



CERTIFICATION

Project Number:	23/016
Education Institution:	Coursera Inc.
Courses:	IBM Data Engineering Professional Certificate IBM Data Science Professional Certificate IBM Cybersecurity Analyst Professional Certificate IBM Data Analytics with Excel and R Professional Certificate IBM Data Analyst Professional Certificate IBM Full Stack Software Developer Professional Certificate

To whom it may concern

All information in this report was provided by Coursera and assessed by the FIBAA expert panel. However, some of the information had to be redacted for one of the following reasons

- Material/information prohibited from disclosing as a public company under U.S. securities laws
- Proprietary information about internal processes not publicly known
- Level of detail that Coursera generally does not share with the public (e.g. expressly naming internal tools to support compliance processes). Please see <https://www.coursera.org/about/privacy> for relevant public information
- Confidential personal information

For information about redactions, please contact: PR@coursera.org

Decision of the FIBAA Accreditation and Certification Committee



11th Meeting on 20 September 2023

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The FIBAA Accreditation and Certification Committee has taken the following decision:

Certification with conditions:

According to § 7 (2) in conjunction with § 10 (1) of the “Special Conditions for awarding the FIBAA Quality Seal for Continuing Education Courses”, the continuing education course(s) are certified with five conditions.

Period of Certification: September 20, 2023 - September 19, 2028

The FIBAA Quality Seal is awarded.

Condition 1

Coursera and IBM provide a deduction of the intended EQF levels of each of the respective courses.

- ✓ Condition fulfilled – Decision by the FIBAA Accreditation and Certification Committee on September 13, 2024.

Condition 2

For each of the six courses, Coursera and IBM implement a learner workload evaluation system which includes a systematic control loop from the survey to the analysis of the results and the taking of appropriate measures.

- ✓ Condition fulfilled – Decision by the FIBAA Accreditation and Certification Committee on September 13, 2024.

Condition 3

For each of the six courses, Coursera and IBM check learning and teaching material (including literature recommendations) according to updates.

- ✓ **Condition fulfilled – Decision by the FIBAA Accreditation and Certification Committee on March 12,2025.**

Condition 4

Coursera and IBM ensure correct documentation about the ECTS credit awarding and recognition on the homepage, in the program descriptions and in the certificates issued after completion, considering ECTS credit recognition obligations by HEIs, EQF levels assigned, number of credits awarded, requirements for awarding credits and workload assigned to the courses.

- ✓ **Condition fulfilled – Decision by the FIBAA Accreditation and Certification Committee on September 13,2024.**

Condition 5

For each of the six courses, Coursera supports IBM to implement a course specific evaluation system which includes a systematic control loop from the survey on learners' feedback to course content as well as teaching and learning material to the analysis and the taking of appropriate measures.

- ✓ **Condition fulfilled – Decision by the FIBAA Accreditation and Certification Committee on September 13,2024.**

- ✓ All conditions are fulfilled for all courses.

The FIBAA Quality Seal is awarded.

Assessment Report

Institution:

Platform: Coursera Inc.

Content partner: IBM

Continuing Education Course:

- IBM Data Engineering Professional Certificate
- IBM Data Science Professional Certificate
- IBM Cybersecurity Analyst Professional Certificate
- IBM Data Analytics with Excel and R Professional Certificate
- IBM Data Analyst Professional Certificate
- IBM Full Stack Software Developer Professional Certificate

Brief description of the continuing education courses:

Coursera Inc.¹ hosts a portfolio of “Entry-level Professional Certificates” from Google, IBM, Intuit, Meta, Salesforce, and other industry leaders as MOOCs (Massive open online courses). The Entry-level Professional Certificates are issued after completing the respective online course which is designed to help develop the skills needed to land entry-level digital jobs in IT, cybersecurity, data science.

IBM Professional Certificate Courses² are part of the Coursera hosted portfolio of Professional Certificates that are available to individuals worldwide who seek to reskill and move into emerging digital careers. The six IBM Professional Certificate Courses comprise a workload of approximately 120 to 220 hours. The small learning entities can be classified as “microcredentials”. With the FIBAA certification, Coursera and IBM propose ECTS crediting recommendation following the “Recognition of prior learning” as outlined in the ECTS Users’ Guide³.

The IBM Professional Certificate Courses are offered on the Coursera learning platform. The content is conceived, produced, and instructed by IBM with support from Coursera regarding modalities and overall alignment of the content and learning objectives.

Date of opening of the procedure:

February 2, 2023

Date of filing the self-assessment report:

March 28, 2023

Date of online assessment conference:

June 27-29, 2023

Type of certification:

Initial Certification

Mode of study:

Part-time, distance learning

Initial start of the Courses:

- IBM Data Engineering Professional Certificate: July 2021
- IBM Data Science Professional Certificate: February 2021
- IBM Cybersecurity Analyst Professional Certificate: June 2020
- IBM Data Analytics with Excel and R Professional Certificate: April 2021
- IBM Data Analyst Professional Certificate: September 2020
- IBM Full Stack Software Developer Professional Certificate: January 2021

Start of course cycle: continuous

Capacity load: unlimited

¹ Referred to as “Coursera” in this report (except for summary chapter)

² Referred to as “programs” by Coursera, for terminology see glossary at the end of this report.

³ [ECTS Users’ guide 2015](#), page 46

Learner intake take by February 2023:

- IBM Data Engineering Professional Certificate: [REDACTED] learners
- IBM Data Science Professional Certificate Professional Certificate: [REDACTED] learners
- IBM Cybersecurity Analyst Professional Certificate: [REDACTED] learners
- IBM Data Analytics with Excel and R Professional Certificate: [REDACTED] learners
- IBM Data Analyst Professional Certificate: [REDACTED] learners
- IBM Full Stack Software Developer Professional Certificate: [REDACTED] learners

No. of ECTS credits assigned to the Course:

- IBM Data Engineering Professional Certificate: eight ECTS credits
- IBM Data Science Professional Certificate Professional Certificate: six ECTS credits
- IBM Cybersecurity Analyst Professional Certificate: four ECTS credits
- IBM Data Analytics with Excel and R Professional Certificate: four ECTS credits
- IBM Data Analyst Professional Certificate: six ECTS credits
- IBM Full Stack Software Developer Professional Certificate: six ECTS credits

Hours (workload) per credit:

25

Date of the Meeting of FIBAA-Certification Commission:

September 20, 2023

Resolution:

Certification under conditions: The certification of the course is subject to five conditions and is valid for five years.

Duration of Certification:

September 20, 2023 – September 19, 2028

Project Manager:

Michael Stephan

Panel Members⁴:**Dr. Martina Albach**

FernUniversität Hagen, Germany

Distance Learning student Bachelor Informatics and Master Practical Informatics

Prof. (FH) Karsten Böhm

University of Applied Sciences Kufstein Tirol, Austria

Research professorship for business informatics (Business informatics, digitalisation, IT-supported knowledge management for the operational support of operational knowledge processing processes as well as innovation management, tools to support innovation management, agile teaching and learning methods in the context of new blended learning scenarios (learning loops)

⁴ The panel is presented in alphabetical order.

Prof. Dr.-Ing. Ronald Glasberg

SRH Berlin University of Applied Sciences, Germany

Professor of International Strategic Management (Business Administration, General Management, Innovation Management, Computer Science and Strategic Management, International Management, Entrepreneurship, Digital Business)

Dipl.-Wi.-Ing. Alexander Nieland

e4 QUALIFICATION GmbH, invenio AG, Rüsselsheim, Germany

CEO e4 QUALIFICATION GmbH; Head of Business Unit Automotive Engineering, invenio AG

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Summary

The panel's assessment takes into account the self-assessment (self-report) and the results of the online assessment conference as well as the statement of Coursera Inc. to the assessment report dated September 7, 2023.

IBM Data Engineering Professional Certificate; IBM Data Science Professional Certificate; IBM Cybersecurity Analyst Professional Certificate; IBM Data Analytics with Excel and R Professional Certificate; IBM Data Analyst Professional Certificate; IBM Full Stack Software Developer Professional Certificate of Coursera Inc. fulfil (with five exceptions) the FIBAA quality requirements for certified continuing education courses and can be certified by the Foundation for International Business Administration Accreditation (FIBAA) under five conditions. They may be recognized as modules within further educational programs and have assigned ECTS credits.

The panel members identified need for improvement regarding the following aspects⁵: Logic and transparency of course objectives (see chapter 1.1); Structure (see chapter 3.1), Didactics and Methodology (see chapter 3.4), Documentation (see chapter 5) and Quality Assurance (see chapter 6). Therefore, they recommend the certification on condition of meeting the following requirements:

Condition 1 (see chapter 1.1)

Coursera and IBM provide a deduction of the intended EQF levels of each of the respective courses.

Condition 2 (see chapter 3.1)

For each of the six courses, Coursera and IBM implement a learner workload evaluation system which includes a systematic control loop from the survey to the analysis of the results and the taking of appropriate measures.

Condition 3 (see chapter 3.4)

For each of the six courses, Coursera and IBM check learning and teaching material (including literature recommendations) according to updates.

Condition 4 (see chapter 5)

Coursera and IBM ensure correct documentation about the ECTS credit awarding and recognition on the homepage, in the program descriptions and in the certificates issued after completion, considering ECTS credit recognition obligations by HEIs, EQF levels assigned, number of credits awarded, requirements for awarding credits and workload assigned to the courses.

Condition 5 (see chapter 6)

For each of the six courses, Coursera supports IBM to implement a course specific evaluation system which includes a systematic control loop from the survey on learners' feedback to course content as well as teaching and learning material to the analysis and the taking of appropriate measures.

⁵ These aspects are asterisk criteria which means that they are essential for the course.

Proof of meeting these conditions is to be documented by June 19, 2024.

Furthermore, the quality requirements that have not been fulfilled: Integration of theory and practice (chapter 3.2) and Methodological competence (chapter 3.2) are not asterisk criteria, so that further conditions are not necessary and the measures the HEI takes to solve the identified problems are to be considered in the context of the re-certification.

The panel members also identified several areas where the courses could be further developed:

- analyzing course-specific completion-tracking for further occupational development of course completers (see chapter 1.1),
- implementing a course specific process that ensures idiomatic and correct translation for each language implemented and full visibility of videos after insertion of subtitles (see chapter 1.2),
- for the IBM Full Stack Software Developer Professional Certificate, the panel recommends appropriately communicating and sensitizing learners to risks from violating international Data Protection laws and regulations (see chapter 3.2),
- implementing an additional ID check for assessments, e.g. by verification of payment information (see chapter 3.2),
- developing further ideas for nurturing interactivity (see chapter 3.4),
- implementing evaluation of the Professional Certificate Career Resources into the completion survey in order to collect data and be enabled to further improve the service platform (see chapter 3.5),
- consistent communication of instructors' roles in course development and presentation (see chapter 4.1),
- improving monitoring teaching assistants' qualifications and resources (see chapter 4.1),
- improving guidance to feedback options during the courses (see chapter 6),
- communicating current Learner Outcome Reports on the website (see chapter 6).

The measures Coursera takes in order to implement the recommendations of the panel members are to be considered in the context of the re-certification.

Furthermore, a set of criteria exists which exceed the quality requirements:

- Position of the courses within the course provider's overall strategy (see chapter 1.3),
- Teaching staff's qualifications (see chapter 4.1),
- Teaching staff's pedagogical /didactic qualifications (see chapter 4.1),
- Practical experience of the teaching staff (see chapter 4.1),
- Process organization and administrative support for learners and teaching staff (see chapter 4.2),
- Technical organizational unit (see chapter 4.5),
- Teaching and Learning platform (see chapter 4.5),
- Data analysis system (see chapter 4.5),

For the overall assessment please refer to the quality profile at the end of this report.

Details on the Institution

Launched in 2012 by two Stanford professors, Andrew Ng, and Daphne Koller, Coursera's mission is to provide universal access to world-class learning. Coursera is now one of the largest online learning platforms, with 118 million registered learners, partnering with over 300 university and industry partners to offer a broad catalog of content and credentials, including courses, Specializations, Professional Certificates, Guided Projects, and bachelor's and master's degrees. Institutions worldwide use Coursera to upskill and reskill their employees, citizens, and learners in data science, technology, and business. Coursera became a B Corp⁶ in February 2021.

Coursera operates in five essential business units within two models:

- 1) Coursera for individual learners
 - a. Degrees
 - b. Open Content (Professional Certificates, Specializations & Courses by university and industry partners)
- 2) Business to Business (Coursera for Enterprise)
 - a. Coursera for Business
 - b. Coursera for Campus
 - c. Coursera for Government

Learners coming to Coursera are offered a broad range of learning offerings, from a two-hour Guided Project on how to build a website to full study programs. As technology automates more repetitive, predictable, lower-skilled job tasks, individuals worldwide seek to reskill with Professional Certificates and college degrees to move into emerging digital careers. Coursera offers a portfolio of entry-level Professional Certificates from Google, IBM, Intuit, Meta, Salesforce, and other industry leaders that help develop the skills needed to land entry-level digital jobs in business, IT, cybersecurity, data science, marketing, sales, design, and finance without requiring a college degree or any experience in the field. Coursera also has online degrees in data science, computer science, engineering, business, social science, and public health. The full Coursera catalog includes⁷:

- 2,200+ Guided Projects: Gain a job-relevant skill in less than two hours
- 5,300+ Courses: Learn something new in four to six weeks
- 625+ Specializations: Gain a job-relevant skill in three to six months
- 20+ MasterTrack Certificates: earn a university-issued certificate in three to twelve months from a module of a university degree and credit that can be applied to that degree in the future.
- 15+ Entry-level Professional Certificates⁸: Earn a certification of job readiness for an in-demand career in three to nine months.

⁶ <https://www.bcorporation.net/en-us/> (certification for sustainability)

⁷ As of December 31, 2021. The periods noted are intended completion timeframes; actual time to completion varies.

⁸ In this report referred to as "courses", for terminology see glossary at the end of this report.

- 20+ MasterTrack Certificates: In three to twelve months, earn a university-issued certificate from a module of a university degree and credit that can be applied to that degree in the future.
- 30+ Degrees: Earn a bachelor's or master's degree or a postgraduate diploma entirely online.

The Coursera platform is designed to enable learners to discover the right content and credentials by domain (e.g., Business, Technology, Health), by skills (e.g., Python, Statistics, Data Visualization), and by job role (e.g., Data Analyst, Marketer, Engineer). Once learners enroll in a course, the unified technology platform is designed to enable them to learn effectively to advance their careers and earn credentials to signal their learning to prospective employers.

Learners either pay per single guided project, course, certificate, or degree. Coursera Plus is a subscription pricing model that gives learners access to over 7,000 courses, Guided Projects, Specializations, and Professional Certificates on Coursera for a monthly or an annual fee.

As part of Coursera's strategy and focus on supporting individuals with job readiness certificates in their career planning, certificate offerings have increasing importance in Coursera's product catalog. After the first positive experiences with this training offer, Coursera has been able to expand the number of available entry-level certificates to over 30 (see Table 1: Entry-level Professional Certificates at Coursera). Coursera systematically derives the needs from a thorough analysis of data as well as the latest conference and research results. Coursera partners with companies to integrate subject matter expertise from professional practice and to train the skills that are needed on the job for the respective tasks. A separate corporate division has dedicated itself to this topic of industry partnerships.

Table 1: Entry-level Professional Certificates at Coursera

Growing catalog of entry-level Professional Certificates

31 live today ...

7 coming soon ...

 IT Support, ACE®	 UX Design, ACE®	 Sales Rep.	 GST Tax Executive	 Web Developer
 Data Science, ACE®	 Data Analytics with Excel, ACE®	 Digital Marketing & E-Commerce, ACE®	 Technology Consultant	 Cybersecurity Analyst
 Cybersecurity Analyst, ACE®	 Sales Operations, ACE®	 Technical Support	 Back-End Development	 Direct Tax Executive
 Social Media Marketing, ACE®	 Bookkeeping	 Front-End Developer	 Career Coach and Navigator	 Support Engineer
 Data Analyst, ACE®	 Data Engineering, ACE®	 Back-end Developer		 HR Associate
 Sales Development Rep, ACE®	 Marketing Analyst	 iOS Developer		 Supply Chain Analyst
 Full Stack Cloud Developer, ACE®	 Data Warehouse Engineer	 Android Developer		 Operations Analyst
 Data Analytics, ACE®	 DevOps & Software Engineering	 Database Administrator		
 Project Management, ACE®	 Mainframe Practitioner	 Bookkeeper		

Source: Coursera data, certificates announced as of the Q4 2022 earnings date. ACE® indicates certificates which have received American Council on Education (ACE) Credit Recommendations.

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Coursera's research and internal data analysis shows that career certificates are a significant opportunity for learners to progress in their jobs and form a path to digital jobs. Many off-platform demand signals are considered when defining Professional Certificate targets, such as job postings and job growth in the last twelve months in key countries, percentage of entry-level positions, percentage of roles not requiring a bachelor's degree, projected job growth, median salary, and difficulty in hiring. The demand signals are further validated once the programs are live by analyzing on-platform demand signals such as search volume, enrollment numbers, revenue, and the number of learners with a Professional Certificate that later have proceeded to enroll in a degree program.

An increasing number of universities worldwide recognize Professional Certificates towards their degrees, thus making these learning units stackable into full-degree programs. To ease recognition in Europe and in accordance with the ECTS Users' Guide's intention of Recognition of Prior Learning⁹, Coursera also aims at ECTS credit recommendation with FIBAA certification. On the other hand, in many cases, entry-level certificates enable learners to start their careers in various new job opportunities (see Table 2: Entry-level Professional Certificates: Pathways to digital jobs).

For Coursera's Professional Certificates in the area of data science and cyber security, Coursera has been able to win IBM as a content partner. IBM is a global leader in business transformation through an open hybrid cloud platform and AI, serving clients in more than 170 countries worldwide. Today 47 of the Fortune 50 Companies rely on the IBM Cloud to run their businesses, and IBM Watson enterprise AI is in use in more than 30,000 engagements. IBM is also one of the world's most vital corporate research organizations, with 28 consecutive years of patent leadership. Above all, guided by principles for trust and transparency and support for a more inclusive society, IBM is committed to being a responsible technology innovator in the world (see self-report p. 8).

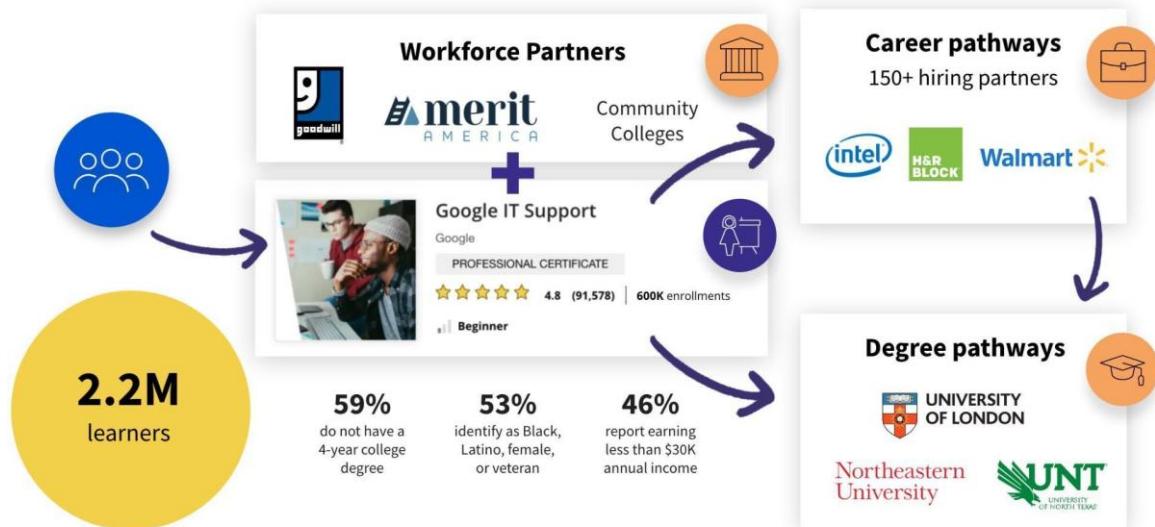
Today, IBM offers a wide range of courses on Coursera, preparing learners with digital job-relevant skills such as IT Support, DevOps and Software Engineering, Cybersecurity, Data Analytics, Software Development, and Data Engineering.

Using their expertise and years of experience in internal and external trainee programs and other education formats (HR development formats and training), IBM developed content to meet the requirements of the job market and enable direct implementation of what has been learned in the company practice.

⁹ [ECTS Users' guide 2015](#), page 46

Table 2: Entry-level Professional Certificates: Pathways to digital jobs

Entry-Level Professional Certificates are pathways to careers and degrees



Although this is the first time the courses in this bundle will be certified according to the ECTS standards, many learners have already completed the courses. Most of the certification courses have already been assessed at least once by the American Council on Education and have received a positive credit recommendation. Comments and recommendations from beta testing and first learners have been implemented. In addition to these external quality assurance measures, Coursera continuously and systematically collects, processes, and makes available data points, including the number of learners, number of completions, star rating, the average time to completion, average passing score, pass ratios, and learner satisfaction rates in dashboards that are analyzed at least once a year in a detailed feedback and evaluation meeting between all parties. In this meeting, areas for improvement are identified, measures derived, and implementation timetables recorded. It is also reviewed whether changes or updates to the learning content are necessary (see also chapter 6.).

Appraisal:

The panel acknowledges the co-operation of Coursera as a well-established platform of online courses and IBM as a global leader in IT technology and know-how as an effective and professional co-operation. The co-operation to develop and conduct and deliver entry-level Professional Certificates provides considerable knowledge and resources for conceiving and designing the courses, a considerable number of highly effective processes and fundamental content knowledge provided by the content partner IBM (see also chapters 4.1, 4.4, 6).

Description and appraisal in Detail

1 STRATEGY AND OBJECTIVES

1.1 Logic and transparency of course objectives (Asterisk Criterion)

Coursera's general objectives for "Professional Certificates" (entry-level, advanced, experts) offer an accessible learning experience from top companies and universities. Learners can get started immediately, study at their own pace, anytime and anywhere. They can create work samples through the course to demonstrate their skills and earn a career credential.

"Entry-level Professional Certificates" on Coursera are designed to provide a comprehensive and high-quality approach to preparing learners for an in-demand career. They are available to learners with little prerequisites and no or little previous knowledge. Learners gain practical skills and knowledge through hands-on projects and, upon completion, can demonstrate job readiness to potential employers with a Professional Certificate credential.

The IBM Professional Certificates are designed to provide learners with a holistic qualification concept that aims to impart subject-specific, methodological, and social competencies. Across the various IBM Professional Certificates, the application orientation is represented in the practical implementation of projects and application of data engineering, data analytics, programming, and database management procedures in the respective method courses and labs. Theoretical foundations and explanations always accompany the expertise of practitioners and subject matter experts.

IBM Data Engineering Professional Certificate

By the end of this Professional Certificate, completers will be able to explain and perform the key tasks required in a data engineering role, such as:

- use the Python programming language and Linux/UNIX shell scripts to extract, transform, and load (ETL) data.
- work with Relational Databases (RDBMS) and query data using SQL statements.
- use NoSQL databases and unstructured data.
- work with Big Data engines like Hadoop and Spark.
- creating Data Warehouses and utilizing Business Intelligence tools to analyze and extract insights.

Learning objectives are:

- Create, design, and manage relational databases and apply database administration (DBA) concepts to RDBMSs such as MySQL, PostgreSQL, and IBM Db2.
- Develop and execute SQL queries using SELECT, INSERT, UPDATE, and DELETE statements, database functions, stored procedures, Nested Queries, and JOINs.
- Demonstrate a working knowledge of NoSQL & Big Data using MongoDB, Cassandra, Cloudant, Hadoop, Apache Spark, Spark SQL, Spark ML, Spark Streaming.

- Implement ETL & Data Pipelines with Bash, Airflow & Kafka; architect, populate, deploy Data Warehouses; create BI reports & interactive dashboards.

IBM Data Science Professional Certificate

The Professional Certificate provides learners with job-ready tools and skills, including open-source tools and libraries, Python, databases, SQL, data visualization, data analysis, statistical analysis, predictive modelling, and machine learning algorithms. Learners will learn data science through hands-on practice in the IBM Cloud using real data science tools and real-world data sets. Upon completing this course courses, completers have built a portfolio of data science projects to provide them with the confidence to head into an entry-level profession in data science. Learning objectives are:

- Describe what is data science, the various activities of a data scientist's job, and methodology to think and work like a data scientist.
- Develop hands-on skills using the tools, languages, and libraries used by professional data scientists.
- Import and clean data sets, analyze and visualize data, and build and evaluate machine learning models and pipelines using Python.
- Apply various data science skills, techniques, and tools to complete a project using a real-world data set and publish a report for stakeholders.

IBM Cybersecurity Analyst Professional Certificate

By the end of this Professional Certificate, completers have completed a real-world security breach project and applied concepts through industry tool virtual labs that provide them with the confidence to start a career in cybersecurity. Learning objectives are:

- Develop knowledge of cybersecurity analyst tools including data protection; endpoint protection; SIEM; and systems and network fundamentals.
- Learn about key compliance and threat intelligence topics important in today's cybersecurity landscape.
- Gain skills for incident responses and forensics with real-world cybersecurity case studies.
- Get hands-on experience to develop skills via industry specific and open-source security tools.

IBM Data Analytics with Excel and R Professional Certificate

By the end of this Professional Certificate, completers can explain the data analyst and data scientist roles. They will also know how to communicate their data findings and prepare a report for stakeholders. Learning objectives are:

- Utilize Excel spreadsheets to perform a variety of data analysis tasks like data wrangling, using pivot tables, data mining, & creating charts.

- Complete the entire data analysis process, including data preparation, statistical analysis, predictive modeling, using R, R Studio, and Jupyter.
- Create relational databases and tables, query data, sort, filter, and aggregate result sets using SQL and R from JupyterLab.
- Communicate learner's data findings using various data visualization techniques including, charts, plots & interactive dashboards with Cognos and R Shiny.

IBM Data Analyst Professional Certificate

Upon successful completion of this Professional Certificate, completers have analyzed real-world datasets, created interactive dashboards, and presented reports to share their findings, giving them the confidence and the portfolio to begin a career as an associate or junior data analyst. They have built the foundation for other data disciplines such as data science or data engineering. Learning objectives are:

- Demonstrate proficiency in using spreadsheets and utilizing Excel to perform a variety of data analysis tasks like data wrangling and data mining.
- Create various charts and plots in Excel & work with IBM Cognos Analytics to build dashboards. Visualize data using Python libraries like Matplotlib.
- Develop working knowledge of Python language for analyzing data using Python libraries like Pandas and Numpy, and invoke APIs and Web Services.
- Describe data ecosystem and Compose queries to access data in cloud databases using SQL and Python from Jupyter notebooks.

IBM Full Stack Software Developer Professional Certificate

In this Professional Certificate learners develop skill sets in technologies including: Cloud foundations, HTML, CSS, JavaScript, GitHub, Node.js, React, Cloud Native practices, DevOps, CI/CD, Containers, Docker, Kubernetes, OpenShift, Istio, Python, Databases, SQL, NoSQL, Django ORM, Bootstrap, Application Security, Microservices, Serverless computing, and more. After completing the Professional Certificate, including the capstone project, completers have developed several applications using front-end and back-end technologies and deployed them on a cloud platform using Cloud Native methodologies. Learning objectives are:

- Develop with front-end development languages and tools such as HTML, CSS, JavaScript, React and Bootstrap.
- Deploy and scale applications using Cloud Native methodologies and tools like Containers, Kubernetes, Microservices and Serverless Functions.
- Program applications using back-end languages and frameworks like Express, Node.js, Python, Django, etc.
- Build an GitHub portfolio by applying Full Stack Cloud Development skills with multiple labs and hands-on projects, including a capstone.

According to Coursera, the specifications from the European Qualifications Framework (EQF) have been taken into account in the design of the learning objectives of the modules and courses¹⁰, e.g., "the ability and willingness of the individual to use knowledge and skills as well as personal, social and methodological abilities and to behave in a thoughtful and individually and socially responsible manner. Competence is understood in this sense as comprehensive action competence" (see self-report p. 11).

Appraisal:

The qualification objectives of the courses are explained and convincingly presented in relation to the target group. They embrace appropriate training of knowledge, skills and competence, comprehensive employability, as well as the development of the individual learner's personality (in relation to the scope of the courses).

The course objectives are based on subject-specific and generic learning outcomes which are in line with the level of the qualification to be awarded upon completion. However, the panel misses a clear deduction of the European Qualification Framework (EQF) level, supported by a taxonomy of the job skills provided in the job task analyses.

Therefore, the panel suggests the following condition:

Coursera and IBM provide a deduction of the intended EQF levels of each of the respective courses.

In order to achieve this the panel suggests taking into account a taxonomy of the intended job skills, (e.g. based on Bloom, EQF and the e-Competence Framework of the EU¹¹).

The panel acknowledges the practical, hands-on skills trained in the courses and the fact that the courses may also be recognized as credits for introductory courses in undergraduate study programs (for communication and documentation, see condition chapter 5).

When defining the learning objectives, the course provider and content partner (IBM) also take into account the findings of course completion-tracking studies (further occupational development of all Professional Certificate completers). During the online assessment conference, insights into details of course completers-tracking survey information was provided. Coursera does not analyze course-specific completion-tracking, but a completion-tracking for all Entry-level Professional Certificates. Due to the number of learners in single courses and the need to develop courses continuously (see also conditions chapter 3.4 and chapter 6), the panel recommends analyzing course-specific completion-tracking for further occupational development of course completers.

	Exceptional	Exceeds quality requirements	Meets quality requirements	Does not meet quality requirements	n.r.
1. Strategy and Objectives					
1.1* ¹² Logic and transparency of course objectives				Condition	

¹⁰ See chapter 3.1 Structure

¹¹ [e-CF levels](#), (see p. 42 to align e-CF and EQF levels)

¹² * Asterisk Criterion

1.2 International orientation of the courses

Coursera hosted content prepares learners with Entry-Level Professional Certificates for jobs in an international environment. The certificates are intended to facilitate learners' development of an international perspective on issues and explicitly prepare them for global professional activity. The language of instruction also supports the certificates' internationality. All courses at this level are delivered in English, while some are translated into other world languages like Spanish, French, or German. Additional languages can be added on request and due to identified demand for certain areas or markets.

If relevant to the learning objectives, international aspects of the respective course content are integrated into all modules, thus enabling learners to gain an international perspective on the problem areas. In addition, when selecting instructors and subject matter experts¹³, greater importance is attached to ensuring they have foreign language skills and international experience, e.g., through stays abroad, employment in internationally active companies, and/or internationally oriented project work. (see self-report p. 12).

Any country-specific differences in software, research, and applicability of what has been learned are addressed. Especially in software training, various formatting, or convention differences are explicitly highlighted, and workarounds are made available within the framework of toolboxes or adapted versions.

The learning objectives are designed to provide learners worldwide with the relevant/appropriate subject knowledge and develop skills that will help them work successfully in an international environment. [REDACTED]

[REDACTED]. Emphasis is always placed on international standards, and common procedural techniques applied worldwide.

Appraisal:

Within the scope of the courses and with respect to the international availability of the courses, the intention is to sustainably promote the employability of [REDACTED] completers. [REDACTED]

[REDACTED] The panel therefore recommends implementing a course specific process that ensures idiomatic and correct translation for each language implemented and full visibility of videos after insertion of subtitles.

	Exceptional	Exceeds quality requirements	Meets quality requirements	Does not meet quality requirements	n.r.
Strategy and Objectives					
1.2 International orientation of the courses			X		

¹³ For Coursera terminology of teaching staff, see chapter 4.1 and glossary.

1.3 Positioning of the courses

During the Covid19 pandemic, online learning provided educators, businesses, and governments with the means to respond to a global crisis that fundamentally changed how people learn and work. The combined forces of online learning and remote work assist to the vision of a world, where anyone, anywhere, has access to education. By working directly with universities and enterprises and powering institutional collaboration across the platform, Coursera provides access to global and affordable education while paving the way for talent to rise from anywhere with remote, digital jobs.

With the rise of online learning and the increasing demand for skills and qualifications, online Professional Certificates have become increasingly popular. They offer a way for individuals to gain new skills, qualifications, and credentials without attending traditional classrooms.

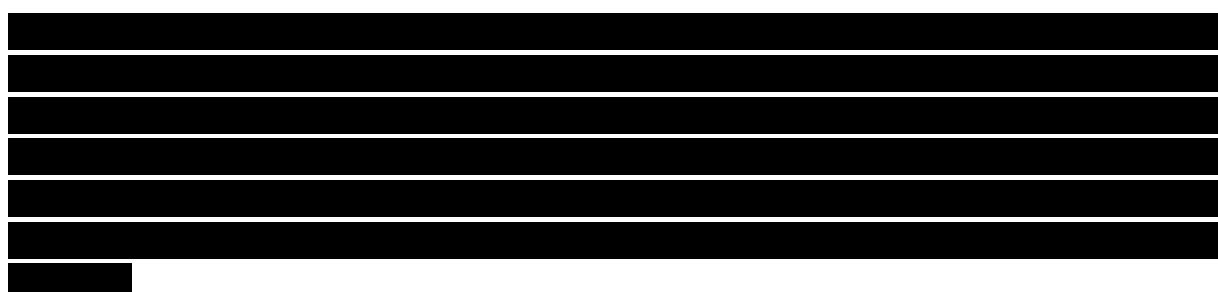
Coursera's Professional Certificates are industry-recognized and can provide a competitive edge on the job market. In addition, Professional Certificates are becoming a much sought-after asset for both candidates and employers, as they demonstrate that an individual has the skills and knowledge necessary to excel in a certain field. They provide individuals with a convenient and accessible way to gain the necessary skills and qualifications to pursue a career. As employers and educational institutions become more rigorous in their requirements, Professional Certificates become an invaluable asset in helping individuals meet their career goals and objectives.

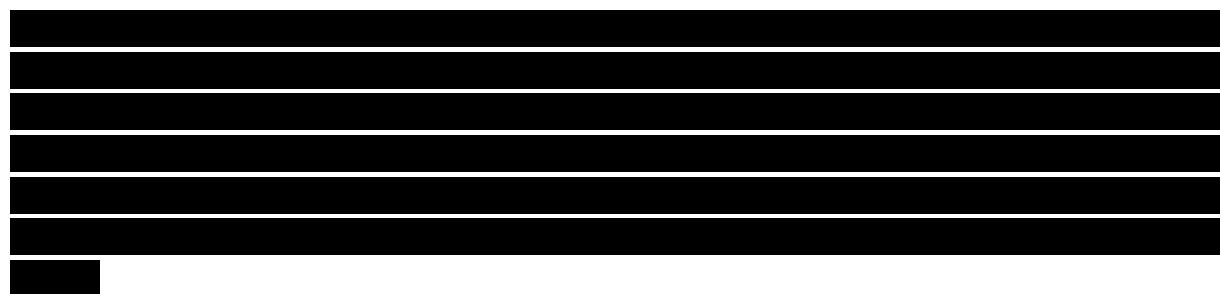
The development of the Professional Certificates was strongly oriented toward the specifications and recommendations of business and industry representatives to prepare completers appropriately for labor market requirements.

Table 3: SWOT analysis of Professional Certificates

Strengths	Weaknesses	Opportunities	Threats
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

	Strengths	Weaknesses
Opportunities	[REDACTED]	[REDACTED]
Threats	[REDACTED]	[REDACTED]





Coursera considers lifelong and lifecycle learning in positioning courses on the Coursera platform. We aim to reach learners early in their careers and offer them affordable, job-relevant content, skills learning, and credentials to help them start or advance their careers. Coursera's lifelong learning ecosystem (see Table 4) shows the three pillars of the company's strategy: the connections made between Learners and Educators, industry, or university partners, the one between Learners and Institutions, and the one between Educators and Institutions.

In this context, Coursera's partnership with IBM connects Learners and Educators to solve a particular learner problem: learning new skills to either land their first professional job or switch to different roles. When further assessing the learner's pain points, Coursera has found that entry-level Professional Certificates from globally renowned brands that are highly job aligned generate very strong Product-Market-fit (PMF). The internal analysis supports this affirmation, considering that entry-level Professional Certificates are currently the largest driver of revenue globally (2022).

During the online assessment conference, Coursera also pointed out that course conception is only initiated on the basis of a strong signal from the job market. [REDACTED]

[REDACTED]. Additional research is conducted to ensure that the differentiation between entry, advanced and expert level is ensured.

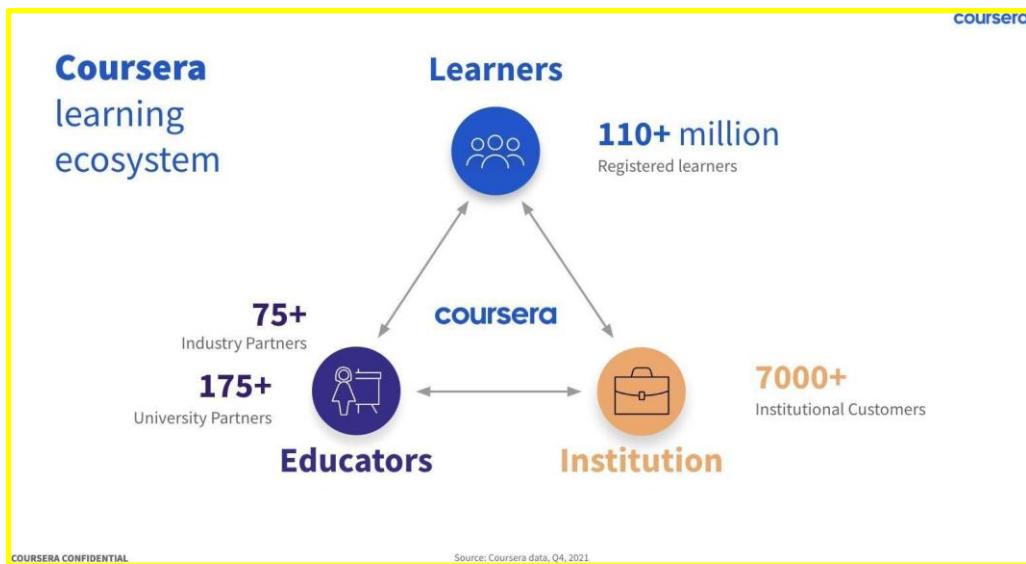


Coursera points out in the self-report (p. 9) that some certificate course completers now work at IBM.

¹⁴ [REDACTED]

¹⁵ Proprietary information not publicly known about internal processes

Table 4: Coursera's lifelong learning ecosystem



Appraisal:

The described profile and the qualification objectives are such that the courses can compete on the education and job market. Course completers-tracking studies are undertaken, analyzed and confirm the desired position of the courses' .

The way in which the courses are integrated into Coursera's overall strategy and relate to the other offers of Coursera is plausibly described. The courses pursue qualification objectives which correspond to Coursera's concept and strategic planning. The qualification objectives constitute the core of the course provider's strategy and are sustainably implemented.

	Exceptional	Exceeds quality requirements	Meets quality requirements	Does not meet quality requirements	n.r.
1. Strategy and Objectives					
1.3 Positioning of the courses					
1.3.1 Positioning of the course in the education and job market, and the professional field ("Employability")			X		
1.3.2 Position of the course within the institution's overall strategy		X			

2 ADMISSION

IBM Data Engineering Professional Certificate

The IBM Data Engineering Professional Certificate is beginner-level learners who want to develop job-ready skills, tools, and a portfolio for an entry-level data engineer position. This program does not require any prior data engineering or programming experience. This Professional Certificate is open to anyone with any job and academic background, with no prior experience required. It will be helpful to learners to have basic IT literacy and knowledge of IT infrastructure and familiarity working with Windows, Linux, or MacOS. Still, it is not necessary to complete the course. No prior computer programming experience is necessary, but it is an asset, as is high school math.

IBM Data Science Professional Certificate

The IBM Data Science Professional Certificate is beginner-level learners who want to develop job-ready skills for an entry-level data scientist, business analyst, data analyst, operations analyst, or similar position. This Professional Certificate is open to anyone with any job and academic background. No prior computer programming experience is necessary, but it is an asset, as are familiarity working with computers, high school math, and communication and presentation skills. For the last few courses¹⁶, calculus and linear algebra knowledge is an asset but not an absolute requirement.

IBM Cybersecurity Analyst Professional Certificate

The IBM Cybersecurity Analyst Professional Certificate is beginner-level learners who want to develop job-ready skills for an entry-level role as an information technology security analyst, security analyst, or junior security analyst. No previous cybersecurity knowledge or experience is required. Still, learners should be comfortable working with computers, be willing to develop new technical skills and enjoy collaborative problem-solving and communicating solutions.

IBM Data Analytics with Excel and R Professional Certificate

The IBM Data Analytics with Excel and R Professional Certificate is beginner-level learners who want to develop job-ready skills for an entry-level role as a data analyst, junior data scientist, associate data analyst, data technician, business performance analyst or marketing analyst. No prior experience, degrees, or statistical or programming knowledge is necessary. Just the passion to self-learn online, comfort and interest in working with numbers and data, and basic computer literacy.

IBM Data Analyst Professional Certificate

The IBM Data Analyst Professional Certificate is beginner-level learners who want to develop job-ready skills for an entry-level role as a data analyst, junior data scientist, associate data analyst, data technician, business performance analyst, or marketing analyst. No specialised background or degree is needed. However, learners are expected to have basic computer literacy, high-school-level mathematics, and be comfortable working with numbers.

¹⁶ For Coursera terminology of programs/courses/modules, see chapter 3.1 and glossary.

[IBM Full Stack Software Developer Professional Certificate](#)

The IBM Full Stack Software Developer Professional Certificate is beginner-level learners who want to develop job-ready skills for an entry-level role as a Full-Stack Cloud Native Application Developer. This Professional Certificate is suitable for those with and without college degrees. It does not require any prior programming or cloud skills. It does require basic understanding of computing environments and computer literacy such as familiarity working with files and folders in an operating system, launching, using, and switching between applications, running commands, copying and pasting text and files, taking screenshots.

To enroll in each of the Entry Level IBM Professional Certificates, learners must subscribe to the Coursera platform and enroll in their preferred course from the course description page on the Coursera website. To enrol, learners must 1) open the page for the course they want to enroll in, 2) click enroll and 3) choose the preferred payment option¹⁷. After enrolling, learners must agree that they will be required to provide a government-issued ID to earn a certificate for completing learning content, after which learners can navigate to the beginning of the course through the platform and begin learning asynchronously. To enroll in the course, learners must have access to a computer or mobile device and internet connection. Learners who enroll in the courses must be proficient in English¹⁸.

As the online platform provider, Coursera has a contract with IBM to host its content. When enrolling in a course, learners agree to Coursera's terms of use and access hosted content through the Coursera platform. The learner's parent relationship is with Coursera, and as such, Coursera holds their data as the controller. Content and instruction are from IBM and owned by IBM. Coursera's role is to (a) aid in sharing best practices for teaching online, (b) recruit learners, (c) foster engagement between learners and the hosted content, and (d) to serve as the main point of organizational contact to ensure a successful learning experience through learner support services, educator support services, and technical support.

Legal relationship between Coursera and IBM

¹⁷ See information on payment in chapter “Details on the institution”

¹⁸ English is the default language for all Professional Certificates, although for some courses there are variants available in other world languages or with subtitles. Learners are informed about the available language versions on the course page and can choose the one that suits them best.

Legal relationship between Coursera and Learners

Coursera sets out terms of use in relation to learners that use the platform. The terms contain key information and provisions on areas such as the extent of a learner's license when using Coursera services, content offering and credit granting, security standards, the use of third-party content, and modification permissions. There are also boilerplate terms related to liability and disclaimers. The terms of use are available online¹⁹. In addition to the contractual terms of use, the document also includes key policies which help clarify material terms for learners on the platform:

- Acceptable Use Policy - which sets out activities that learners are and are not allowed to do on the platform.
- Copyright and Trademark Policy - this protects intellectual property in the content and platform
- Payment and Refund Policy - this policy sets out details on refund, cancellation, etc., in line with Coursera's consumer law obligations
- Honor Code - this code is published to protect academic integrity standards and links to a plagiarism policy. Coursera notes that this Honor Code has undertaken a substantive review and is about to be updated (see self-report p.20).

Legal relationship between IBM and Teaching staff



Appraisal:

The target groups of the courses are defined based on previous knowledge, experience, and educational level. The choice of the specific target group the content is best suited for is based on the strategic objectives of the certificate course.

Admission conditions have been defined and are coherent. They take into account the specific characteristics of the target group best suited for the content. They support the achievement of the course objectives. Program requirements and expectations also include information on the requirements in terms of technical equipment.

The contractual relationship between Coursera and the content partner (IBM) on the one hand and the learners on the other hand, as well as between content partner and teaching staff is set down

¹⁹ <https://www.coursera.org/about/terms> (last call June 28th 2023)

²⁰ For Coursera terminology of teaching staff, see chapter 4.1 and glossary.

and documented. Rights and obligations of contractual parties have been established and are known to all relevant parties. Transparency and legal certainty exist.

	Exceptional	Exceeds quality requirements	Meets quality requirements	Does not meet quality requirements	n.r.
2. Admission					
2.1* Focus on the target group			X		
2.2* Admission conditions			X		
2.3* Legal relationship			X		

3 IMPLEMENTATION

3.1 Structure

Entry-Level Professional Certificates require no degree or experience in the area to take the program or obtain a specified entry-level job role. For example, a learner with a high school diploma and no degree or work experience can take an Entry-Level Professional Certificate and be considered for related roles upon completion. Like all content on Coursera, Professional Certificates include Coursera's Pedagogy Principles (see chapter 3.4).

Each IBM Professional Certificate program contains "courses", which contain weekly "modules"²¹ (4-6 lessons) that progressively build on concepts taught previously. Each module contains weekly learning objectives. By completing the weekly content for each module in order, learners can achieve the learning outcomes required to progress to the subsequent module.

At a glance, IBM Entry-Level Professional Certificates on Coursera:

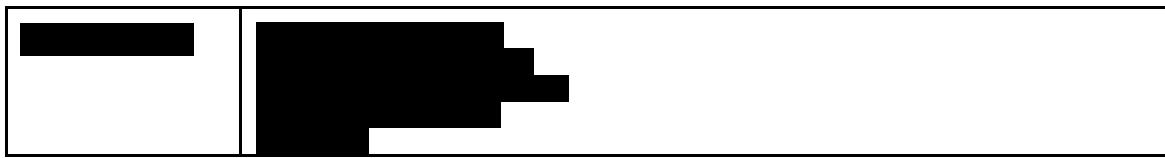
- Include eight to 13 courses designed to be completed in three to five months (workload of 10 hours/week).
- Include career-relevant, hands-on projects to showcase to potential employers on the learner's resume and in interviews.
- Include a partner-branded Professional Certificate, which Coursera issues and the partner delivers, from the partner dashboard to learners who successfully complete the program.
- Provide career-readiness resources, so the learner knows how to prepare for the job role.

Learners should be expected to complete an Entry-Level Professional Certificate in 80-200+ hours of total engagement time. Each course in the Entry-Level Professional Certificate must include approximately 10+ hours of total learner engagement time per week (e.g., watching videos, reading materials, completing assessments).

To help learners prepare for an entry-level job, Coursera emphasizes that they should get ample practice and hands-on learning time to learn the skills they need for the role. Each course should also include a job-relevant project at the end of each course to help learners demonstrate their skills and build their resumes for potential employers. Coursera summarizes Entry-Level Professional Certificate Content Specifications as follows:

²¹ "Course" in Coursera terminology is a learning unit within the certificate program covering a certain content topic. A course (topic) is split into "modules" (in Coursera terminology) which is a weekly learning unit, thus "module" being Coursera's terminology for the smallest learning unit within the "course" and the "program" (as a whole), see glossary.

Table 5: Entry-Level Professional Certificate Content Specifications



IBM Professional Certificates have been developed from the ground up to ensure employability for a specific target occupation and to build skills, abilities, and competencies to be job-ready.

1. Learning Outcomes

Derived from the [REDACTED] a basic idea of the learning objectives has been developed together with the Coursera specialists from the Teaching and Learning Team and the respective Subject Matter Experts from IBM. Each Professional Certificate has therefore defined learning objectives to be achieved at the top level, whereby both the EQF recommendations on competence acquisition have been applied, and the descriptions of the respective learning objectives have been formulated based on the recommendations of Bloom's taxonomy.

In addition, the overarching learning objectives for the respective certificate are broken down further toward individual learning outcomes for each “course” and for each weekly “module”. The quizzes and assessments are aligned with the learning objectives at the weekly “module”, “course”, and certificate levels.

2. Workload

To determine the workload, each sub-element is analyzed within the pre-structured weekly learning plans, and the length (e.g., videos or reading) is determined. The learning and processing times determined in this way are finally summarised at the level of the Professional Certificate. In this way, learners know the total workload in the respective certificate and the weekly learning times for each element. It is possible to set individual learning time targets and days on which Coursera reminds the user of their learning goals in the app or the browser, thus continuously motivating learners to participate. The workload at all levels is documented and systematically displayed before and during learning.

3. Recommendations for ECTS credit allocation

Referencing the methodology and principles from the ECTS User’s Guide and utilizing the application of the workload calculation, Coursera aims to show a defined ECTS credit recommendation that corresponds appropriately to the workload and learning objectives for the individual certificates. One ECTS credit should correspond 25 hours of workload. The individual workload per module may vary depending on the task and exceed the initially determined reference time. The workload analyses provide a regular check, but in case of doubt, a slightly higher effort for a task should be assumed rather than less learning time. Coursera considers this by using the lower end of the range²² and showing a corresponding ECTS credit recommendation value.

4. Non-Allocation for single educational components (on “module”/“course” level)

²² i.e. the possible range of hours allocated per ECTS credit: 25-30

Although the Professional Certificate comprises smaller units, the respective “courses” and “modules”, Coursera refrains from distributing ECTS credits at this level. The approach follows the application in higher education institutions. For example, a module in the field of tertiary education, similar to an entire certificate, extends over four to six months. The ECTS credit allocation assigned to one module at higher education institutions should, according to many national recommendations²³, not be less than five ECTS credits as a rule. A different allocation than full ECTS credits should be avoided unless the general program design can compensate for the sensible full ECTS credits per semester. In addition, the corresponding course unit should conclude with an examination performance, which justifies the acquisition of the ECTS credits. In the case of the Professional Certificate, this is the Final Project, often also called the Capstone Project.

5. 60 ECTS credits allocation per year

The Professional Certificates are part-time continuing education programs intended to enable the acquisition of competencies and skills part-time. The weekly learning performance is geared towards this circumstance, with a maximum workload of approximately ten hours of workload per week for three to five months.

6. ECTS credit documentation

The use of ECTS credits is facilitated and quality enhanced by supporting documents like the course catalogue and the certificate supplement via Credly. The use of Credly has proven to be an exceptional fit because learners have the permanent ability to store their achieved digital credits in one secure place. In addition, Credly provides prospective employers with the ability to verify that the individual earned the Professional Certificate, thus enabling a certificate authenticity check. In addition to badges, Credly provides learners with a transcript that Registration Offices a HEIs can utilize.

²³ As an example, they refer to the recommendations for action of the HRK University Rectors' Conference, such as the recommendation on "Designing modularisation" from February 2016.

Table 6: Credly Sample page



Data Science Professional Certificate (V2)

Issued by [IBM](#)

The badge earner is ready for a career in data science with demonstrated ability to solve for real-world problems. They can apply Data Science methodology - work with Jupyter notebooks - create Python apps - access relational databases using SQL & Python - use Python libraries to generate data visualizations - perform data analysis using Pandas - construct & evaluate Machine Learning (ML) models using Scikit-learn & SciPy and apply data science & ML techniques to real data sets.

[Learn more](#)

Learning Advanced Months Paid

Skills



Earning Criteria

[Complete all courses in the IBM Data Science Professional Certificate program on Coursera \(includes quizzes, hands-on assignments and projects\), and earn the following badges:](#)

7. Certificate supplements

A Certificate supplement documents the courses and the associated qualifications. The acquired skills, the earning criteria for the certificate, the learner, the content, the issuer, the course description, and the certificate details (when and where obtained) are documented through Credly in a safe space that still allows for authenticity checks for external parties.

For each certificate program, IBM provided a plan including learning objectives of the program, the “courses”, and the “modules”, the learning projects, and an overview and biographies of the teaching staff²⁴.

After enrolment, learners must agree that they will be required to provide a government-issued ID to earn a certificate for completing learning content, after which learners can navigate to the beginning of the course through the platform and begin learning asynchronously.

²⁴ See also chapter 4.1 and glossary

Learners attend the course by viewing lectures, completing readings and quizzes, responding to discussion prompts, and completing hands-on labs and programming assignments. Each IBM Professional Certificate has a minimum passing score of either 70 % or 80 % that learners must meet in order to pass graded quizzes and complete the qualification for the Professional Certificate. All learners must adhere to the Coursera Code of Conduct, Honor Code, and Terms of Use. Detailed conditions of participation and assessment regulations, such as quiz attempt rates, passing grades, and identity verification, are described to learners within each IBM Professional Certificate program at the start of each assignment as they navigate throughout the course content. In addition, learners are informed where they can go in case of doubt about discrepancies and how the grading appeal procedure would look like in these cases.

Content on Coursera ensure the feasibility of the programs' workload by a suitable curriculum design and a plausible calculation of workload of under ten hours of study a week to complete the course within the suggested three to five months (see Table 7: Sample weekly plan). Learner enrolment is voluntary and self-guided. Learners will complete the content asynchronously at a pace that meets the demands of their personal schedules. Assessment deadlines are generated based on a personalized schedule that begins when a learner enrolls in a course. If learners miss two assessment deadlines in a row or an assessment deadline by two weeks, they will see a "reset deadlines" option in their grades page. Learners can then switch to a new schedule for the course with updated deadlines and can utilize this option as many times as needed. This does not remove progress made in the course. If a learner cancels their Coursera subscription and then reactivates it, their deadlines will automatically reset.

Table 7: Sample weekly plan

<p>▽ What is Data Engineering?</p> <p>▷ 46 min an Videos verbleibend @ 20 min an Lektüre verbleibend @ 2 benotete Aufgaben verbleibend</p> <hr/>														
<p>In this module, you will learn about the different entities that come together to form a modern data ecosystem and the role Data Engineers, Data Scientists, Data Analysts, Business Analysts, and Business Intelligence Analysts play in this ecosystem....</p>														
<p>▽ Lernziele anzeigen</p> <hr/>														
<p>▽ Modern Data Ecosystem and role of Data Engineering</p> <p>1 benotete Aufgabe verbleibend</p> <table border="1"><tbody><tr><td>▷ Welcome to Introduction to Data Engineering Video • 3 min</td><td>Erste Schritte</td></tr><tr><td>▷ Modern Data Ecosystem Video • 4 min</td><td></td></tr><tr><td>▷ Key Players in the Data Ecosystem Video • 5 min</td><td></td></tr><tr><td>▷ What is Data Engineering? Video • 4 min</td><td></td></tr><tr><td>▷ Viewpoints: Defining Data Engineering Video • 4 min</td><td></td></tr><tr><td>▷ Viewpoints: Evolution of Data Engineering Video • 7 min</td><td></td></tr><tr><td>▷ Summary and Highlights Lesevorgang • 10 min</td><td></td></tr></tbody></table>	▷ Welcome to Introduction to Data Engineering Video • 3 min	Erste Schritte	▷ Modern Data Ecosystem Video • 4 min		▷ Key Players in the Data Ecosystem Video • 5 min		▷ What is Data Engineering? Video • 4 min		▷ Viewpoints: Defining Data Engineering Video • 4 min		▷ Viewpoints: Evolution of Data Engineering Video • 7 min		▷ Summary and Highlights Lesevorgang • 10 min	
▷ Welcome to Introduction to Data Engineering Video • 3 min	Erste Schritte													
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▷ Key Players in the Data Ecosystem Video • 5 min														
▷ What is Data Engineering? Video • 4 min														
▷ Viewpoints: Defining Data Engineering Video • 4 min														
▷ Viewpoints: Evolution of Data Engineering Video • 7 min														
▷ Summary and Highlights Lesevorgang • 10 min														

Discussion forums are accessible for enrolled learners, where they benefit from:

- Support from fellow learners which are moderated by IBM Subject Matter Experts.
- Interaction with classmates, shared resources, and help answer questions about course materials or assessments.
- Asking questions, debating ideas, and identifying classmates who share the same goals.

Appraisal:

The courses' structural elements are convincingly described and motivated. The course structures serve to promote the objectives and the learner acquisition of knowledge and competences in line with the given objectives.

During the assessment conference, Coursera and IBM pointed out that the "Recognition of prior learning and experience" according to the ECTS Users' Guide²⁵ is an important guideline for the intended ECTS crediting recommendation. By compiling the self-assessment report and giving an analysis of the approach towards ECTS credits allocation, Coursera and IBM have proven comprehensive examination of the ECTS guidelines. The following ECTS elements: principle of modularization, credit points and workload specifications, have mostly been implemented. The guidelines for workload calculation are clearly and understandably deduced. The course descriptions provide detailed descriptions of intended learning outcomes and the information defined in the [ECTS Users' Guide](#). Certificate supplements document the courses and the associated qualifications in a transparent and coherent manner.

As for the workload calculated by Coursera and IBM and intended ECTS credits to be awarded, the conversion is as follows:

Table 8: Workload calculation and intended ECTS credit assignment

Course	Learning hours ²⁶	Exact ECTS Credits (25 hours per ECTS credit)	Intended ECTS credit assignment
IBM Data Engineering Professional Certificate	217	8,68	8
IBM Data Science Professional Certificate	165	6,6	6
IBM Cybersecurity Analyst Professional Certificate	128	5,12	4
IBM Data Analytics with Excel and R Professional Certificate	124	4,96	4

²⁵ [ECTS Users' guide 2015](#), page 46

²⁶ See chapter 3.2, Table 9: IBM Entry-Level Professional Certificates: Course contents and learning hours

IBM Data Analyst Professional Certificate	151	6,04	6
IBM Full Stack Software Developer Professional Certificate	141	5,64	6

According to the ECTS Users' Guide²⁷, workload is an estimation of the time the individual typically needs to complete all learning activities such as lectures, seminars, projects, practical work, work placements and individual study required to achieve the defined learning outcomes in formal learning environment. Therefore, the panel notes that workload calculation and ECTS credit allocation is plausible for all programs.

However, the panel also notes that Coursera did not provide proof of a process of reviewing the workload including taking into account learner feedback and the courses' success rate. During the assessment conference learners confirmed that the calculated workload was feasible, however, a question whether the actual workload of the whole course corresponds with, is lower or higher than the estimated workload (including teaching time, self-study time and examination) is missing in the course completion survey.

The panel recommends the following condition:

For each of the six courses, Coursera and IBM implement a learner workload evaluation system which includes a systematic control loop from the survey to the analysis of the results and the taking of appropriate measures.

There are transparent conditions of participation and assessment regulations. The courses' characteristic structural features have been implemented.

Apart from the missing implementation of learners' feedback into the evaluation of the workload (see condition, second part), the feasibility of the courses' workload is ensured by a suitable curriculum design, by a plausible calculation of workload, by an adequate number and frequency of assessments, by appropriate support services as well as academic and general learner counselling.

	Exceptional	Exceeds quality requirements	Meets quality requirements	Does not meet quality requirements	n.r.
3. Implementation					
3.1 Structure					
3.1.1 Structure of the course			X		
3.1.2* Application of the „European Credit Transfer and Accumulation System (ECTS)“ and modularization				Condition	
3.1.3* Conditions of participation and assessment regulations			X		
3.1.4* Feasibility of study workload			X		

²⁷ [ECTS Users' guide 2015](#), page 10

3.2 Content

The course contents are as follows:

Table 9: IBM Entry-Level Professional Certificates: Course contents and learning hours

IBM Data Engineering Professional Certificate (13 “courses”²⁸)

Module Number	Module Title	Learning Hours
1	Introduction to Data Engineering	14
2	Python for Data Science, AI & Development	21
3	Python Project for Data Engineering	7
4	Introduction to Relational Databases	19
5	Databases and SQL for Data Science with Python	39
6	Hands-on Instruction to Linux Commands and Shell Scripting	13
7	Relational Database Administration (DBA)	21
8	ETL and Data Pipelines with Shell, Airflow and Kafka	14
9	Getting Started with Data Warehousing and BI Analytics	16
10	Introduction to NoSQL Databases	18
11	Introduction to Big Data with Spark and Hadoop	13
12	Data Engineering and Machine Learning using Spark	8
13	Data Engineering Capstone Project	14
Total Learning Hours		217

²⁸ In the following tables, Coursera uses the term “modules” for what is elsewhere called “courses”, see glossary

IBM Data Science Professional Certificate (10 “courses”²⁸)

Module Number	Module Title	Learning Hours
1	What is Data Science?	8
2	Tools for Data Science	20
3	Data Science Methodology	8
4	Python for Data Science, AI & Development	21
5	Python Project for Data Science	8
6	Databases and SQL for Data Science with Python	39
7	Data Analysis with Python	14
8	Data Visualization with Python	17
9	Machine Learning with Python	13
10	Applied Data Science Capstone	17
Total Learning Hours		165

IBM Cybersecurity Analyst Professional Certificate (8 “courses”²⁸)

Module Number	Module Title	Learning Hours
1	Introduction to Cybersecurity Tools & Cyber Attacks	20
2	Cybersecurity Roles, Processes & Operating System Security	15
3	Cybersecurity Compliance Framework & System Administration	16
4	Network Security & Database Vulnerabilities	14
5	Penetration Testing, Incident Response and Forensics	17
6	Cyber Threat Intelligence	26
7	Cybersecurity Capstone: Breach Response Case Studies	16
8	IBM Cybersecurity Analyst Assessment	4
Total Learning Hours		128

IBM Data Analytics with Excel and R Professional Certificate (9 “courses”²⁸)

Module Number	Module Title	Learning Hours
1	Introduction to Data Analytics	10
2	Excel Basics for Data Analysis	12
3	Data Visualization and Dashboards with Excel and Cognos	9
4	Assessment for Data Analysis and Visualization Foundations	1
5	Introduction to R Programming for Data Science	10
6	SQL for Data Science with R	28
7	Data Analysis with R	16
8	Data Visualization with R	12
9	Data Science with R - Capstone Project	26
Total Learning Hours		124

IBM Data Analyst Professional Certificate (9 “courses”²⁸)

Module Number	Module Title	Learning Hours
1	Introduction to Data Analytics	10
2	Excel Basics for Data Analysis	12
3	Data Visualization and Dashboards with Excel and Cognos	9
4	Python for Data Science, AI & Development	21
5	Python Project for Data Science	8
6	Databases and SQL for Data Science with Python	39
7	Data Analysis with Python	14
8	Data Visualization with Python	17
9	IBM Data Analyst Capstone Project	21
Total Learning Hours		151

IBM Full Stack Software Developer Professional Certificate (12 “courses”²⁸)

Module Number	Module Title	Learning Hours
1	Introduction to Cloud Computing	12
2	Introduction to Web Development with HTML, CSS, JavaScript	12
3	Getting Started with Git and GitHub	8
4	Developing Front-End Apps with React	13
5	Developing Back-End Apps with Node.js and Express	12
6	Python for Data Science, AI & Development	20
7	Python Project for AI & Application Development	7
8	Developing Applications with SQL, Databases, and Django	13
9	Introduction to Containers w/ Docker, Kubernetes, & OpenShift	13
10	Application Development using Microservices and Serverless	12
11	Full Stack Cloud Development Capstone Project	16
12	Full Stack Software Developer Assessment	3
Total Learning Hours		141

IBM's Professional Certificates align with Coursera's best practice guidelines for Quality in Online Learning and other manuals on online teaching pedagogy and course structures. Each week is comprised of individual content units that incorporate both theoretical and practical components. The theoretical components include readings and videos, while the practical elements are always aligned with the previously covered knowledge. This approach enables learners to assess their progress not only through small quizzes throughout the learning process but also through practical exercises that allow them to apply what they have learned. For example, learners can experiment with coding, data loading, processing, and evaluation in a virtual Jupiter notebook instance. Furthermore, learners can discuss their approaches in the forum and upload their work at the end of each unit. As a result, there is a continuous and effective interplay between theoretical learning and practical application.

The Professional Certificates courses are aimed at providing participants with the essential knowledge and skills required to perform well in their intended job role, including proficiency in relevant software, programming languages, tools, and systems. The Professional Certificates also offer an overview of current industry trends. Through practical, hands-on exercises, learners will develop their methodological competence and practical experience using various business tools and industry best practices.

The courses adopt a methodological approach to learning, enabling learners to acquire practical skills through exercises and projects. Learners will have the opportunity to apply their newly acquired skills in practical settings, preparing them for entry-level positions in the workforce.

Additionally, the Professional Certificates cover guidelines for collecting, presenting, analyzing, and interpreting data using appropriate methods. The programs cover various methods, such as analyzing processes, assessing data, and measuring success.

The in-depth methods build on the basic knowledge acquired earlier in the course and enable the planning and use of complex methods for evaluation and assessment. Learners will deepen their knowledge through projects and practical exercises, including the final capstone projects.

The following types of assessments and examinations are included in Entry-Level IBM Professional Certificates to assess learning outcomes:

- **Discussion prompts:** Discussion prompts allow for active reflection and engagement among learners in a public forum in Coursera. Discussion prompts offer a low-stakes opportunity for learners to reflect on what they have learned, connect new knowledge to prior understanding, and benefit from discussions and feedback.
- **Practice Quizzes:** Ungraded quizzes, or practice quizzes, are used to help students monitor their own learning. They answer the question: Is this student successfully learning what he or she is expected to learn? When a new concept is introduced, it is typically tested in an ungraded quiz.
- **Applied Learning Projects:** Applied learning projects are hands-on labs and projects that allow learners to gain practical experience with programming languages, and databases, building data pipelines, and working with data warehouses .
- **Peer-reviewed assessments:** The peer review activities allow learners to put the course concepts they are learning into practice by doing an activity or solving a problem. In a peer review, learners complete an artifact, review, and grade each other's work, and receive qualitative and quantitative feedback from other learners. Peer-reviewed assessments contribute to the final course grade. During the assessment conference Coursera specified the concept of peer review, which is a two-sided process: In a peer review all learners are obliged to assess and to let their project be assessed (by at least three peers). The quality of the assessment is also evaluated by the learners.
- **Graded quizzes (summative):** Graded quizzes are used to monitor educational outcomes. They answer the question: Has this student demonstrated that he or she can complete this task? Graded quizzes are summative and contribute to the final course grade .

Learners are given transparent information about established plagiarism standards and regulations regarding the conduct of digital assessments on the Coursera platform (Coursera Honor Code).

Appraisal:

The curricula adequately reflect the qualification objectives of the courses. The contents of the courses are well-balanced, logically connected and oriented towards the intended learning outcomes. The lectures and seminars on offer cover the contents necessary for achieving the qualification objectives and are outcome oriented.

During the assessment conference the panel verified that the courses do not only cover IBM tools. Learners also get insights into different tools (e.g., open source). The concept of the

courses is to sensitize learners that they may find work at a company with a different tool.

In the courses, theory and practice are linked. Knowledge delivery and practical contributions complement each other to develop the learners' competences. However, in the panel's opinion, the number of labs and depth of project work may assess the achievement of learning and qualification objectives at short notice, but does not allow sustainable training of the newly acquired knowledge in different environments in practical work. For instance, the Module "Cybersecurity Compliance Framework & System Administration"²⁹, contains explaining the basics and little testing. Thus, the learning objective of an admin capability with Linux cannot be sufficiently reached in the opinion of the panel. The panel therefore recommends implementing further practice of critical competences to help learners to train the application in different settings, e.g., by increasing the number of labs and testing exercises to make users gain more confidence applying the tools.

Within the limited scope of the courses in terms of workload, Coursera and IBM in the self-report has noted "international and intercultural" contents as "not applicable". Nevertheless, the panel noted that in the courses country-specific differences in software, research, and applicability of what has been learned are addressed. Especially in software training, various formatting, or convention differences are explicitly highlighted, and workarounds are made available within the framework of toolboxes or adapted versions. However, for the IBM Full Stack Software Developer Professional Certificate, the panel notes that risks from cloud computing in relation to Data Protection laws and regulations (e.g. the European General Data Protection Regulation (GDPR)) are not appropriately communicated. As a violation of the GDPR can lead to high, even existence-threatening legal costs for a company, the panel recommends appropriately communicating and sensitizing learners to risks from violating international Data Protection laws and regulations.

In the panel's opinion, the acquisition of methodological competences is not fully ensured due to limited training (see also recommendation above). For instance, in the IBM Cybersecurity Analyst Professional Certificate, there is only one exercise in text encryption. "Introduction to Web Development with HTML, CSS, JavaScript"³⁰ contains a very rudimentary introduction of "JavaScript". Even taken into account that modules with "React" and "Node" are following later in the program, in the panel's opinion the necessary level of JavaScript application of a full stack developer cannot be reached. The panel emphasizes that covering a wide range of topics as done in the program is appropriate for the breadth of a full stack developer job profile - but that these topics are only be touched upon and not covered in appropriate depth to acquire sufficient methodological competence for immediate application in a professional context, even taken into account a limited operational range of the completers. The panel therefore recommends additional trainings and exercises on critical qualifications to ensure assurance in methodological competence.

Due to the limited duration and the focus of the courses the integration of academic work and science-based teaching is not applicable.

All assessments, as they are defined for the courses, are suited in format and content to ascertain the intended learning outcomes as well as the identity of the examinees. The requirements are in accordance with the desired qualification level. The course provider has established plagiarism

²⁹ IBM Cybersecurity Analyst Professional Certificate, module 3

³⁰ IBM Full Stack Software Developer Professional Certificate, module 2

rules and regulations regarding the conduct of digital assessments. Learners are given transparent information about these policies.

During the assessment conference, the panel addressed the considerable number of quizzes and graded examinations that must be conducted by the learners. Coursera and IBM shared that this concept of tight scaffolding allows the learners to monitor learning progress and the achievement of learning objectives very closely, thus effectively supporting the concept of a self-learning open online course. With reference to the learner audience, learning objectives and intended job profiles of the completers, the panel team supports this concept.

In the panel's opinion, online examinations are state of the art of technology. However, the panel emphasizes the possibility that HEIs may reject ECTS credit recognition due to non-standard ID checks at the point of the actual examinations (as they may occur prior to). The panel therefore recommends implementing an additional ID check for assessments, e.g. by verification of payment information.



	Exceptional	Exceeds quality requirements	Meets quality requirements	Does not meet quality requirements	n.r.
3. Implementation					
3.2 Content					
3.2.1* Logic and conceptual coherence			X		
3.2.2 Integration of theory and practice				X	
3.2.3 International and intercultural contents					X
3.2.4 Methodological competence				X	
3.2.5 Academic work and science-based teaching					X
3.2.6* Examinations			X		

3.3 Transdisciplinary qualifications and soft skills

The duration and the scope of the courses allow mainly for acquiring the identified methodological and software competencies. However, due to the nature of the acquired skills in data processing, methods, software applications, and due to the popularity of them (e.g., Python), competencies can be transferred to different industries and contexts.

Soft skills are trained for example during the peer-review process Coursera allows content providers to deploy for learners to grade each other's assignments. There are clear feedback rules to be applied during this process and the form and content of the peer feedback is also evaluated by peers.

Additionally, the Professional Certificates cover guidelines for collecting, presenting, analyzing, and interpreting data using appropriate methods. Moreover, learners acquire the skills to communicate their results for data processing and analysing to relevant stakeholder, e.g., using visualisation tools.

Appraisal:

Within the limited scope of the courses, the learners acquire appropriate transdisciplinary qualifications in accordance with the qualification objectives. This is supported by means of suitable didactical and methodological measures.

	Exceptional	Exceeds quality requirements	Meets quality requirements	Does not meet quality requirements	n.r.
3. Implementation					
3.3 Transdisciplinary qualifications and soft skills			X		

3.4 Didactics and Methodology

Coursera's platform is built for Mastery Learning, a pedagogical model that allows and requires learners to demonstrate mastery of learning objectives before moving forward to learn subsequent information. The platform organizes content into modules, setting scheduled milestones for their completion, which requires learners to demonstrate mastery of the learning objectives over time. According to Coursera, Data analysis from thousands of courses shows that well-designed, high-quality content includes both formative and summative assessments with elaborative feedback to support learners as they work toward mastery of the defined learning objectives (see self-report, p.37).

Coursera's platform supports the structure of content to facilitate Mastery Learning by requiring instructors to set key learning objectives at the program level, course level, and modular levels.

The practical application of Coursera's "learners first" strategy begins with effective content and program development. Its real time monitoring of learner progress is an essential element to support all content providers and learners enrolled in hosted content of all its courses and programs. As defined by Coursera Professional Certificate Content Specifications (see chapter 3.1, table 8), the six IBM Professional Certificates include "Applied Learning Projects" that help learners hone and apply the concepts learned throughout each course in the asynchronous video lectures, readings, discussion posts, and quizzes.

For example, in the Data Engineering Professional Certificate, learners are instructed through various teaching methods, including discussion prompts, lectures, peer reviews, practice and graded quizzes, readings, and hands-on lab work and projects. Learners are encouraged to actively participate in the learning process and engage with other learners through discussion prompts, peer reviews, and applied learning projects. There are various hands-on labs and projects to help

learners gain practical experience with Python, SQL, relational databases, NoSQL databases, Apache Spark, building data pipelines, managing databases, and working with data warehouses.

Applied Learning Projects in the Data Engineering Professional Certificate include:

- Design a relational database to help a coffee franchise improve operations.
- Use SQL to query census, crime, and school demographic data sets.
- Write a Bash shell script on Linux that backups changed files.
- Set up, test, and optimize a data platform that contains MySQL, PostgreSQL, and IBM Db2 databases.
- Analyze road traffic data to perform ETL and create a pipeline using Airflow and Kafka.
- Design and implement a data warehouse for a solid-waste management company.
- Move, query, and analyze data in MongoDB, Cassandra, and Cloudant NoSQL databases.
- Train a machine learning model by creating an Apache Spark application.
- Design, deploy, and manage an end-to-end data engineering platform.

Formative and summative assessments with feedback-corrective features are used to measure progression towards those objectives. Instructors can embed practice and feedback directly in the learning path using various proprietary tools, including in-video questions, quizzes, technical labs, and other exercises. Providing frequent opportunities for feedback and active learning helps the learners track their progress towards mastery. Feedback is also used for summative graded assessments, which are available to learners at the end of each course module. Whereas practice assessments are low-stakes formative opportunities that provide feedback explaining why a response is correct or incorrect, learners demonstrate mastery of the learning objectives by passing each week's summative assessment. Mastery learning embraces “failure as feedback” to the learning process; allowing multiple attempts on graded assessments. A learner cannot earn a completion certificate until they demonstrate mastery of the learning objectives by passing all graded assessments in a course or program.

All course materials for IBM Professional Certificates are included within the course content on the Coursera Platform. Learners do not need access to supplementary literature to be purchased that IBM has not produced and provided itself, therefore, no external content is integrated in the course structure. Datasets for hands-on labs are provided in the “Resources” section of the platform in CSV format for learners to export to their desktops and use for analysis in practical exercises. Welcome, and learning/lecture videos for each week are hosted under the “Course Material” section of the platform with transcriptions. Under “Course Materials”, learners will also find readings, practice quizzes, and graded assignments in the order they should be reviewed. Within the platform, there is a section for learner notes and discussion forums.

Within the platform, each week of course material begins with a module description and a clear outline of learning objectives that should be met throughout the week of study. The lectures, readings, hands-on projects, and quizzes in each week help learners meet the weekly learning objectives.

Appraisal:

The didactic concept of the courses is systematically oriented towards the course objectives. It is orientated towards the learning outcomes of each course and module and towards the target group. A mix of different teaching and learning methods (Videos, quizzes, Labs), depending on the contents and curricular requirements, is applied in the courses/single modules. Coursera and IBM provided a list of Applied Learning Projects for all IBM Professional Certificates as part of the course descriptions.

The accompanying course and learning materials are oriented towards the intended learning outcomes and correspond to the required qualification level. They are easily accessible for the learners. However, during the assessment conference, learners inquired about outdated learning material. The panel also found outdated material and teaching content in all courses³¹:

Therefore, the panel recommends the following condition:

For each of the six courses, Coursera and IBM check learning and teaching material (including literature recommendations) according to updates.

For ensuring continuous evaluation of courses` teaching and learning material by implementing an evaluation system, see condition chapter 6.

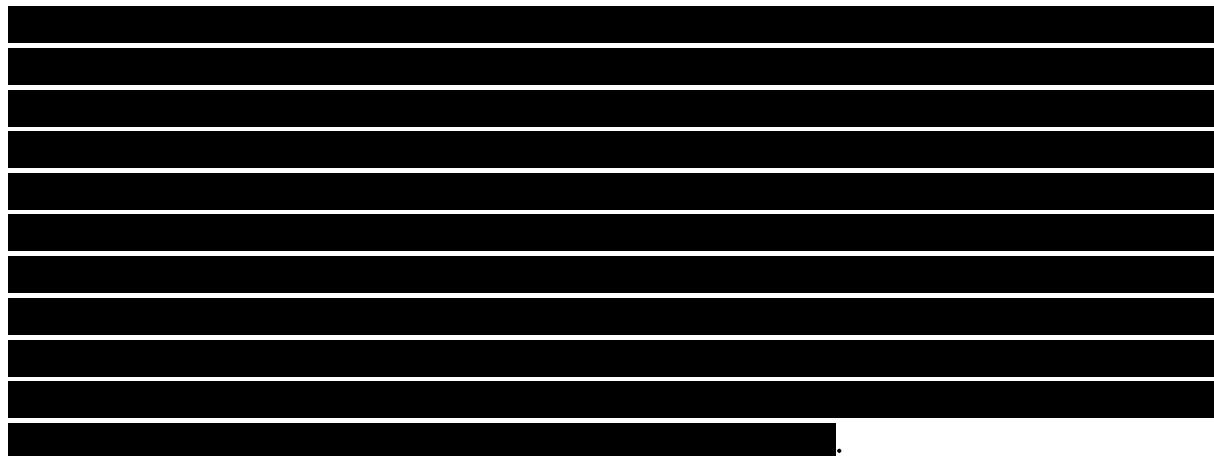
The panel supports the idea of interaction, e.g., by attaching discussion forums to each course. However, the panel would like to point out that, due to the concept of asynchronous learning, due to the generic support by teaching assistants (see recommendation chapter 4.1) and due to the fact that learners' contributions in discussion forums may also occur much later than the respective thread started, the teaching concept lacks interaction as compared to ideal cadences in more traditional educational settings. Documentation of the threads may help other learners, but in many cases the forums are not truly interactive. The panel therefore recommends developing further ideas for nurturing interactivity.

	Exceptional	Exceeds quality requirements	Meets quality requirements	Does not meet quality requirements	n.r.
3. Implementation					
3.4 Didactics and methodology					
3.4.1* Logic and transparency of teaching and learning methodology			X		
3.4.2* Course and learning materials				Condition	

³¹ e.g. IBM Cybersecurity Analyst Professional Certificate:

- Module 4: ccrypt exercise does not link to precondition "hardening Kali Linux Lab", which also cannot be found via search tool (<https://www.coursera.org/learn/cybersecurity-compliance-framework-system-administration/supplement/oVZes/hands-on-lab-encrypting-and-decrypting-files-with-ccrypt>).
- In the area of the GDPR, the status of the implementation is given, examples of penalties are from 2018. Here, more current examples could be introduced and the topic discussed that the data of European customers must be processed differently by US services, which has still not been conclusively clarified (Safe Harbor and the various descendants of these treaties).

3.5 Skills for employment / Employability (Asterisk Criterion)



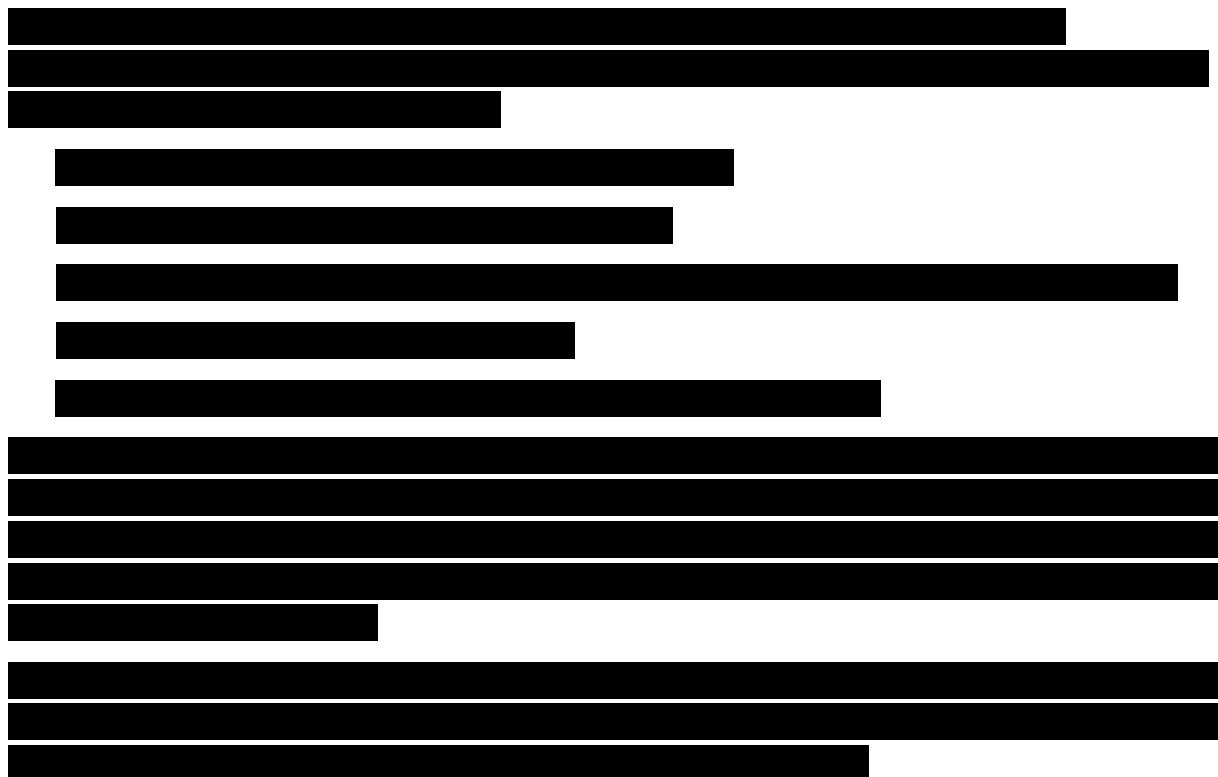
The nature of self-responsible online learning also promotes the individual development of organizational skills, specifically concerning time management. These essential skills are integral to asynchronous online learning experiences; due to structure and learning methods, learners are guided in this process to reach the intended level of competence. Analyzing problems and making decisions are competencies that learners require and develop in different course units of the “Entry-level Professional Certificates”.

Through labs, and the final Cap-Stone Project, learners' skills are further developed through ongoing practical application of the theories and models learned.

Completers of the Professional Certificates are intended to have up-to-date specialist knowledge and methodological skills in the corresponding qualification areas of the job requirements on which the certificates are based. They already have practical experience in the application of this knowledge. They have demonstrated their reliability through their self-motivated and committed learning and successful completion of the courses. The completers' practical experience facilitates their entry into the world of work or support their career switch into a new industry or job type upon completion of the certificate. Detailed work samples or portfolios could already be built up in some certificates.

Example: [REDACTED] IBM Data Engineering Professional Certificate





Once learners complete the courses, they have access to job placement support through the Completer Community (“Professional Certificate Career Resources”) on Coursera. This includes a suite of resume and interview prep videos, downloadable resume templates, free virtual interview practice, a job board with relevant local, regional and national roles, and forums to connect with other learners and inspiring learner stories.

Learners finishing most IBM Professional Certificates on Coursera can avail no charge access to Career specific Guides and Interview Preparation courses from IBM to help prepare for and navigate the hiring process. In addition, IBM, through its Citizenship and Social Responsibility initiatives like IBM SkillsBuild provides free access to develop skills in a number of areas. IBM also participates in open-source content development projects such as the OpenDS4All.



[REDACTED]. During the conference, Coursera also highlighted that according to the Learners Outcome Report 2023, for the Entry-Level Professional Certificates 72 per cent of learners report career benefits, 52 per cent of these report tangible career benefits (e.g. new job. Increased salary/pay; increase in interview job offers) and 86 per cent report intrinsic career benefits (e.g. gained skills to apply in their career or decided whether a role or career path was right for them).

Appraisal:

The contents focus on achieving the qualification objectives and have a clear profile. Employability in accordance with the qualification objectives and the defined learning outcomes is promoted, adding a benefit for course completers in the respective occupational field.

When assessing employability of the courses, the panel has taken into account that job entry opportunities in many countries- unlike in European countries - may not require profound vocational or academic training in the first place after leaving school but a more limited entry-level training-on-the-job. Consecutive learning-by doing and step-by step-qualification may be a more common development into professional careers in other countries.

As far as the services for employment are concerned, the panel points out that the completion survey does not include an evaluation of the quality of the “Professional Certificate Career Resources”. The panel therefore recommends implementing evaluation of the Professional Certificate Career Resources into the graduate survey in order to collect data and be enabled to further improve the service platform.

	Exceptional	Exceeds quality requirements	Meets quality requirements	Does not meet quality requirements	n.r.
3. Implementation					
3.5* Skills for employment / Employability			X		

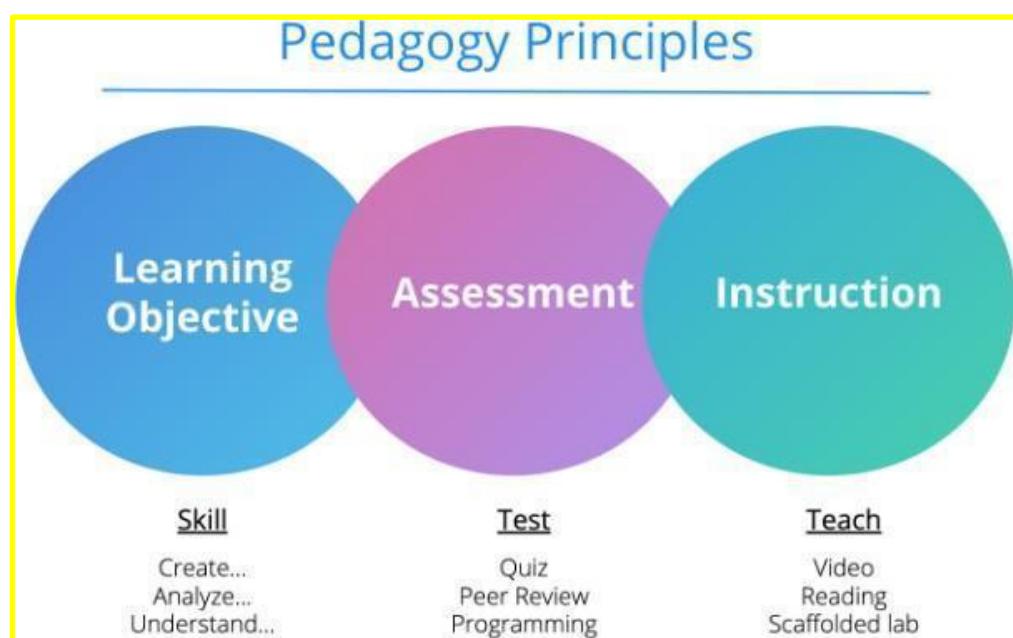
4 RESOURCES AND SERVICES

4.1 Teaching Staff of the courses

Coursera's Pedagogy Principles, which are available to guide content creating partners in their development of materials to be hosted on the platform, incorporate findings from peer-reviewed educational research and learning science. Coursera bases its platform technology and education philosophy on Mastery Learning (see chapter 3.4), which focuses on the importance of feedback in learning and promotes the mastery of a topic before moving on to more advanced materials.

Quality education that supports Mastery Learning requires the tight alignment of learning objectives, instructional materials, and assessments. Instructors and curriculum developers use backward design by creating learning objectives and assessments before content and instructional materials. All content on Coursera must include these Pedagogy Principles:

Table 10: Coursera Pedagogy Principles



The IBM Entry-Level Professional Certificates at Coursera are overseen by the Global Program Director at IBM. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Each IBM Professional Certificate is developed by a team of Subject Matter Experts (SMEs), teaching experts, content creation and instructional designers. The IBM program lead is in charge of identifying and building a team of SMEs and course production staff. Any course team members who are new to developing IBM courses on Coursera need to undergo training (pedagogical best practices). Before the content is designed, the team [REDACTED] [REDACTED] identify the key skills required for the specific job role. The skills are then translated into Learning Objectives based on which the curriculum is designed. [REDACTED]

The SMEs work collaboratively within the framework of the general project management to operationalize the predefined learning objectives, divide them into units and logically sequenced learning elements, and collect and prepare the corresponding materials through internal cooperation. Finally, they prepare these materials in the form of videos or reading units to ensure a good learning experience for the learner. Instructors and teaching staff of the course are selected based on their professional working experience and academic expertise. On the Coursera platform within the course description page learners find information on instructor's backgrounds and qualifications.

All instructors for the IBM Professional Certificates are subject matter experts by training, job role, or research for each topic at IBM. IBM selects instructors that provide a global presence and have a range of real-life experience. Instructors have provided evidence of previous academic training, such as a diploma or bachelor's degree.

Coursera also offers further staff development and qualification measures, including training and best practices through the Coursera Classroom teaching and learning opportunities.

Table 11: IBM Professional Certificates

[[REDACTED]]	[[REDACTED]]	[[REDACTED]]
[[REDACTED]]	[[REDACTED]]	[[REDACTED]]
[[REDACTED]]	[[REDACTED]]	[[REDACTED]]
[[REDACTED]]	[[REDACTED]]	[[REDACTED]]

The Coursera Teaching and Learning team includes pedagogy experts with graduate degrees in Cognitive Science, Computer Science & Engineering, Education, Instructional Design, and Neuroscience as well as AI engineers, software developers and marketing professionals. This team has developed extensive resources on best practices for online education, based on Coursera's own data from millions of learners and learning science research.

The Coursera Teaching and Learning team is available from the second project phase, the start of course development, and is with advice and practical help as well as many useful tips, manuals, and best practice tips, is involved in intensive QA work to support the quality of the learning units and, in case of doubt, checks each learning element individually for quality and function.

[[REDACTED]]
[[REDACTED]]
[[REDACTED]].

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[[REDACTED]]
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[[REDACTED]].

33

³² Confidential personal information

³³ Proprietary information not publicly known about internal processes

Learners are provided support services while enrolled in the program, including personalized communications to support successful engagement and completion such as motivation help, pain-point help, dropout intervention by providing in-course popups, learning reminder and nudge emails, and app notifications.

Learners are supported and coached by instructors and teaching staff through a variety of proprietary tools in the learning path, including in-video questions, quizzes, technical labs, and other exercises. Providing frequent opportunities for feedback and active learning helps the learner track their progress towards mastery. Feedback is also used for summative graded assessments, which are available to learners at the end of each module of a course. Whereas practice assessments are low-stakes formative opportunities that provide feedback explaining why a response is correct or incorrect, learners demonstrate mastery of the learning objectives by passing each week's summative assessment. Outside of feedback related to formative and summative assessments, instructors can create engagement opportunities with learners through custom forums where learners can engage with instructors by asking questions and answering discussion prompts. Learners and instructors can also engage via email messaging in the "Messages" section of the platform.

[REDACTED]. In addition, Coursera Classroom resources are available to all content providers. In addition to the numerous manuals and guidelines, systematic onboarding about Coursera, the use of the platform, the available tools and much more takes place here. There are courses such as "Getting Started with Coursera", "Coursera Administrator Training", "Build and Enterprise Guided Project", "Technical Assessment Basics".

Appraisal:

The qualifications and experience of the course management as represented by the IBM course lead correspond with the requirements of the courses. The IBM course lead is responsible for the content and methodology of the courses. Coursera provides guidelines (in a blueprint and a Pedagogy Playbook) and has a Coursera Teaching and Learning team that works alongside IBM staff to design and develop the courses.

The subject-specific, pedagogical and didactic qualifications of the teaching staff correspond with the requirements of the courses. Special characteristics of the target group are considered. Having checked the biographies of the teaching staff and talked to representatives during the assessment conference, the panel highlights the teaching staff's outstanding professional qualification, their networking within the professional community and commitment as instructors. The teaching staff has above-average business experience and uses it in a clearly visible and valuable way in their teaching activities.

The panel also highlights the training procedures Coursera provides for the pedagogical training of the content partner's (IBM) instructors. [REDACTED]

In this context, the panel would like to point out that the list of instructors given for each course and the presenter that eventually presents the course via the videos may differ (e.g., “IBM Data Science Professional Certificate”, module “What is Data Science?”, lesson “Fundamentals of Data Science”). In the panel’s opinion, the quality of the content is not in principle impeded by the fact that a course is designed by a subject matter expert, but presented by a “presenter”. Nevertheless, in order to manage learners’ expectations and navigate learners consistently, the panel recommends consistent communication of instructors’ roles in course development and presentation.

It is systematically ensured that the teaching staff cooperate internally for the purpose of tuning the course components towards the overall qualification objectives (see also chapter 6). The cooperation is not based on the principle of regular meetings of all those teaching in the course, but on project-based work.

The structure and number of teaching staff (instructors) correspond with the requirements of the courses. Support of the learners is an integral part of the services provided by the teaching staff in person of the teaching assistants. Support is offered on a regular basis by the teaching assistants and serves to help participants learn successfully. However, during the online assessment conference, course learners and completers criticized occasionally belated and generic answers from the teaching assistants. As the quality and delay of answers did not lead to critical issues about accomplishing the courses, the panel refrains from a condition, but recommends improving monitoring teaching assistants’ qualifications and resources. The panel suggests thinking about a „ticket system”, where learners always feel that their issue is assigned to a person in charge instead of creating the impression among learners that issues get lost/communicated into an anonymous cloud.

	Exceptional	Exceeds quality requirements	Meets quality requirements	Does not meet quality requirements	n.r.
4. Resources and Services					
4.1 Teaching Staff of the courses					
4.1.1* Course management			X		
4.1.2* Structure and number of teaching staff in relation to curricular requirements			X		
4.1.3* Teaching staff’s qualifications		X			
4.1.4* Teaching staff’s pedagogical /didactic qualifications		X			
4.1.5 Practical experience of the teaching staff		X			
4.1.6 Internal cooperation			X		
4.1.7* Learner support and coaching			X		

³⁴ Level of detail that is not generally shared with the public

4.2 Process organization and administrative support for learners and teaching staff (Asterisk Criterion)

Coursera offers learner support and educator support designed to empower learners, educators, and administrators to do what they need to do on the Coursera platform. The Learner Help Center aims to help learners with questions they have on the Coursera platform from finding courses to take, to participating in their chosen course, to troubleshooting technical issues as needed. The Learner Help Center is exclusively for Coursera learners before, during, and after their course participation and completion. Learners can reach the Learner Help Center 24/7 (includes 24-hours live chat support and clientsupport@coursera.org responding within one hour) and get assistance in the following areas:

- **Account settings, login issues, and notification preferences.** Here, learners can get help with setting up their Coursera account, changing account settings and password troubleshooting, changing email notifications, and using the Coursera mobile app.
- **Payments and subscriptions.** Here, learners can receive help with payments for their courses, apply for financial assistance or scholarships, learn about their subscription details, and receive information about promotions and free trials.
- **Enrollment options.** Learners can receive help enrolling or un-enrolling in a course, and finding courses to take.
- **Grades, peer reviews, assignments, and labs.** Learners can receive help with troubleshooting the submission of peer-reviewed assignments, taking quizzes and assignments, checking grade details, understanding how to complete programming assignments, in-browser coding, and common issues with Coursera Labs.
- **Sharing and verifying Course Certificates.** Learners can access guides on how to download and share course certificates, verify their identity, and solve problems with course certificates.
- **Coursera Policies and Program Terms.** Learners can access accessibility statements³⁵, accommodations for learners with disabilities, third-party policies, code of conduct, honor code, age restrictions, information relating to privacy and data protection, and more.
- **Course content, including videos, discussion forums, and common course issues.** Learners can receive help troubleshooting problems with the Coursera platform, learn about recommended browsers and devices, receive assistance with video settings and subtitles, report problems within a course, and receive help with course content in discussion forums. Learners can also report abuse in forums here.

The Coursera Educator Resource Center, exclusive to Coursera instructors, is a place for both self-service and on-demand support to ensure the success of the digital classroom. Instructors can reach the Educator Resource Center 24/7 and get support in the following areas:

³⁵ https://www.coursera.support/s/article/360050668591-Accessibility-Statement?language=en_US (last call August 7, 2023)

- **Platform onboarding & best practices.** View articles, instructional videos, and frequently asked questions on Coursera terminology, production milestones, partner communication channels, recommended browsers, and Coursera Pedagogy Principles.
- **Creating course content.** View resources on creating and organizing instructional material in lessons and modules through course authoring tools, digital course content management, templates for importing and exporting course outlines, video recording, and formatting guidelines, importing and exporting content assistance, reading item management, and more.
- **Developing effective assessments and managing learner submissions.** Learn how assessments on Coursera work, how to set and adjust grading formulas, how to add new assessment items, auto-graded questions, and question variations, peer review assignments, how to manage quizzes, staff graded assignments, and discussion prompt management. This section also includes information on programming assignments, team assignments, high-touch grading features, question banks, proctored assignments, and academic integrity.
- **Building custom learning content and programming assignments.** Instructors can learn about how to create custom programming assignments, lab activities, and coding labs. Learn about developing, managing, and adding plugins, in-browser coding, and managing and configuring code blocks.
- **Viewing tips for launching, branding, and marketing content.** Through this resource, instructors can learn how to launch a new course, set a target launch date, marketing recommendations, improve search engine optimization, how to beta test, and how to reach new learners in the Coursera community.
- **Managing their course staff, landing pages, and other settings.** Instructors can learn how to manage staff roles and permissions, how to copy a course, how to invite group members, manage landing pages and brand assets, update and manage course certificates, and how to create and manage private sessions.
- **Interacting with learners through discussion forums and announcements.** Here, instructors can learn how to leverage Coursera discussion forums, send course announcements and messages, recruit mentors to help support learners, and schedule live events.
- **Tracking content performance with data dashboards and exports.** Instructors can learn how to leverage course dashboards, download grade books, manage organization dashboards, and export data.
- **Finding content and accessibility policies.** Here, instructors can review content policies, platform changes, sharing and research policies, data privacy information, and copyright guidelines.

All employees have access to all learning opportunities on the platform, and partners, like employees, have additional access to Coursera Classroom Resources and Coursera Administrator Training.

Appraisal:

The panel was impressed by the feedback management in terms of process organization and administrative support. The main processes and responsibilities are described. The administrative staff operates as service provider for both learners and teaching staff, contributes to the further development of the course in cooperation with the relevant groups and prepares for the learner's needs in advance. The administrative contact is regularly available to help with enquiries and acute problems and questions. The course provider offers continuous professional development for the administrative staff. Opportunities of electronic service-support are intensively and effectively applied.

	Exceptional	Exceeds quality requirements	Meets quality requirements	Does not meet quality requirements	n.r.
4. Resources and Services					
4.2* Process organization and administrative support for learners and teaching staff		x			

4.3 Networking

Learners are supported in creating and maintaining networks through discussion forums monitored by IBM subject matter experts. In discussion forums, learners receive support from one another on course-related topics and create and maintain networking opportunities. Discussion forums benefit learners by providing a space for interaction with classmates, sharing resources, and help to answer questions about course materials or assessments. They are used for asking questions, debating ideas, and identifying other classmates who share the same goals so they can pursue networking opportunities and conversations.

In addition, all Professional Certificate completers receive access to the Professional Certificate Community, which not only provides further peer support, but also offers a range of career services, resume support and interview practice.

Table 12: Coursera Professional Certificate Career Resources

Professional Certificate Career Resources

All Professional Certificate completers will have access to a number of career support resources to help them reach their career objectives.

- Job Search Guide:** The job search process is complex, especially when switching to a new career field. Our 5 step guide helps learners navigate the job search process.
- Resume support:** Learners get free access to an AI-powered checker to score their resume and LinkedIn profile with actionable feedback for improvements, a resume builder, and a library of resume templates and guides to help them build a standout resume.
- Hands-on interview practice:** Learners can practice mock interviews tailored to their specific industry, job, and experience level with free access to Big Interview.
- Professional Certificate community:** Learners get access to the Professional Certificate community where they can get peer support and network with alumni who have successfully made a career change.

Appraisal:

The participants are supported in creating and maintaining networks by measures Coursera and IBM provide to them.

	Exceptional	Exceeds quality requirements	Meets quality requirements	Does not meet quality requirements	n.r.
4. Resources and Services					
4.3 Networking			X		

4.4 Cooperation with academic institutions or enterprises (Asterisk Criterion for cooperation courses)

Cooperation of Coursera with all content partners for Professional Certificates (i.e. IBM in this case) follows a general pattern Coursera has developed:

Coursera's content strategy team's core initiatives are divided into a three-pronged approach:

1. Identify: Identify in-demand jobs and skills, and translate them into relevant content and credentials, and a sourcing strategy to meet learners' needs,
2. Advise: Leverage data and domain knowledge to advise other internal teams and external partners on content to add to Coursera, and

3. Innovate: Collaborate on or incubate new content types (e.g., projects), emergent domains (e.g., health), and launch strategic efforts [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED].

Cooperation with the content partners:

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED].

Quality Assurance in Implementation:

During implementation, either the key account manager (program responsibility) or a dedicated implementation success manager ensures that all work streams according to Coursera's blueprint for high-quality courses, are being well informed, kicked off, have their relevant action items and keep their deadlines in order to complete the production process of the course to a level where the beta testing can start (see also chapter 6).

Initial launch and further cooperation:

Feedback from the beta testing is discussed with IBM and changes are recommended. After the last QA test has successfully been achieved, content can go live on the platform. The cooperation is followed up by Coursera's Industry or University Partner success teams and enables Coursera to stay abreast of current trends and technologies and to develop courses and teaching materials accordingly. In addition, Coursera participates in research projects and events to gain valuable insights and further enhance teaching and learning quality. All cooperation is documented in detail and regularly evaluated. IBM regularly reviews and updates the agreements to ensure that all activities contribute to developing the learners' qualifications and skills. After the initial start yearly success meetings are conducted between Coursera and its partners and [REDACTED]
[REDACTED].

Feedback loop:

After the content is launched, Coursera starts receiving feedback from learners and from the content partner (IBM) itself. Therefore, both the quantitative performance data as well as the qualitative information received is taken into consideration for future content mapping by Coursera's content

strategy team making sure that they can collaboratively learn from their mistakes and celebrate their successes (see also chapter 6).

Appraisal:

Cooperation with the content partner (i.e IBM), is aligned with the strategy of the course and actively promoted for example, by means of regular project work involving those who contribute to the courses in responsible positions to discuss the further development of the programs). The cooperation is actively pursued and has a clear impact on the conception and implementation of the courses. Such cooperation has a formative impact on the curricular contents and on the profile of the completers.

The agreements forming the basis of the cooperation with IBM are documented. All such activities contribute to the development of the learners' qualifications and skills. Coursera ensures that the quality standards are met. Processes to enable this are coordinated closely with IBM.

The panel acknowledges an effective and professional co-operation between Coursera and IBM. To exceed quality requirements, the panel would like to draw attention to the recommendations in terms of interaction between learners and instructors (see chapter 4.1) and the conditions and recommendations for continuous development and quality management (see chapters 3.4 and 6).

	Exceptional	Exceeds quality requirements	Meets quality requirements	Does not meet quality requirements	n.r.
4. Resources and Services					
4.4(*) Cooperation with academic institutions or enterprises (asterisk criterion for cooperation courses)			X		

4.5 Technology and Facilities

4.5.1 Technical organizational unit

For the work of the technical organizational unit to enable and support the implementation of digital teaching see description of the Coursera Educator Resource Center in chapter 4.2. Coursera regularly maintains and updates the Educator Resource Center and the Coursera platform with guides on various innovative technologies and tools for teaching, digital classroom management, assessment management, and learner management so that instructors can create a seamless digital learning experience for learners.

4.5.2 Teaching and Learning platform (Asterisk Criterion)

The Coursera platform is designed to enable learners to discover the right content and credentials by domain (e.g., business, technology, health), by skill (e.g., Python, statistics, data visualization), and by job role (e.g., data analyst, marketer, engineer). Once learners enroll in a course, the unified technology platform is designed to enable them to learn more effectively to advance in their careers and earn credentials to signal their learning to prospective employers.

The learning experience includes:

- Courses with video-based lectures, in-video quizzes, notes and highlights, readings, assessments, peer reviews, and group projects;
- [REDACTED];
- Coursera Labs with hands-on projects that teach practical skills using real-world tools such as Python, Jupyter Notebooks, VS Code, R-Studio, and many other desktop and cloud-based applications fully in-browser with no software or data downloads;
- A mobile app that is designed to enable course downloads for offline learning, regarded to be especially important for learners with limited or intermittent internet connectivity or power; and
- Localized learning experiences including localized homepage, payment options, local partnership, and content discovery.

Learners enroll in their preferred course by clicking “Enroll” and subscribing to Coursera through the course description page. After enrolling, learners can view all course³⁶ content by module and week, continue to the course and begin navigating the Coursera platform. Within the platform, there is a navigation bar that contains sections including Course Material, Grades, Notes, Discussion Forums, Messages, and Course Information. All tools and multimedia files are integrated into the Coursera platform, and the entirety of teaching and learning activities in Coursera courses occurs within the Coursera platform.

- **Course Material:** In this section, learners can navigate throughout the weekly learning material. Each week begins with a summary overview, introductory videos, an overview of the learning objectives, video lecture, readings, and assignments, and ends with a summary of the week.
- **Grades:** In this section, learners can view the quiz or assessment item, their completion status, the due date, the weight of the quiz or assessment item, and their grades.
- **Notes:** Learners can utilize the Notes section as a digital notebook, where notes are collected throughout the duration of their study.
- **Discussion Forums:** Instructors can create custom forums to provide a space for learners to interact with one another. Learners can share resources and help answer questions about course materials or assessments. This section holds all discussion forums for the course by week, where learners can discuss the week’s modules or respond to assigned prompts. Discussion forums can also be used to ask questions, debate ideas, and find classmates who share their goals. Forum guidelines are available for reference in the Discussion Forums section of the platform.
- **Messages:** In the Messages section, which is not a private inbox, learners can read messages from the instructor, organization, or Coursera support. Instructors can send messages to learners to communicate important updates and information. They can send course announcements to all learners who meet certain criteria, like those who are currently

³⁶ For Coursera terminology program/course/module, see chapter 3.1 and glossary.

enrolled or have completed the course. Instructors can also send announcements only to learners in a specific private course instance.

- **Course Information:** In the Course Information section, learners can view a course description and course details, view instructor information, and review the syllabus.

In addition to the above features of the Coursera platform, learners can access the Learner Help Center, and Instructors are able to access the Educator Resource Center, directly through their respective platform instance.

In order to enable learning outside the homepage, i.e., without constant access to the internet, learners have the possibility to download all videos, the corresponding transcripts and toolboxes to their own computers and to read and edit the materials offline.

In addition, Coursera offers a learning app for download via all common app stores. Learners can keep track of their current learning status, view and download the relevant elements of the current week or the entire course, and watch videos directly in the app. The app also offers the possibility to receive learning reminders as a notification and to be reminded of learning at self-determined times. Only the software-supported labs require learning on a computer.

Another feature was made available with the last update. With the new "audio only" mode, participants can now listen to only the audio track of selected videos.

Accessibility

Coursera's mission is to provide universal access to the world's best education. They are committed to achieve the goal of maintaining access to the website and mobile applications to all learners, including those with disabilities via the following:

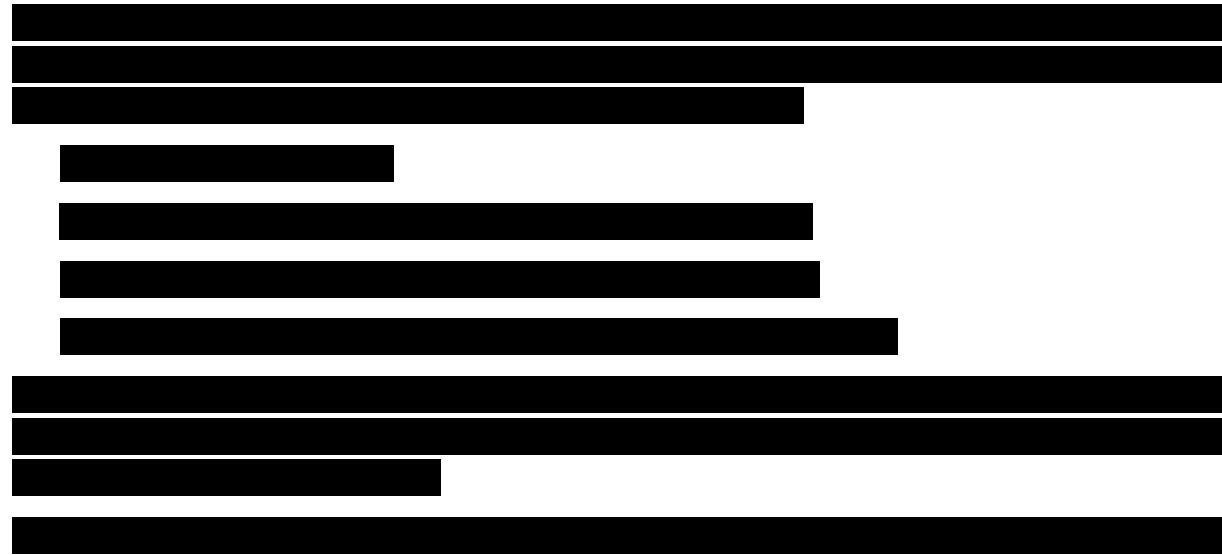
- Coursera strives to comply with the Web Content Accessibility Guidelines ("WCAG") 2.1 AA published by World Wide Web Consortium.
- All course lecture videos offer closed captioning. Learners may flag issues while watching lecture videos and are encouraged to submit support tickets for content that is not captioned appropriately. Coursera is committed to address the matter promptly.
- Coursera's videos are available to learners at any time which allows learners to get a head start on the course.
- An independent accessibility consultant periodically reviews the platform. Potential accessibility issues are identified so that Coursera can address such issues and take any remedial actions deemed necessary.
- Coursera developers engage in training and projects relating to accessibility that both educate and improve the accessibility of their products as they are being developed.
- Coursera has published accessibility guidelines for content providers and contractually requires that content providers comply with their independent obligations under applicable accessibility laws.
- Coursera manages an email alias where incoming accessibility support tickets from learners are addressed.

The Learner Help Center has resources for learners with disabilities³⁷.

Data Protection³⁸

A large block of text has been completely redacted with black bars.

4.5.3 Data Analysis System

A large block of text has been completely redacted with black bars.

³⁷ https://www.coursera.support/s/article/208280056-Accommodations-for-learners-with-disabilities?language=en_US (last call July 12, 2023)

³⁸ Please see <https://www.coursera.org/about/privacy> for relevant public information.

A large black rectangular redaction box covers the majority of the page content, starting below the header and ending above the footer. The redaction is composed of several horizontal black bars of varying lengths, creating a stepped effect. There are also a few smaller, isolated black bars located at the top and bottom edges of the main redaction area.

4.5.4 Technical support for learners (Asterisk Criterion)

11. **What is the primary purpose of the *Journal of Clinical Endocrinology and Metabolism*?**



4.5.5 Access to required literature

A horizontal row of black bars of varying lengths, representing redacted content.

Appraisal:

The technical organizational unit enables and supports the implementation of digital teaching. Instructors have sufficient advisory and support services available. The technical organizational unit follows trends and enables instructors to implement innovative technologies and tools in teaching beyond the standard. It offers regular and varied training to instructors and works continuously on the further development of digital learning tools. There is a plan at course provider level for the provision of training in the technical aspects of digital teaching.

The teaching platform is clearly structured and designed to be user-friendly. It is stable and scalable and there are generally no disruptions when using it. It offers sufficient possibilities for embedding text, audio, images, graphics, animation, multimedia files and social media. Learners can navigate smoothly through the teaching units. The teaching platform offers sufficient opportunity for collaborative learning and promotes interaction both among learners and between learners and instructors.

The course provider has access to a data analysis system and other tools that enable a variety of learning analytics with a high degree of integration, so that they can be used meaningfully for didactics. The panel was impressed by the amount and quality of data provided and processed.

Learners can reach the technical support of the course provider easily. During the assessment conference, learners complained about outdated interfaces and disrupted access to IBM Watson, however acknowledged that issues were quickly solved [REDACTED]

[REDACTED]. The panel therefore concludes that questions regarding digital teaching and the teaching platform are answered quickly. The course provider ensures that learners are able to handle the technologies and tools.

The Coursera platform hosts access to all necessary literature, articles and information within the course. The information is aligned with the course content and up to date. A concept for the course's continuing development (update) is available.

	Exceptional	Exceeds quality requirements	Meets quality requirements	Does not meet quality requirements	n.r.
4. Resources and Services					
4.5 Technology and Facilities					
4.5.1 Technical organizational unit		X			
4.5.2* Teaching and Learning platform		X			
4.5.3 Data analysis system		X			
4.5.4* Technical support for learners			X		
4.5.5 Access to required literature			X		

5 DOCUMENTATION

The IBM Professional Certificates are documented and publicized through the Coursera platform. Learners can access the entirety of the course description and learning objectives before enrolling in the course through the course description pages. Learners can access all course data and content by enrolling in Professional Certificates at the following points of registration:

- IBM Data Engineer Professional Certificate:
<https://www.coursera.org/professional-certificates/ibm-data-engineer>
- IBM Data Science Professional Certificate:
<https://www.coursera.org/professional-certificates/ibm-data-science>
- IBM Cybersecurity Analyst Professional Certificate:
<https://www.coursera.org/professional-certificates/ibm-cybersecurity-analyst>
- IBM Data Analytics with Excel and R Professional Certificate:
<https://www.coursera.org/professional-certificates/ibm-data-analyst-r-excel>
- IBM Data Analyst Professional Certificate:
<https://www.coursera.org/professional-certificates/ibm-data-analyst>
- IBM Full Stack Software Developer Professional Certificate:
<https://www.coursera.org/professional-certificates/ibm-full-stack-cloud-developer>⁴¹

All course content, including lectures, projects, readings, assessments, and assignments are accessible for interested parties within the Coursera platform. The courses' content, curricula, and assessment schemes are documented on the course and module description pages accessible by the stated web address.

In addition to course documentation through the Coursera platform, Coursera's academic policies and procedures related to accommodations for learners with disabilities, age restrictions, accessibility, honor code, general data protection regulations, international restrictions, and third-party tools are constantly updated and made available.⁴²

It is planned that after successful initial certification, additional information will also be made available on the course homepages about ECTS credit documentation.

⁴¹ Last call July 12, 2023

⁴² https://www.coursera.support/s/learner-help-center-coursera-policies?language=en_US, last call July 12, 2023

Appraisal:

The courses' contents, curricula, and assessment schemes have been suitably documented and published. Therefore, the basic quality requirements as described in the assessment guide are met regarding the current state of documentation.

However, for the planned documentation on the program homepages about ECTS documentation the panel team emphasizes the following issues to observe:

1. Documentation of ECTS crediting has to be included on the respective course description and include: number of ECTS credits awarded⁴³, requirements for awarding credits and workload assigned to the course (see condition chapter 3.2).
2. Documentation of ECTS crediting has also to be included on the respective certificate issued by Coursera. Documentation has to include number of credits awarded³⁹ and workload assigned to the course (see condition chapter 3.2).
3. The EQF level assignment must not communicate EQF levels others than what has been confirmed by the FIBAA certification committee after condition chapter 1.1 has been met.
4. When course completers apply for recognition of ECTS credits at a HEI, the HEI is obliged to examine recognition and to justify if ECTS credits are not or only partially accepted. However, the HEI is not obliged to the recognition of ECTS credits. Documentation on the Coursera Homepage therefore must not evoke the impression that HEIs are obliged to give (full) recognition.

Based on these requirements, the panel team recommends the following **condition** for the planned documentation of ECTS credit award of the Coursera Professional Certificates:

Coursera and IBM ensure correct documentation about the ECTS credit recommendation and recognition on the homepage, in the program descriptions and in the certificates issued after certification, considering ECTS credit recognition obligations by HEIs, EQF levels assigned, number of ECTS credits, requirements for achieving credits and workload assigned to the courses.

As an additional suggestion, the panel would like to point out that the phrase "Earn a recognized certificate from IBM" plus the information that the content is provided by IBM, while factually truthful, may support the idea that training is only provided on IBM tools. The panel therefore suggests to also appropriately make clear in the course description that the course work is not limited to IBM tools. Furthermore, during the assessment conference, it was revealed to the panel that there may be a gap between the entry level conception of the courses and factual learners that bring along more and advanced qualifications than required by the course design. These advanced learners are then critical about the level of course content and assessment, consequently also doubting courses' eligibility to provide job-ready skills. The panel therefore suggests to strive for a more sophisticated balance between communication of course objectives and managing learners' prerequisites and expectations.

⁴³ For the sake of readability, "awarded" is used here. Coursera does not "award" credits, but issues an ECTS credit recommendation

	Exceptional	Exceeds quality requirements	Meets quality requirements	Does not meet quality requirements	n.r.
5.* Documentation				Condition	

6 QUALITY ASSURANCE

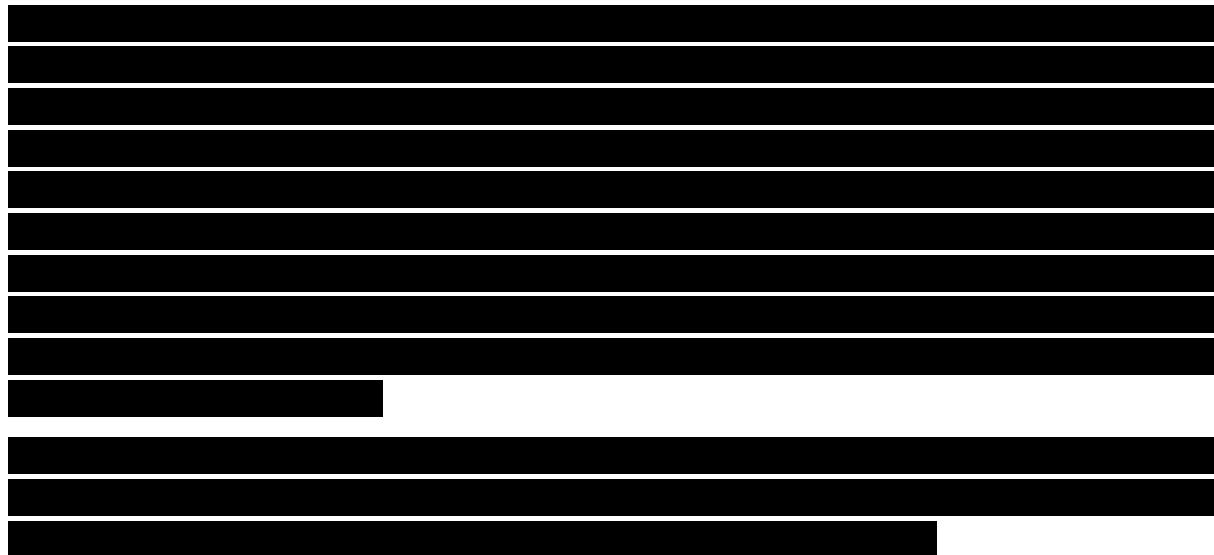
[REDACTED]. Coursera designed a system to advise on best practices to support content creators placing their content on the platform in producing high quality, relevant, accurate, and up-to-date content and that the platform and technology are reliable and accessible to all learners.

Table 13: Coursera Quality Assurance System

Quality means

Topic	Percentage
The concept of a 'smart city'	95
Smart city projects in India	92
Smart city projects in the world	90
Smart city projects in the US	88
Smart city projects in the UK	85
Smart city projects in China	82
Smart city projects in India	80
Smart city projects in the world	78
Smart city projects in the US	75
Smart city projects in the UK	72
Smart city projects in China	70
Smart city projects in India	68

IBM Entry-level Professional Certificates



Extensive internal cooperation is required between Coursera stakeholders and IBM stakeholders in preliminary research for in-demand content, curriculum development, content production, testing, and instruction. IBM and Coursera collaborate closely across the following phases: Research, Course Development, Production, Beta Testing, and Evaluation and Improvement.

Phase 1: Research



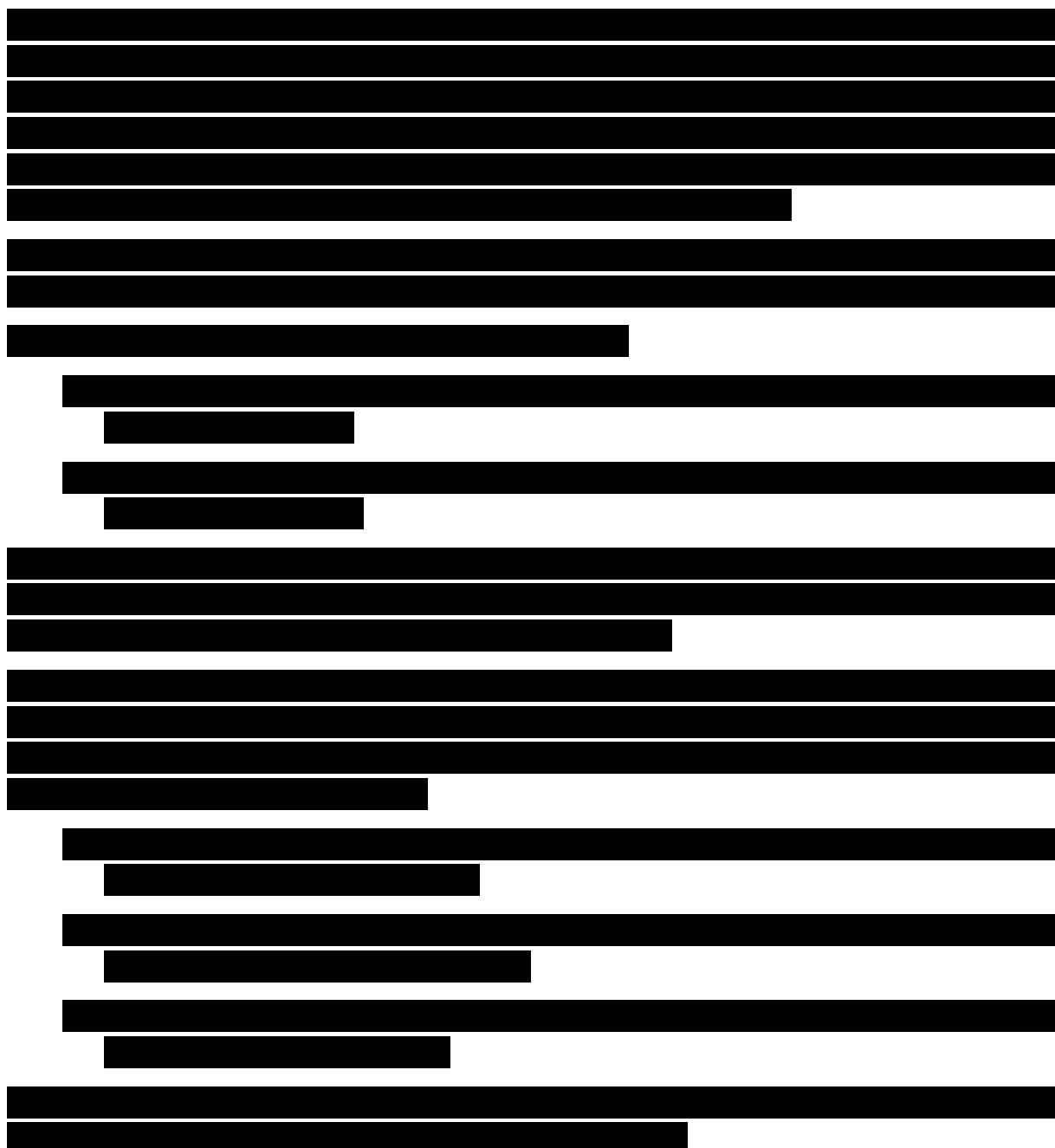
Phase 2: Course Development



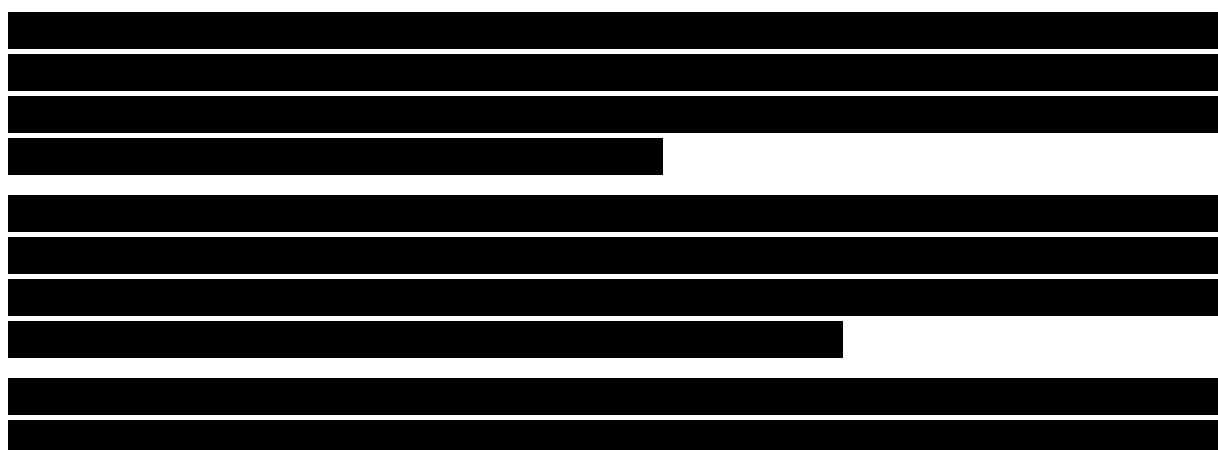
A grid of 15 horizontal black bars of varying lengths on a white background. The bars are arranged in a single column. The lengths of the bars decrease from top to bottom. The top bar is the longest, followed by a short bar, then a medium bar, then a long bar, then a short bar, then a medium bar, then a long bar, then a short bar, then a medium bar, then a long bar, then a short bar, then a medium bar, then a long bar, then a short bar, and finally a very short bar at the bottom.

Phase 3: Production

Phase 4: Beta Testing



Phase 5: Evaluation and Improvement



Content life-cycle-management

- 
- 
- 
- 
- 
- 
- 
- 

⁴⁴ Confidential personal information

At the end of each course, learners are encouraged to rate the module on a 5-star scale and provide individual feedback to the instructor. If the learner does not provide feedback directly, an email is sent with a gentle reminder to encourage them to contribute to improvement.

Table 15: Screenshot – Course level feedback

The screenshot shows a feedback form for a course titled "Databases and SQL for Data Science with Python". The form includes a "Your review" section with a 5-star rating, a text area for optional feedback, and a "Submit" button with a privacy agreement. A yellow box highlights the entire form.

Databases and SQL for Data Science with Python

Your review

☆☆☆☆☆

Write your review (optional)

By clicking Submit, I agree that my feedback may be viewed by the Coursera community, in compliance with the Coursera [Terms of Use](#) and [My Profile privacy settings](#).

Submit

Table 16: Screenshot – Feedback to the teaching staff

The screenshot shows a feedback form for teaching staff, which is mostly blacked out. A small portion of the text "By clicking Submit, I agree that my feedback may be viewed by the Coursera community, in compliance with the Coursera Terms of Use and My Profile privacy settings." is visible at the bottom left.

Upon certificate completion, learners are asked to evaluate the entire program, including all courses. All evaluations and feedback are made available to IBM [REDACTED]

Additionally, learners are asked to identify the relevant skills they have learned in the program, selecting from a provided list, or adding their own. This information is used to improve future program offerings and ensure learners are gaining the desired skills and knowledge.

Table 17: Course level completion feedback



Course Feedback

Thanks for your rating.

Can you tell us more about your course experience?

This survey will take you only 2 minutes. We read all of the feedback and share it with our University partners. Thank you!

What was your primary goal in taking this course?

Learn skills for my current job
 Learn skills for a new job in the same field
 Learn skills for a new job in a different field
 Explore a new career area
 Personal, non-career interest
 Just try out the course
 Other:

Has this course helped you achieve your primary goal?

Not at all
 Somewhat
 Mostly
 Completely

Please explain:

If applicable, when do you plan to make a job or career change?

Within 6 months
 6 months to 1 year
 1 to 2 years
 2 to 5 years
 More than 5 years

Next

Completers are surveyed after six

45

Table 18: IBM Entry-Level Professional Certificates: Completions and

46

⁴⁵ Material nonpublic information that we are prohibited from disclosing as a public company under U.S. securities laws.

U.S. securities laws
46

Appraisal:

There is a quality assurance and development procedure, which systematically and continuously monitors and develops the quality of the courses with respect to its contents, processes, technology, and outcomes. Sufficient staff resources are available and responsibilities are clearly defined. Instructional staff and learners' contribution to quality assurance and development procedures is ensured. During the assessment conference IBM and Coursera elaborated that IBM monitors discussion forums daily (see recommendation in chapter 4.1), and content review is done regularly monthly.

The panel would like to emphasize that the co-operation of Coursera and IBM shows an impressive number of highly effective processes in course development and quality assurance. However, the panel noted that within the processes of monitoring and quality assurance aspects of operational quality management of the single course's content are missing. There is no systematic evaluation of the content of single courses apart from the basic star-rating and voluntarily free-text feedback (see table 19). Learners' feedback after completing the courses and the evaluation of the feedback does not include course specific aspects, but only aspects evaluated in the level of all entry-level Professional Certificates. In this context, see condition chapter 3.4 on up-to-date learning material and recommendation chapter 4.1 on learner support.

Therefore, the panel recommends the following condition:

For each of the six courses, Coursera supports IBM to implement a course specific evaluation system which includes a systematic control loop from the survey on learners' feedback to course content as well as teaching and learning material to the analysis and the taking of appropriate measures.

Evaluation by learners is carried out on a regular basis and in accordance with a prescribed procedure; the outcomes are communicated and provide input for the quality development process. During the assessment conference, learners revealed that feedback possibilities during the course were not always obvious to them (e.g., the thumbs up, thumbs down option at each end of module). Feedback opportunity at the end of the course was clearly visible and accessible. The panel therefore recommends improving guidance to feedback options during the courses.

Coursera collects a lot of feedback information and processes this into the "Learner Outcome Report". However, it has not become clear to the panel whether and how information of the Learner Outcome Report is provided to the learners and completers. The panel therefore recommends communicating current Learner Outcome Reports on the website.

Quality controls by the teaching staff and external evaluation are carried out on a regular basis and in accordance with a prescribed procedure; the outcomes are communicated to the learners and provide input for the quality development process. ~~The panel is convinced that the procedure of the job task analysis (JTA) is an effective alternative to the traditional method of assigning expert advisory boards for course and overall program development.~~

The panel also discussed completion rates of the courses. ~~The overall completion rates vary between 1,3 and 10,7 per cent and appear extremely low to the panel, even taken into account the~~

nature of MOOCs. Coursera argued that these figures include all learners, including those that finally not chose to pay for the respective program. From those learners that paid for the programs, completion rates vary between 55 % and 75 %. As a considerable percentage of learners claim private financial issues for cancelation (e.g., about 25 % in IBM Data Engineering Professional Certificate⁴⁷ of reasons recorded), the panel suggests developing ideas about region specific pricing models and/or concepts on financial support/sponsorship to support learner completion, globally.

	Exceptional	Exceeds quality requirements	Meets quality requirements	Does not meet quality requirements	n.r.
6. Quality Assurance					
6.1* Quality assurance and development of course content, processes and outcomes				Condition	
6.2 Instruments of quality assurance					
6.2.1 Evaluation by learners			X		
6.2.2 Quality assurance by teaching staff			X		
6.2.3 External evaluation by course graduates, employers and others			X		

⁴⁷ „Cancelation Survey”, provided by Coursera on all six programs under scrutiny.

Quality Profile

Institution: Coursera Inc.

Content partner: IBM

Continuing Education Courses:

- IBM Data Engineering Professional Certificate
- IBM Data Science Professional Certificate
- IBM Cybersecurity Analyst Professional Certificate
- IBM Data Analytics with Excel and R Professional Certificate
- IBM Data Analyst Professional Certificate
- IBM Full Stack Software Developer Professional Certificate

Quality Ratings	Exceptional	Exceeds quality requirements	Meets quality requirements	Does not meet quality requirements	n.r.
1. Strategy and Objectives					
1.1* ⁴⁸ Logic and transparency of course objectives				Condition	
1.2 International orientation of the courses			X		
1.3 Positioning of the courses					
1.3.1 Positioning of the courses in the education and job market, and the professional field ("Employability")			X		
1.3.2 Position of courses within the course provider's overall strategy		X			
2. Admission					
2.1* Focus on the target group			X		
2.2* Admission conditions			X		
2.3* Legal relationship			X		
3. Implementation					
3.1 Structure					
3.1.1 Structure of the courses			X		
3.1.2* Application of the „European Credit Transfer and Accumulation System (ECTS)“ and modularization				Condition	
3.1.3* Conditions of participation and assessment regulations			X		
3.1.4* Feasibility of study workload			X		
3.2 Content					
3.2.1* Logic and conceptual coherence			X		
3.2.2 Integration of theory and practice				X	
3.2.3 International and intercultural contents					X
3.2.4 Methodological competence				X	
3.2.5 Academic work and science-based					X

⁴⁸ *: Asterisk Criterion

Quality Ratings	Exceptional	Exceeds quality requirements	Meets quality requirements	Does not meet quality requirements	n.r.
teaching					
3.2.6* Examinations			X		
3.3 Transdisciplinary qualifications and softskills					X
3.4 Didactics and methodology					
3.4.1* Logic and transparency of teaching and learning methodology			X		
3.4.2 Course and learning materials					Condition
3.5* Skills for employment/Employability			X		
4. Resources and Services					
4.1 Teaching staff of the courses					
4.1.1* Course management			X		
4.1.2* Structure and number of teaching staff in relation to curricular requirements			X		
4.1.3* Teaching staff's qualifications		X			
4.1.4* Teaching staff's pedagogical/teaching qualifications		X			
4.1.5 Practical experience of the teaching staff		X			
4.1.6 Internal cooperation			X		
4.1.7* Learner support and coaching			X		
4.2* Process organization and administrative support for learners and teaching staff		X			
4.3 Networking			X		
4.4(*) Cooperation with academic institutions or enterprises (asterisk criterion for cooperation courses)			X		
4.5 Technology and Facilities					
4.5.1 Technical organizational unit		X			
4.5.2* Teaching and learning platform		X			
4.5.3 Data analysis system		X			
4.5.4* Technical support for learners			X		
4.5.5 Access to required literature			X		
5.* Documentation				Condition	
6. Quality Assurance					
6.1* Quality assurance and development of course content, processes and outcomes				Condition	
6.2 Instruments of quality assurance					
6.2.1 Evaluation by learners			X		
6.2.2 Quality assurance by teaching staff			X		
6.2.3 External evaluation by course graduates, employers and others			X		

Glossary

Coursera and report terminology	description
Professional Certificate (program); Program	Course (entity that is subject to certification)
Course	Content entity covering one topic within the program
Module	Weekly learning entity, smallest learning entity
Subject Matter Expert (SME)	Employee of IBM (Coursera content partner) or third party assigned by IBM (Coursera content partner), who is qualified for content development
Instructor	Teaching staff that is part of the team that conceives, designs, and produces the course
Teaching assistant	Teaching staff that supports learners in case of content related matters