defined networking
- Containerization and orchestration
- Infrastructure as code and system hygiene
- OS know-how
- Profound programming skills
- Monitoring and alerting
Machine Learning Engineer

**Role description:** Machine Learning Engineers develop Machine Learning and AI models in close cooperation with other experts in the areas of data and cloud. They are responsible for the development of powerful AI systems across application fields such as Computer Vision, Natural Language Processing and Time-Series Analysis using, for example, Deep Learning methods. They work closely with Data Engineers and cloud specialists on the deployment and integration of AI models in applications and services.

**Prerequisites:** Strong affinity with IT and advanced knowledge of a relevant programming language, e.g., Python. Expertise in data management technologies, especially in a cloud and big data context. Good prior knowledge of statistics and mathematics and advanced experience with regard to Machine Learning processes and their deployment and operation using DevOps-like processes (MLOps).

**Learning objectives:** Build-up of basic knowledge in the area of information design and of advanced expertise in database technologies. Expert knowledge in the areas of Big Data and Machine Learning Engineering using programming languages such as Python or Scala are also conveyed.

**Mindset:** DevOps, agile mindset, team player, problem solver, storytelling.

**Tasks:** Development of AI solutions and their deployment. Communication of technical details of AI solutions to a range of stakeholders, including business decision makers.
**Bertelsmann Tech Curricula**  
FAQs for Bertelsmann Employees

## Computer Vision

### Subject description
This major offers deep insights into the field of Computer Vision. Participants will acquire skills and programming techniques that will enable them to develop applications in the field of image and video processing and even for the creation of new image and video material.

The offer is aimed at specialists in Machine Learning or Deep Learning who would like to deepen their existing skills and gain expert knowledge in the field of Computer Vision.

### Prerequisites
Knowledge of Linear Algebra and Differential Calculus, advanced Python programming and Machine Learning skills, including, Deep Learning in particular.

### Learning Objectives
Foundational knowledge of Computer Vision techniques in the field of image and video analysis, such as image categorization and object detection, segmentation and tracking. Expert-level knowledge of essential modeling techniques such as Convolutional Neural Networks (CNNs), Residual Networks, Single-shot Detectors (SSDs), including generative models for automatic image synthesis using, e.g., style transfer.
Natural Language Processing

Subject description
This major focuses on modern Natural Language Processing (NLP) techniques. It provides insights into topics such as Natural Language Understanding (NLU) and Natural Language Generation (NLG). Knowledge acquired as part of this major will help participants develop applications that process written or spoken language using Machine Learning methods.

The offer is aimed at specialists in Machine Learning or Deep Learning who want to deepen their existing skills and acquire expert knowledge of the core elements of Natural Language Processing.

Prerequisites
Knowledge of Linear Algebra and Differential Calculus, advanced Python programming and Machine Learning skills, including Deep Learning in particular.

Learning Objectives
Basic knowledge of Natural Language Processing techniques, such as lexical, syntactic and semantic analyses. Expert-level modeling techniques, such as Embeddings, Long-Short Term Memory (LSTM), Recurrent Neural Networks (RNNs) and Transformer Models, including NLG models for automatic text generation.
Subject description
Time-Series analysis and related topics like predictive analytics are valuable tools for companies for purposes, such as trend prediction, predictive maintenance, etc. The creation of forecasts using modern data analysis is generally of crucial importance in the context of data-based business models.

In this specialization subject, participants will learn how time-series models can be developed and used for decision support in various business scenarios.

Prerequisites
Sound knowledge of linear algebra and statistics, especially probability theory. Data analysis experience.

Learning Objectives
Basic knowledge of linear, non-linear and multivariate time-series concepts such as trends, seasonal, stationary and co-integrated time-series, autocorrelations, autoregressions, moving averages, etc. Expert-level knowledge of time-series modeling using, for example, sequence models such as Long-short Term Memory (LSTM), Recurrent Neural Networks (RNNs), 1D ConvNets and Hidden Markov Models and their use for specific forecasting and predictive analytics purposes.