

Future job profiles.

Future Skills Report Chemistry

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www.hrforecast.de
peopleForecast GmbH
Agnes-Pockels-Bogen 1, 80992 Munich

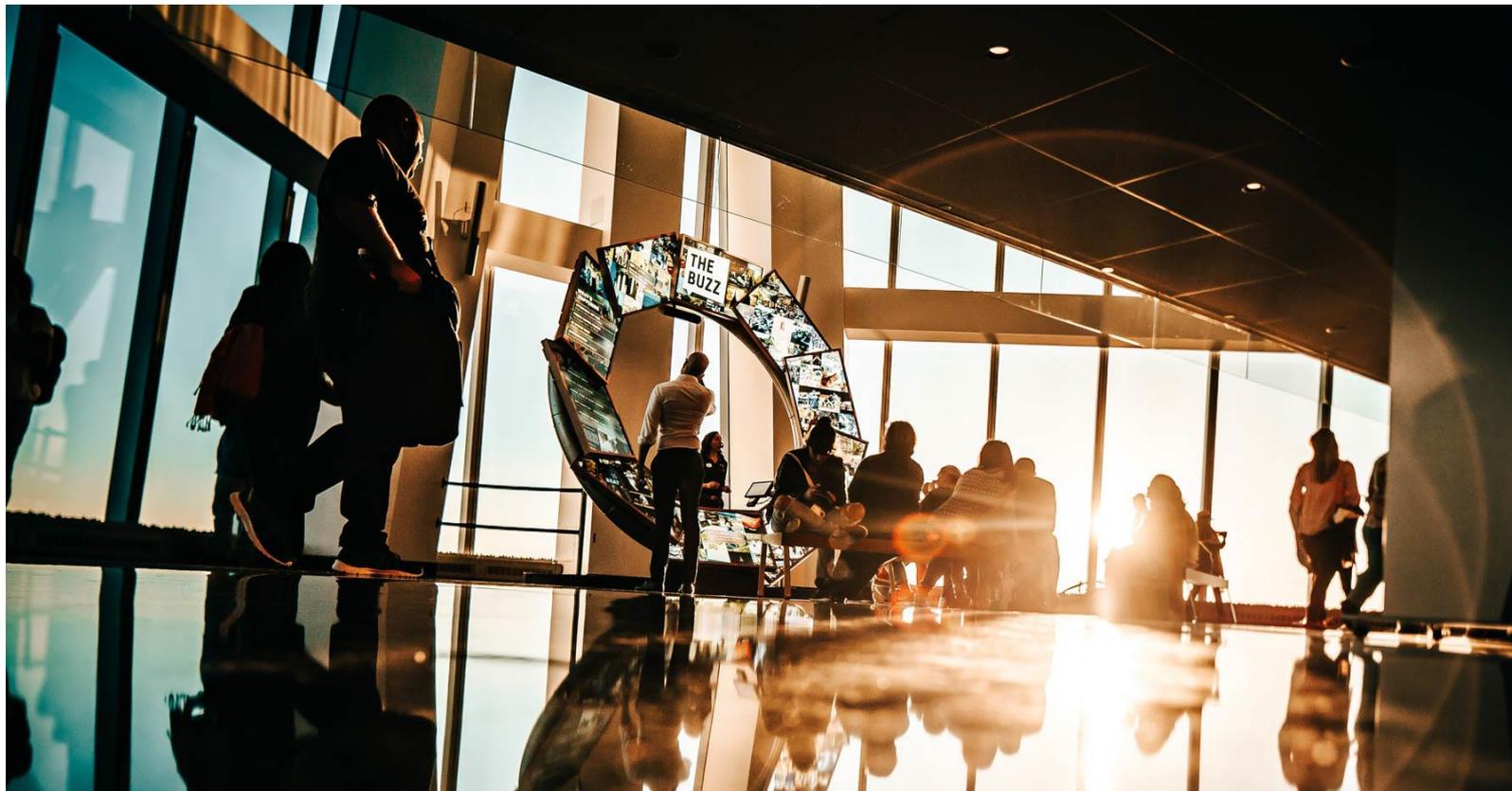


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1. Methodology

The aim of the project is to support the chemical industry in developing future-oriented and competitive job profiles. To this end, external data and analysis are used to:

- Evaluate existing chemical company job postings for future skills and provide best practices.
- Evaluate the importance of existing and future skill trends for relevant profiles.

To perform the analysis, the following process is used:

1. Defining the data sources and crawling the data
2. Data standardization
3. Quantitative and qualitative analysis
4. Creation of the future job profiles

Future job profiles reflect how specific jobs and skill profiles will evolve in the short, medium and long term. This information can be used by company and HR managers to develop and recruit the latest occupations and associated skills. On the employee side, the profiles provide transparency and guidance to better prepare for future developments.

1.1 Defining the data sources and crawling the data

HRForecast crawls over 900 job portals worldwide every day. This shapes a basis for the global job database with more than 1.4B job profiles. The world's largest job portals (e.g. Indeed, Monster, Stepstone, etc.), company career pages, patents, public statistics, company networks (e.g. Xing, LinkedIn) and scientific publications are analyzed for this.

1.2 Standardization of the data

HRForecast uses various algorithms to standardize the data. In a first step, HRForecast filters relevant job profiles from the data pool by assigning each job profile to a standardized job catalog. Data enhancements are then performed on the filtered data set:

- **Skill extraction:** HRForecast uses its own skill catalog, which contains more than 10 million skills as a basis for extraction. The catalog is market-driven, which means it is a highly dynamic catalog that is constantly updated to filter out and monitor skill trends in the market. Machine Learning algorithms are applied to search the data for relevant skill information. After extraction, the skills are standardized and **evaluated for future relevance**.
- **Location extraction:** The location information in the job description is standardized, based on a global location database. This allows HRForecast to structure cities, counties and countries, which can later be used to filter the data. The job profiles have a global validity, which means that global data is used as a basis. An exception are the so-called 'classic apprenticeship jobs', as here the data is reduced to Germany.

- Value chain: Based on the patterns of the extracted skills, we identify the corresponding area of the value chain of a job (e.g. IT, sales, engineering).
- Career level: HRForecast distinguishes different career levels for each job ad (e.g. Junior Engineer, Senior Engineer, etc.). This attribute can be used later to filter the dataset.

1.3 Quantitative and qualitative analysis

The first step is to conduct a quantitative analysis of the standardized and extended data set. The quantitative analysis shows the qualification frequencies and the underlying trends. In a second step, HRForecast performs a qualitative analysis to determine future relevance and uses different methods that lead to a trend display:

1. A market-driven, dynamic skills catalog is constantly updated and expanded. HRForecast continuously crawls job advertisements across all industries for this purpose. This allows us to monitor developments, frequently adjust trend indications and identify new skills.
2. Trend identification and skill generation are part of the consulting portfolio. HRForecast draws on several years of experience to define important skill indications.
3. HRForecast also conducts various trend research on technologies in a variety of industries. The insights from the trend research are directly translated into skillset requirements for companies pursuing these technologies.

1.4 Creation of the future job profiles

The experts at HRForecast use the results of the quantitative analysis as the basis for **defining future job profiles**. We use our know-how to refine and formulate the quantitative results into meaningful job descriptions. In addition, the future orientation of certain skills is regularly updated. In consultation with the client, job profiles are then discussed and adjusted if necessary.

Some skills mentioned below are not explicitly mentioned in every profile, although they may be **highly relevant for the profiles**. The reason given for this is that the profile descriptions are shorter and therefore more readable, and repetitive statements are avoided. In addition, these skills can have different relevance depending on the company location and size (in the USA, for example, knowledge of the skill 'English' would be assumed). This relates to the following skills:

- **Language skills (e.g. English, German)**
- **Intercultural / international competence**
- **Compliance and related skills**
- **Data protection and related skills**
- **Data security and related skills**

2. Legend & Definitions

The following legends and definitions are applied to the interpretation of the future-oriented job profiles:

2.1 Indicator of the future skills relevance

- ↑ **Increasing relevance:** Increasing future relevance of the skill
- **Stable relevance:** Stable future relevance of the skill

2.2 Skill level

We train our algorithms to automatically assign the proficiency of each skill level on a four-level scale. Some examples of how the algorithms classify the proficiencies are:

- **Basic** knowledge in marketing → Skill level: Basic
- **Some practical experience** in data analysis → Skill level: Intermediate
- **Good** knowledge of Python → Skill level: Advanced
- **Excellent** analytical skills → Skill level: Expert
- **Very good** knowledge of English → Skill level: Expert

Skill levels are defined as follows:



Basic

Knowledge: The person has a basic or general familiarity, awareness, or understanding of the subject, technique, or concept

Skill: Basic tasks or activities can be performed

Experience: No or very little practical experience with the subject, technique or concept



Intermediate

Knowledge: The person is familiar with, aware of, or understands the topic, technique, or concept and is able to explain it to others - but not in detail

Skill: The person is able to successfully complete tasks as required, usually at an operational level. From time to time the help of an expert may be required

Experience: Some practical experience on the topic, technique or concept

Knowledge: The person is well acquainted with the topic, technique or concept, has a good understanding of it and is able to explain it in detail to others



Advanced

Skill: The person is able to successfully perform tasks associated with this skill without assistance and can support others in doing so. The help of an expert is rarely required

Experience: usually more than one year (depending on skill, it can be several years) of hands-on experience with the subject, technique, or concept

Knowledge: A person is known as an expert in that field. He or she can provide guidance and answer questions related to this area of expertise and the area in which the skill is used



Expert

Skill: The individual is able to successfully perform the tasks associated with this skill at a strategic level. Able to provide guidance and answer questions related to this skill and the area in which the skill is applied

Experience: Usually many years of practical experience on the subject, technology or concept

Data Scientist

Description

The Data Scientist plans and leads the development of new data analytic techniques, methods, and analytic solutions from design through implementation to prototyping and testing. He/she applies statistical and machine learning methods to discover hidden patterns and information from data that can be used for decision making. He/she manages and designs data-driven controlled experiments and models by collecting relevant data from multiple sources. He/she builds data manipulation and processing tools, creates models and algorithms, proposes and applies new technologies.

Duties

Collaborate with stakeholders to translate business problems into data science projects

Develop strategies to identify, acquire, and use appropriate data sets to develop practical solutions and support decision making

Maintain advanced knowledge of industry relevant trends

Processing of analytical projects with the group and all operating companies

Collaborate with various departments and operating companies to implement their algorithms and use their data more wisely

Manipulate and analyze complex, large-scale, and high-dimensional data using data analysis techniques

Deep-dive into massive data sets to answer critical business questions

Use machine learning algorithms, libraries, and tools to build machine and statistical models

Apply statistical learning models and knowledge to transform a business problem into a solution using applied data science

Implement new statistical and mathematical methods for specific models or analyses and continuously improve these models

Work with the development team to create data logging tools and repeatable data tasks to accelerate and automate data scientist activities

Apply data analysis, data mining, and data processing to present data in a clear manner

Hard skills	Trend	Level
Knowledge of data strategy	↑	Expert
Knowledge of programming languages such as Python, C++, R, or Scala	↑	Expert

Knowledge of statistics, mathematics, artificial intelligence	↑	Advanced
Machine Learning and Deep Learning tools such as H2O.ai, Spark MLlib, Tensorflow, Pytorch, Scikit-learn, etc.	↑	Advanced
Knowledge and experience in data modeling, data - mining, statistical analysis, and predictive analytics	↑	Advanced
Natural language processing and libraries like SpacyNLTK, etc.	↑	Advanced
Knowledge of Big Data technologies (Hadoop, Hive, HBase, Spark, etc.)	↑	Intermediate
Cloud computing (e.g. AWS, Azure)	↑	Intermediate
Data visualization tools (e.g. Tableau, PowerBI)	→	Intermediate
Analysis of business requirements	→	Intermediate
Agile project management (e.g. SCRUM, Kanban)	↑	Intermediate

Soft skills	Trend	Level
Quick comprehension	↑	Advanced
Problem solving	→	Advanced
Analytical thinking	↑	Advanced
Detail orientation	→	Advanced
Teamwork	↑	Intermediate
Presentation and communication	→	Intermediate
Creative thinking	↑	Intermediate

Future skills in dual training - practical tip for companies

Companies can train the "Data Science" or "Data and Process Analysis" skills using the professional training "IT Specialist in Data and Process Analysis." Subsequent professional training enables both further specialization and qualification for more complex tasks.

More information can be found on the company page of the "Elementary Diversity (EIVi)" training campaign at: www.elementare-vielfalt.de/digitalisierung/it-berufe

Alternatively, dual courses of study are also offered in the field of "Data Science", e.g. at the Baden-Württemberg Cooperative State University.

Big Data Analyst

Description

The Big Data Analyst is responsible for the design, implementation and maintenance of extensively distributed data flow channels and data processing systems that support the collection, storage, batching, real-time processing and analysis of information in a scalable, repeatable and secure manner. He/she focuses on defining optimal solutions for data collection, processing and storage. He/she designs, codes, and tests data systems and works on implementing them into internal infrastructure.

Duties

Collaborate with stakeholders to understand data structure, availability, and accessibility requirements

Develop strategies to identify, obtain, maintain, and use appropriate customer data; create scripts that make the data evaluation process more flexible or scalable across data sets

Collaborate with various business units to understand their analytical needs and identify critical metrics/KPIs

Gather, merge, and clean data from multiple sources to support the solution of the business problem

Building the complete package of the data analysis platform, from data entry to data analysis

Contribute to the design and development of data warehouse, data lake and business intelligence platform

Develop tools to improve the flow of data between internal and/or external systems and the data warehouse

Design and implement ETL infrastructure, processes, frameworks, and data processing solutions for analytics and data management

Implement Machine Learning algorithms together with Data Scientists and support them in the use of the tools

Conduct research (benchmarks, conventions) on hardware and software requirements to support selected solutions

Automate data collection and analysis processes, data sharing and reporting tools

Enable search, data visualization, and advanced analytics capabilities

Collaborate with cross-functional teams and architects contributing to analytics as well as their data-driven projects and products

Advise on the latest technologies, strategies and products in database and data processing software to become more agile in data and analytics

Ensure that tools are available on the platform and can be used by different business units in self-service mode

Hard skills	Trend	Level
Experience with data warehouse and relational database technologies, data architecture, and open-source platforms	↑	Expert
Knowledge of relational databases, SQL and PLSQL	→	Expert
Knowledge of programming languages such as Python, R, or Scala	↑	Advanced
Experience in the use of self-service analysis tools	→	Advanced
Knowledge of data modeling and ETL tools	→	Advanced
Knowledge of distributed databases and NoSQL databases such as HBase, Cassandra, MongoDB, Snowflake	↑	Advanced
Understanding of CPU, operating system, memory and networks	→	Advanced
Knowledge of Big Data technologies such as HBase, Hive, etc.	↑	Intermediate
Knowledge of cloud computing (e.g., AWS, Azure)	↑	Intermediate
DevOps technologies (e.g., Docker, Kubernetes) and configuration management tools (Puppet, Chef, Ansible, etc.)	↑	Advanced
Analysis of business requirements	→	Intermediate
Machine Learning and Deep Learning tools such as Spark MLlib, Tensorflow, Pytorch, Scikit-learn, etc.	↑	Intermediate
Graphic analysis	↑	Intermediate
Agile methods (e.g. Scrum, Kanban)	↑	Intermediate
Soft skills	Trend	Level
Problem solving	→	Advanced
Detail orientation	→	Advanced
Analytical thinking	↑	Advanced
Teamwork	→	Advanced

Presentation and communication	→	Advanced
Creative thinking	↑	Intermediate
Transdisciplinary thinking	↑	Intermediate

Future skills in dual training - practical tip for companies

Companies can train the "Data Analyst" or "Data and Process analysis" skills using the professional training "IT Specialist in Data and Process analysis." Subsequent professional training enables both further specialization and qualification for more complex tasks.

More information can be found on the company page of the "Elementary Diversity (EIVi)" training campaign at: www.elementare-vielfalt.de/digitalisierung/it-berufe

Alternatively, dual courses of study are also offered in the field of "Data Science", e.g. at the Baden-Württemberg Cooperative State University.

Cyber Security Specialist

Description

The Cyber Security Specialist designs, develops, and implements secure system architectures. He/she embeds security principles into the design of system architectures to mitigate risks posed by emerging technologies and business practices. He/she designs artifacts that encompass design, development, and implementation into enterprise systems that describe security principles and their relationship to the overall enterprise system architecture. He/she performs routine activities related to periodic review and audit activities of infrastructure security systems and maintains documentation of security standards and procedures.

Duties

Design security controls and systems in accordance with security policies and procedures

Assist in the testing and evaluation of new security technologies and control systems

Consults on security products, services, and procedures to improve system architecture designs

Create specific documentation for design, operation, use, and expected results of new systems

Research modern security software architectures and best practices for network architecture design

Implement new security architectures, technologies, and potential enhancements to the enterprise

Apply techniques to scale and automate security infrastructure and processes

Solving problems that arise during the implementation of new safety systems

Monitor security systems for strengths and weaknesses and suggest improvements to address weaknesses

Oversee the maintenance of security systems, platforms, and associated software

Develop and implement custom disaster recovery exercises and simulation testing for existing systems

Assist in the resolution of identified issues and incidents

Design security controls and systems in accordance with security policies and procedures

Hard skills	Trend	Level
Cloud security expertise (against data breaches, hijacked accounts, malicious insiders)	↑	Expert

IoT security expertise (against DDoS attacks)	↑	Expert
In-depth knowledge of identity and access management	↑	Advanced
Skills in malware analysis and recovery	→	Advanced
Knowledge in network security	→	Advanced
Knowledge of intrusion detection	↑	Advanced
Knowledge of IoT encryption methods (Data Encryption Standard (DES), U.S. Government Advanced Encryption Standard (AES), Triple Data Encryption Standard (DES), RSA encryption, Twofish encryption algorithm)	↑	Advanced
Knowledge of secure protocol configuration (HTTPS and corresponding certificates: SSL) for web applications	→	Intermediate
Knowledge in risk analysis and mitigation	→	Intermediate
Experience with penetration testing	→	Intermediate
Knowledge of system architecture, administration, management of operating systems, virtualization software, networking, programming and languages	→	Basic
Soft skills	Trend	Level
Detail orientation	→	Advanced
Problem solving	→	Advanced
Communication	→	Advanced
Teamwork	↑	Advanced
Networking	↑	Advanced
Analytical thinking	→	Advanced
Transdisciplinary thinking	↑	Intermediate

Future skills in dual training - practical tip for companies

Skills at the level of a skilled worker can also be built up in the field of “Cybersecurity” through the company’s “IT Specialist” training program. Subsequent professional training enables both further specialization and qualification for more complex tasks.

You can find more information on the company page of the "Elementary Diversity (EIVi)" training campaign at: www.elementare-vielfalt.de/digitalisierung/it-berufe.

Alternatively, dual courses of study are offered in the field of "Cybersecurity", e.g. at the Baden-Württemberg Cooperative State University.

IT Specialist

Description

The IT Specialist works in various areas of IT. The dual training in this job specializes in four different areas: Application Development, Data and Process Analysis, Digital Networking and System Integration. IT Specialists working in the area of "Application Development" build program software solutions and apps for internal and external customers. IT Specialists operating in the area of "Data and Process Analysis", develop Machine Learning systems, provide/process data (quantity, quality) and analyze it to implement and optimize digital business processes. IT Specialists in the area of "Digital Networking" work with the network infrastructure and the interfaces between network components and cyber-physical systems. They ensure networking and optimizing of systems and applications. They also secure data against unauthorized access and prevent/remedy system failures. The range of tasks in the "Systems Integration" area includes designing, installing and administering networked IT systems (in particular, in the area of telecommunications). Source: Certificate explanations of the respective dual professional training on the website of the Federal Institute for Vocational Education and Training: <https://www.bibb.de>

Since it would be too extensive to list all the tasks of the various specializations, you will find below a selection of particularly frequently mentioned activities that HRForecast has identified based on postings and descriptions of IT Specialist jobs.

Duties

Provide all necessary assistance to users (e.g., desktops, computer peripherals such as printers, scanners, hard drives, monitors, etc., or software help with installing and updating software)

Monitor and track all IT-related issues in the organization to identify patterns and prioritize interventions

Ensure robustness and reliability of IT infrastructure through monitoring and regular maintenance using tools such as SolarWinds, Zabbix, VMware, etc.

Troubleshoot system and network problems, diagnose and resolve issues

Procurement of new software and hardware equipment within the designated budget

Oversee maintenance, backup, and protection of databases and retrieve files as needed

Define Service Level Agreements (SLAs) and performance metrics based on business requirements

Anticipate internal and/or external business challenges and/or regulatory requirements that may impact IT operations and support functions

Evaluate future technologies and the viability of software and hardware upgrades and technology solutions

Enforces processes and systems to ensure regulatory compliance

Drive IT operations as an internal change agent and support process improvements and innovations

Hard skills	Trend	Level
Knowledge of information technologies and systems	→	Expert
Data center facilities management	↑	Expert
Helpdesk/user support experience	→	Advanced
Experience with incident systems, ticketing systems and monitoring tools (SolarWinds, Zabbix, VMware)	↑	Advanced
Management of cyber and data breach incidents	↑	Advanced
IT Security	↑	Advanced
Knowledge in infrastructure strategy (e.g. cloud)	↑	Advanced
Agile methods for troubleshooting (e.g. Agile, Scrum, Jira)	↑	Advanced
IT Service Management (Zendesk, Genesys PureCloud, Jira Service Desk, Freshdesk, etc.)	↑	Intermediate
ITIL (Information Technology Infrastructure Library)	↑	Intermediate
Incident Management & Problem Management (Opsgenie, Jira Service Desk, PagerDuty)	→	Intermediate
Knowledge of one or more programming languages such as Perl, Python	→	Intermediate
Agile project management (e.g. Scrum, Kanban)	↑	Intermediate
Virtualization tools (e.g. Citrix Essentials, PowerShell, Xen, KVM, VMware, etc.)	↑	Basic
Soft skills	Trend	Level
Detail orientation	→	Advanced
Customer service	→	Advanced
Communication	↑	Advanced
Problem solving	↑	Advanced

Organizational skills	↑	Advanced
Conflict Management	→	Intermediate
Analytical thinking	↑	Intermediate
Decision making	→	Intermediate
Teamwork	→	Intermediate

Future skills in training - practical tip for companies

The IT jobs that came into force on August 1, 2020 offer companies new opportunities and skills profiles. For obtaining "IT specialist" skills, the specializations "Application Development", "System Integration", "Data and Process Analysis" and "Digital Networking" are available. In the commercial field, you can benefit from the "Management Assistant for Digitalization Management" and the "IT Systems Management Assistant" specializations. The "IT Systems Electronics Technician" training offers a link between IT and electronics.

For more information, visit the corporate page of the "Elementary Diversity (EIVi)" training campaign at: www.elementare-vielfalt.de/digitalisierung/it-berufe

IoT Architect

Description

The IoT Architect creates a process for building IoT solutions. He/she develops and standardizes the process of building IoT solutions and then leads the development and improvement of this process, which is a strategic key.

Duties

Lead the development of the IoT vision and technical strategy

Document critical success factors for the business and use business value to drive engagement

Designing an end-to-end IoT architecture

Enabling the design and build of IoT solutions

Create a process for building IoT solutions

Collaborate with various business units to deliver value by working effectively in teams across the enterprise and develop clear business objectives for IoT solutions

Design, implement and maintain data management solutions for cloud computing

Mastering stream and batch processing

Gaining insights from Big Data by implementing machine learning and visualizing those insights

Hard skills	Trend	Level
Embedded software development for smart sensors and endpoint IoT devices (e.g. Java SE Embedded, Java ME Embedded)	↑	Expert
Experience with GPIO (General Purpose Input Output) and I2C (Inter-Integrated Circuit)	↑	Expert
Embedded software development for field gateways (edge computing) (e.g. C, C++)	↑	Expert
Data Lake and Big Data Warehouse Design, Development and Maintenance	↑	Expert
Knowledge of Azure Event Hubs, Apache Kafka and Amazon Kinesis	↑	Advanced
Knowledge of Azure Stream Analytics	↑	Advanced
Data storage for IoT with scalable storage solutions such as S3, HDFS, Apache Cassandra, and Apache HBase	↑	Advanced
Batch processing with modern technologies like Apache Spark	↑	Advanced

Streaming or real-time processing with streaming technologies such as Apache Kafka, Amazon Kinesis	↑	Advanced
Experience with scheduler management tools such as Airflow	↑	Intermediate
Machine Learning algorithms applied to real-time or historical data (e.g., Python, Java, and R)	↑	Intermediate
Data analysis with Python (and its libraries Seaborn, Bokeh and Pygal)	↑	Intermediate
Backend of web applications that work with languages like Java, .NET, and PHP. Front-end web app development requires knowledge of HTML, CSS, and JavaScript (Angular, React, Backbone, Meteor, etc.)	↑	Basic

Soft skills	Trend	Level
Analytical thinking	↑	Expert
Coordination skills	↑	Expert
Detail orientation	→	Advanced
Networking	→	Intermediate
Teamwork	↑	Intermediate
Presentation and communication	→	Intermediate

Blockchain Architect

Description

The Blockchain Architect is the key person who works with technology and R&D teams to design and build solutions that leverage cross-asset concepts and frameworks that meet business needs. He/she works on emerging technologies and creates performance metrics to measure blockchain performance. He/she provides innovative solutions to build and support client systems and applications on distributed ledger platforms such as Blockchain.

Duties

Derive the complexity of a system into a manageable model that describes the essence of a system by revealing important details and significant constraints

Responsible for gathering customer requirements, explaining proposed technical solutions in the proposal, and estimating associated costs and planning

Keep abreast of the latest developments in blockchain technology and work with the blockchain team to propose technical solutions to advance the blockchain ecosystem

Design end-to-end solutions for customers with blockchain

Develop an overall strategy for engagement in the blockchain ecosystem

Create a solution prototype and participate in technology selection

Create performance metrics to measure blockchain performance

Prepare risk/fault analysis and risk mitigation

Develop best practices or guidelines for blockchain teams

Train or mentor technical staff on blockchain concepts, tools, and frameworks

Hard skills	Trend	Level
Programming languages, e.g. C++, Java, Python, Solidity	↑	Advanced
Experience with cryptography	↑	Advanced
Knowledge of specific blockchain protocols, such as Bitcoin and Ethereum and corresponding development frameworks (Hyperledger Fabric)	↑	Advanced
Distributed Ledger Technology (DLT)	↑	Advanced
Knowledge of real-time payment protocols such as Ripple	↑	Advanced
User application development (web and mobile backend) Development, Web Design, UI/UX Design	↑	Advanced

Powerful and user-friendly native (iOS, Android, Windows Phone) and cross-platform (Cordova, Xamarin) mobile applications	↑	Advanced
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Knowledge of APIs such as Go RESTful	↑	Advanced
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Knowledge of agile methods and tools (e.g. Scrum, Jira)	↑	Basic
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Soft skills	Trend	Level
Analytical thinking	↑	Advanced
Problem solving	→	Advanced
Coordination skills	↑	Advanced
Detail orientation	→	Advanced
Presentation and communication	→	Intermediate
Teamwork	↑	Intermediate

Agile Manager

Description

The Agile Manager assumes responsibility for successful implementation and achievement of project/process goals by increasing process efficiency and reducing redundant activities. He/she defines resource allocations, manages status updates, and facilitates interactions and tasks among various parties to reduce the risk of overall failure. He/she develops and identifies project/process management progress/opportunities to improve on-time delivery and efficient use of resources.

Duties

Promote agility in mindset, and implement it across the organization with the goal of improving business outcomes

Lead and execute projects, working closely with various internal and external stakeholders to create project plans, risk management plans, project milestones and deliverables using an agile framework and agile principles

Develop operational plans and Standard Operating Procedures (SOPs) for equipment and systems.

Recommend improvements to procedures and work methods for production areas or processes

Use real-time data to control iteration

Promote agility and flexibility (especially in production) by using real-time data to drive iterations, using 3D printing to prototype faster, using computer vision to assist operators, using manufacturing apps to augment training programs

Conduct a cost-benefit analysis and develop a project plan

Review project plans to determine timeframes, funding constraints, and procedures for implementing projects

Document and track project scope, changes, issues, and risks that impact implementation

Performance review implementation, task delegation, project planning, project finance, quality review

Facilitate daily standup to build consensus within the team

Eliminate conflicts and assist in developing solutions to overcome obstacles

Management and tracking of project backlog and support for both system integration and test planning tasks

Develop team members through ongoing coaching, mentoring, and career discussions

Conduct performance management practices within the team in accordance with organizational policies and procedures

Develop initiatives to support the ongoing skills and professional development of the team

Facilitate discussion, problem solving and conflict resolution

Hard skills	Trend	Level
Knowledge of Agile management techniques, including daily standups, scrums, backlog and story creation and development, sprint creation and development, and complexity measurement	↑	Expert
Experience with standard methodologies such as Waterfall, SDLC, Agile and Scrum	↑	Expert
Project management methods and techniques	→	Expert
Experience with project management tools (MS Project, JIRA/VersionOne, SharePoint) to manage Scrum team sprints and backlogs	↑	Advanced
Business intelligence and data analysis software such as PowerBI, Tableau, or other similar tools	↑	Advanced
Analysis of the business environment and business requirements	→	Advanced
Change Management	→	Advanced
Contract Management	→	Advanced
Personnel and performance management	→	Advanced
Process improvement and optimization	→	Intermediate
Knowledge of innovative methods such as design thinking	↑	Intermediate
Stakeholder management	→	Intermediate
Soft skills	Trend	Level
Conflict management	↑	Expert
Communication	↑	Expert
Facilitation skills	→	Advanced
Critical thinking	↑	Advanced

Analytical thinking	↑	Advanced
Problem solving	↑	Advanced
Teamwork	→	Advanced
Time management	→	Intermediate

(Multichannel) Sales Manager

Description

The Sales Manager drives business growth by improving the customer experience and managing customer order fulfillment, technology and infrastructure plans. He/she is responsible for generating data-driven commercial insights and managing relationships with business partners.

Duties

Develop sales plan to achieve the incremental sales targets

Develop targeted market segments according to specific buyer profiles

Work with data/analytics team to define customer segments to target with specific messages and forecast impact of initiatives

Implement and track metrics to measure success and evaluate channel performance against revenue target to drive sales objectives

Analyze data and information about the competitive landscape and prospect/customer information to identify sales/cross-selling opportunities

Review the buyer's entire business cycle to identify the buyer's current and future business needs that can be met by the sales team

Analysis of sales demographics, sales transactions by personas, and lifetime value of customers

Maintain a robust sales pipeline and associated territory target lists (e.g., in Salesforce)

Develop, leverage, and rotate various contact channels (e.g., mobile push notifications, in-app messages, direct mail, social media, video chats, and others) to provide a seamless customer experience

Proactively identify customer risk and opportunity signals and develop comprehensive strategies to avoid and/or mitigate the risk

Use customer feedback to generate ideas for new features or products

Using marketing and sales automation tools to reactivate inactive customers

Drive technology and infrastructure development, grow the e-commerce business, and improve the e-commerce customer experience

Manage and analyze prospects, sales activity, and forecasts through active use of customer relationship management (CRM) and sales intelligence software

Explore and discover methods to increase customer engagement (automation and artificial intelligence, particularly in natural language processing to support the lead generation process)

Apply advanced technologies, such as facial and mood recognition, to ensure appropriate, customized feedback

Maintain an in-depth knowledge of industry and sales intelligence trends to ensure the company is prepared for change and employs the best technologies and processes

Hard skills	Trend	Level
Experience in sales/business strategy	↑	Expert
Knowledge of sales methodology	→	Expert
Knowledge of standard business practices related to sales and the entire life cycle of the sales process	→	Expert
Ability to optimize sales processes by identifying causes of inefficiencies within the organization	→	Expert
Experience with lifecycle marketing across the entire customer lifecycle/journey	↑	Advanced
Experience in sales campaign management	↑	Advanced
Understanding of customer pain points and requirements	↑	Advanced
Experience in quantitative analysis and business judgment to forecast	↑	Advanced
Experience with advanced CRM tools (e.g. Salesforce, Pipedrive, HubSpot Sales)	↑	Advanced
Experience in customer segmentation with SQL	↑	Advanced
Experience using reporting or data interpretation tools such as Excel and SQL	↑	Advanced
Knowledge of sales and marketing software (e.g. Google Ads, Marketo)	↑	Advanced
Knowledge of digital communication channels to engage with customers remotely (e.g. Skype, WebEx)	↑	Advanced
Knowledge of business intelligence and data analysis software	↑	Intermediate
Experience in data acquisition, manipulation and integration	↑	Intermediate
Experience with data visualization and KPI interpretation	↑	Intermediate
Soft skills	Trend	Level
Strategic thinking	↑	Expert
Presentation and communication	→	Expert
Business expertise	→	Expert

Negotiation skills	→	Expert
Storytelling	↑	Advanced
Active listening	↑	Advanced
Analytical thinking	↑	Advanced
Customer-oriented problem solving	→	Advanced
Emotional intelligence	↑	Intermediate
Teamwork	→	Intermediate
Stakeholder management	→	Intermediate

Future skills in dual training - practical tip for companies

Companies can train the "E-Commerce" skills themselves using the "E-Commerce Clerk" training. Subsequent professional training enables both further specialization and qualification for more complex tasks.

Industrial Clerk

Description

The Industrial Clerk can be employed in numerous business areas in industry. He/she works in offices and secretariats as well as in various operational departments (e.g. purchasing, marketing, HR, accounting, controlling). He/she performs a variety of organizational and commercial-administrative activities in a company with the help of modern IT applications. In doing so, he/she works in a particularly business process-oriented manner and also supports the department in which he/she is deployed in (cross-departmental) projects.

Duties

Preserve files and records

Maintain current filing and database systems of the organization and maintain an organized system of electronic documents

Responsible for creating and processing purchase requests and purchase orders in the organizational system

Digitally document and manage monthly and annual financial statements (DMS)

Sending invoices with accounting software (e-invoicing)

Maintain oversight of project management and invoice data management and assist in scheduling and tracking execution of invoice payments

Process accounting and financial controlling via an ERP system

Generating analysis reports and creating appropriate statistics

Develop, maintain, and update an organizational system for tracking, monitoring, and prioritizing tasks and projects

Capture records into an electronic system either by data entry or using optical scanners.

Build and maintain proactive valuable working relationships and internal and external networks to effectively identify and review priorities and maintain an up-to-date contact database

Responsible for administrative support, including answering and processing incoming correspondence

Responsible for planning, coordinating, prioritizing, and scheduling meetings, conferences, and conference calls

Responsible for planning, coordinating and monitoring internal events and assisting with ad hoc events/projects

Evaluate key figures and statistics for performance monitoring and for controlling operational processes

Hard skills	Trend	Level
Experience in an administrative and secretarial role	→	Expert
Experience in planning, organizing and prioritizing administrative tasks and systems	→	Expert
Ability to keep paper and electronic files and documents organized and accessible	↑	Expert
Experience with reporting and scheduling	→	Expert
Knowledge in accounting	→	Advanced
Knowledge of current accounting concepts, practices and procedures	→	Advanced
Knowledge of MS Office	→	Advanced
Knowledge of Corporate Performance Management (CPM) software (e.g., OneStream, Planful, Blackline, etc.)	↑	Advanced
Experience with Adobe Creative Suite programs	→	Advanced
Use of digital communication channels (e.g., teleconferencing, web, voice) and tools (e.g., Skype, WebEx)	↑	Advanced
Knowledge of AP/AR administration software (e.g. QuickBooks, Sage Intacct, MIP Fund Accounting, etc.)	↑	Intermediate
Contract Management	→	Intermediate
Knowledge of SAP, CRM or other ERP systems	↑	Basic
Price list automation	↑	Basic
Understanding data basics	→	Basic
Soft skills	Trend	Level
Organizational skills	→	Expert
Detail orientation	→	Expert
Analytical thinking	↑	Advanced
Business expertise	↑	Advanced

Multitasking	→	Advanced
Teamwork	→	Intermediate
Problem solving	→	Intermediate
Presentation and communication	→	Intermediate
Time management	→	Intermediate

Future skills in training - practical tip for companies

Digital competencies in the professional training of "Industrial Clerk" can be mapped via the certificate course "Digital Business Process Specialist" developed by company experts in the chemical and pharmaceutical industry.

For more information, visit the corporate page of the "Elementary Diversity (EIVi)" training campaign at: www.elementare-vielfalt.de/digitalisierung/industriekaufleute

Process Engineer

Description

The Process Engineer provides functional and technical support for process control and automation to optimize process capability, efficiency, yield and quality. He/she is responsible for process engineering input to ensure plant assurance requirements are met. He/she is a specialist in process control, optimization or process engineering projects. He/she assists the production department by conducting production trials and suggesting improvements to procedures and work methods of production areas or processes.

Duties

Establish product specifications, in collaboration with relevant stakeholders, to meet customer requirements and standards

Acquire scientific principles regarding thermodynamics, flow assurance, heat transfer, etc.

Use and configure process simulation software to develop best production practices

Use of statistical data to perform simulations, improvements and changes

Initiate purchase requisitions and oversee installation of equipment

Conduct production trials to introduce new raw materials and/or new product specifications

Responsible for testing new processes during the commissioning and start-up phase

Ensure that the device types operate according to their specification and the corresponding capacities

Supervise and monitor the construction of new facilities

Plan and coordinate work assignments within tight deadlines and financial budgets

Assist in the investigation of nonconformities and advise on remedial actions

Identify and eliminate equipment or process problems

Collaboration with installation/project engineers and specialists as well as external suppliers

Ensure safe working conditions and compliance with health and safety regulations

Apply interactive digital modeling to process engineering solutions with reference to case studies and standards

Hard skills	Trend	Level
Experience in chemical/process engineering	→	Expert
Knowledge of pfd, p&id (e.g. Process Flow Diagram and Piping and Instrumentation Diagram)	→	Expert

Knowledge of risk assessment (e.g. Hazop - Hazard and Operability Study)	→	Expert
Knowledge of health and safety regulations	↑	Expert
Experience with process simulation and software (e.g. Hysys/ Aspen/ Unisim/ Flarenet)	→	Advanced
Knowledge of process engineering software packages (e.g. Microsoft Visio, Excel Refprop module, Matchad, Matlab)	→	Advanced
Lean Six Sigma approach to troubleshooting chemical processes.	↑	Advanced
Ability to develop and implement new technologies, such as digital maintenance or remote condition monitoring	↑	Advanced
Mastery of CAD, AutoCAD and BIM software	→	Intermediate
Knowledge of agile project management principles (e.g. Scrum, etc.)	↑	Basic
Knowledge of document system software (e.g. EMC2 Documentum)	→	Basic
Knowledge of purchasing system software (ERP purchasing modules such as SAP MM)	→	Basic
Knowledge of planning system software (Primavera, MS Project)	→	Basic

Soft skills	Trend	Level
Analytical thinking	→	Expert
Communication	↑	Advanced
Problem solving	↑	Advanced
Teamwork	↑	Advanced
Time management	→	Intermediate
Load capacity	→	Basic
Prioritization	→	Basic

Production Engineer

Description

The Production Engineer is responsible for ensuring the functionality of equipment, components and systems. He/she oversees the operation and maintenance of equipment and systems. He/she leads all continuous improvement initiatives to identify and implement innovations within the organization. He/she follows company procedures and best practices and monitors compliance with work activities related to regulatory and legal policies, procedures and regulations.

Duties

Collaborate with other managers to formulate goals and understand requirements

Estimating costs and creating budgets

Organize workflow to meet specifications and deadlines

Monitor production to troubleshoot problems

Monitor and evaluate the performance of production personnel (quality inspectors, workers, etc.)

Determine the amount of resources needed (labor, raw materials, etc.)

Ensure compliance with organizational Workplace Safety and Health (WSH) and Environmental Management System (EMS) policies for contractors and suppliers as well

Develop operational plans and Standard Operating Procedures (SOPs) for equipment and systems

Approve maintenance and purchase of equipment

Ensure that the yield meets the quality standards

Introduce new technologies to improve performance monitoring and process troubleshooting (Industry 4.0) for predictive maintenance using Big Data and advanced analytics

Coordinate technicians remotely through the use of virtual/augmented reality technologies

Implement risk management plans and risk controls within the team

Suggest improvements to business processes and operations to drive continuous improvement

Collaborate with other managers to formulate goals and understand requirements

Estimating costs and creating budgets

Organize workflow to meet specifications and deadlines

Hard skills	Trend	Level
Knowledge of production planning and control	→	Expert
Knowledge of operational maintenance metrics (Planned Maintenance Percentage (PPS), Overall Equipment Effectiveness (OEE), Mean Time To Repair (MTTR), Mean Time Between Failure (MTBF))	→	Expert
Knowledge of performance evaluation and budgeting concepts	→	Advanced
Experience in reporting key production metrics (on-time percentage delivery to customer, production schedule adherence, forecast accuracy, order cycle time, capacity plan vs. actual (capacity utilization))	→	Advanced
MS Office and ERP software (modules SAP MM, PP, PM)	→	Advanced
Six Sigma and Lean Management Principles	↑	Advanced
Knowledge of occupational safety	→	Advanced
Predictive maintenance	↑	Basic
Knowledge of Big Data and Advanced Analytics (mathematical correlations, prediction and modeling)	↑	Basic
Knowledge of virtual reality technologies	↑	Basic
Soft skills	Trend	Level
Analytical thinking	→	Expert
Organizational skills	↑	Advanced
Decision making	→	Advanced
Problem solving	↑	Advanced
Results orientation	→	Advanced
Detail orientation	→	Advanced
Communication	↑	Advanced
Teamwork	→	Intermediate

Industrial Mechanic

Description

The Industrial Mechanic is employed in the maintenance and monitoring of technical equipment and systems. (Source: Certificate explanations of the dual professional training on the website of the Federal Institute for Vocational Education and Training: <https://www.bibb.de>).

He/she sets up, retools, inspects, maintains and repairs production machines and takes care of all mechanical components. In doing so, he/she must read and interpret sketches, drawings, manuals, and specifications to derive dimensions and tolerances of finished workpieces, operating procedures, and setup specifications. He/she monitors machines, determines malfunctions and makes adjustments to ensure the highest possible system availability. If necessary, Industrial Mechanics can produce selected spare parts themselves using additive manufacturing processes. They work with 3D printers, CAD models and data sets as well as modern hardware and software.

Duties

Interpret engineering drawings and blueprints

Performing dimensional and geometric measurements

Operating production equipment, tools and machines

Perform general machining and assembly tasks

Apply shop practices, cleanliness and housekeeping protocols in accordance with Standard Operating Procedures (SOPs)

Apply organizational quality systems in manufacturing

Apply standards and SOPs related to manufacturing safety policies and procedures

Apply productivity methods and practices to improve efficiency in manufacturing tasks

Perform machine maintenance using data glasses or tablets

Take the initiative to look for opportunities for improvement and take corrective action

Perform maintenance tasks through the use of extensible/virtual reality technologies

Filling the production line and/or additive manufacturing equipment with raw material powder

Perform chemical and mechanical treatments for surface preparation and surface protection of finished products

Hard skills	Trend	Level
Technical comprehension	→	Expert

Additive manufacturing	↑	Advanced
Surface preparation and protection	↑	Advanced
Quality system management	→	Advanced
Non-destructive testing	→	Advanced
Computer-aided design	→	Advanced
Knowledge of real-time data systems	↑	Advanced
Experience with wearable technology (e.g. monitoring CNC machines using data glasses)	↑	Advanced
Knowledge of occupational safety	→	Advanced
Embedded systems	↑	Intermediate
Maintenance	→	Intermediate
Internet of Things Management	↑	Basic
Continuous process improvement	↑	Basic
Knowledge of virtual/augmented reality technologies	↑	Basic
Precision measurement	→	Basic
Soft skills	Trend	Level
Carefulness	→	Expert
Sense of responsibility	→	Advanced
Communication	→	Intermediate
Load capacity	→	Intermediate
Problem solving	→	Intermediate
Reliability	→	Intermediate
Teamwork	↑	Intermediate

Future skills in training - practical tip for companies

Digital skills in the professional training of "Industrial Mechanic" can be further developed through additional qualifications during training. Available are: "Additive Manufacturing Processes, IT-supported Plant Modification, Process Integration and System Integration." The additional qualification "IT-supported Plant Modification" relates in particular to the requirements of the chemical industry when modifying existing or designing new production plants.

For more information, visit the corporate page of the "Elementary Diversity (EIVi)" training campaign at: www.elementare-vielfalt.de/digitalisierung/m-e-berufe

Electronics Technician

Description

The dual professional training of the Electronics Technician is divided into two specializations: Automation Technology or Operating Technology. He/she is responsible for the commissioning, maintenance and servicing of electronic components, for example (automated) systems for technology measurement and control. Depending on the specialization, he/she programs and configures networking systems, tests system functions and their safety devices. In addition, he/she assembles and installs cables, assembles or wires switchgear and automation systems. To ensure high system availability, the electronic parts of the systems are regularly monitored and proactively maintained by the Electronics Technician.

Duties

Install and assemble electronic systems according to technical specifications

Repair and maintain electronic systems as needed

Safe operation of power and hand tools to prevent accidents

Accurate execution of cable and wiring connections

Perform regular inspections to detect and eliminate defects

Perform system testing to assess performance and functionality

Maintenance of machines and equipment with the help of virtually superimposed information

Minimize unplanned repairs and downtime through ongoing evaluation of device and system data

Predictive maintenance of electrical equipment by evaluating machine and process data in real time

Manage inventory of electronic components and tools

Document system installation and maintenance procedures

Coordinate deadlines for assigned tasks with management

Recommend upgrades and changes to improve system performance

Developing prototypes for feasibility studies and creating product presentations

Understand drawings, technical manuals and instructions to perform system installation activities

Instruction and guidance of other technicians as needed

Report completed and in-progress tasks to supervisor on a daily basis

Programming and configuring electronic systems

Implement benefits of IT systems in digitized processes

Hard skills	Trend	Level
Data synthesis	→	Expert
Electrostatic discharge control	→	Expert
Automated operation monitoring	→	Advanced
Automation system maintenance	→	Advanced
Continuous process improvement	→	Advanced
Maintenance	→	Advanced
Predictive maintenance	↑	Advanced
Knowledge of real-time data systems	↑	Advanced
Implementation of good manufacturing practices	→	Advanced
Knowledge of occupational safety	→	Advanced
Hazard and risk control and policy management	→	Advanced
Experience with wearable technology (e.g., data glasses to assist with maintenance and repair work)	↑	Advanced
Quality control and assurance	→	Advanced
Quality systems management	→	Advanced
Internet of Things (IoT) Management	↑	Intermediate
Embedded Systems	↑	Intermediate
Experience in augmented reality operation	↑	Basic
Knowledge of 5G technology	↑	Basic
Knowledge of 3D simulation	↑	Basic
Soft skills	Trend	Level
Carefulness	→	Expert

Sense of responsibility	→	Advanced
Communication	→	Intermediate
Load capacity	→	Intermediate
Problem solving	→	Intermediate
Reliability	→	Intermediate
Teamwork	↑	Intermediate

Future skills in training - practical tip for companies

Digital competencies for such specializations as "Electronics Technician for Industrial Engineering" and "Electronics Technician for Automation Technology" can be further developed via additional qualifications included into professional training. Available are: Digital Networking, IT Security and Programming.

For more information, visit the company's Elemental Diversity (EIVi) training campaign page at: www.elementare-vielfalt.de/digitalisierung/m-e-berufe

Laboratory Assistant

Description

The Chemical Laboratory Technicians plan test procedures, carry out chemical reactions and analysis, check starting materials and finished products, operate test facilities and equipment or set them up. They also produce organic and inorganic preparations and separate substance mixtures using various methods. In their work, chemical laboratory assistants use modern analytical equipment and robots, which they control using software and apps. They digitally record, analyze and document the data obtained in this way and prepare it for the laboratory management. When working in the laboratory, Chemical Laboratory Technician uses various chemicals properly and complies with occupational safety, health and environmental protection regulations.

Duties

Carry out general laboratory work and analysis

Prepare samples, formulations and recipes in the laboratory

Monitor product quality to ensure compliance with standards and specifications

Perform chemical or physical laboratory testing to assist scientists in the qualitative or quantitative analysis of solids, liquids, or gaseous materials

Examine chemical samples in the test laboratory and digital evaluation of the obtained data

Prepare chemical solutions for products or processes according to standardized formulas or creating experimental formulas

Monitor product quality to ensure compliance with standards and specifications

Set up and perform chemical experiments, tests, and analysis using techniques such as chromatography, spectroscopy, physical or chemical separation methods, or microscopy

Compile and interpret the results of tests and analysis

Digital documentation and management of measurement results and tests

Develop or perform sampling and analytical programs to maintain quality standards of raw materials, chemical intermediates, or products

Write technical reports or create graphs or charts to document experimental results (using digital technologies)

Responsible for the laboratory organization

Hard skills	Trend	Level
Knowledge in chemistry / related industries	→	Expert

Knowledge of occupational safety and environmental protection	↑	Advanced
Technical comprehension	→	Advanced
Knowledge in general and instrumental analytics	→	Advanced
Knowledge of general data processing	↑	Advanced
Knowledge of digital document management (DMS)	↑	Advanced
MS Office	→	Intermediate
Handling of networked laboratory and analysis devices	↑	Intermediate
Statistics knowledge	→	Basic

Soft skills	Trend	Level
Independent and careful way of working	→	Advanced
Observation accuracy	→	Advanced
Perseverance	→	Advanced
Load capacity	→	Advanced
Sense of responsibility	→	Advanced
Detail orientation	→	Advanced
Teamwork	↑	Advanced
Communication	→	Advanced

Future skills in training - practical tip for companies

Digital competencies of "Chemical Laboratory Technician" specialization can be further developed during training via the elective qualifications "Digitization in Research, Development, Analytics and Production" and "Working with Networked and Automated Systems".

For more information, visit the corporate page of the "Elementary Diversity (EIVi)" training campaign at: www.elementare-vielfalt.de/digitalisierung/labor-berufe

Chemical Technician

Description

The Chemical Technician works at production plants in the chemical industry and related industries (e.g. plastics rubber, mineral oil processing, active ingredient production, waste management). He/she controls and monitors production facilities. In doing so, the Chemical Technician uses digital process control systems for data acquisition in the plant as well as manual processes. With the help of the data and analysis, he/she optimizes procedural processes in production. Deviations from the ideal state are documented and reported to the responsible departments. To ensure permanent plant availability, he/she prepares maintenance work in advance (predictive maintenance) and instructs the units responsible for this (industrial mechanics, plant mechanics) on site. The Chemical Technician is familiar with the proper handling of chemicals and hazardous substances. In doing so, he/she observes occupational safety and environmental protection regulations. (See also certificate explanations on the website of the Federal Institute for Vocational Education and Training: <https://www.bibb.de>).

Duties

Operation and monitoring of the various production facilities

Carrying out inspections of the overall production facilities and processes

Carrying out laboratory tests and quality controls

Examination of chemical samples in the test laboratory and digital evaluation of the collected data

Carrying out minor repair, maintenance and servicing work on production equipment with the help of the robots

Optimize and predictively maintain production equipment using real-time evaluation of machine and process data

Collecting data from automated machines and working with digitally networked production facilities

Carrying out machine maintenance and plant monitoring with the aid of smart glasses

Analysis of the process control and documentation of the working steps according to the quality requirements

Optimization of existing processes and workflows

Consideration of all necessary safety and environmental regulations

Reliable adherence to deadlines for the completion of materials

Hard skills	Trend	Level
Knowledge of machine and plant management, plant operation	→	Expert
Experience in equipment calibration and equipment cleaning	→	Expert
Knowledge of operational process controls	→	Advanced
Technical comprehension	→	Advanced
Predictive maintenance	↑	Advanced
Implementation of good manufacturing practices	→	Advanced
Knowledge of real-time data systems	↑	Advanced
Experience with wearable technology (e.g., data glasses to assist with maintenance and repair work)	↑	Advanced
Experience with networked laboratory and analytical equipment	↑	Advanced
Quality control and assurance	→	Advanced
Operation monitoring	→	Advanced
Maintenance	→	Advanced
Knowledge of occupational safety and environmental protection	↑	Advanced
Knowledge of machine data acquisition (MDE)	↑	Intermediate
Knowledge of ERP systems	→	Intermediate
MS Office	→	Basic
Experience in augmented reality operation	↑	Basic
Soft skills	Trend	Level
Sense of responsibility	→	Advanced
Problem solving	→	Advanced

Reliability	→	Advanced
Time management	↑	Advanced
Decision making	→	Advanced
Flexibility	→	Advanced
Analytical thinking	→	Advanced
Detail orientation	→	Intermediate
Teamwork	↑	Intermediate
Communication	→	Intermediate

Future skills in training - practical tip for companies

Digital competencies of "Chemical Technician" specialization can be further developed during training via the elective qualification "Digitalization and Networked Production".

For more information, visit the Elemental Diversity (EIVi) training campaign company page at: www.elementare-vielfalt.de/unternehmen/digitalisierung/chemikant.html

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Publisher:

German Chemical Employers' Association (BAVC)

Abraham Lincoln Street 24
65189 Wiesbaden

Tel.: (0611) 77881-0

Fax: (0611) 77881-23

E-mail: info@bavc.de

www.bavc.de

Register of Associations Wiesbaden Local Court, Register No. VR 1528

President: Dr. Kai Beckmann

Chief Executive Officer: Dr. Klaus-Peter Stiller

Mining, Chemical and Energy Industrial Union (IG BCE)

Königsworther Platz 6
30167 Hanover

Tel.: (0511) 7631-0

Fax: (0511) 7631-713

E-mail: info@igbce.de

www.igbce.de

Chairman: Michael Vassiliadis