

Syllabus and study guide

Data Science Professional (SDS)

September 2027 to June 2028

Designed to help with planning study and to provide detailed information on what could be assessed in any examination session.

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1. Overall aim of the syllabus

The overall aim of the syllabus is to enable the application of relevant technical skills, digital capabilities and professional judgement to determine business problems, and design and evaluate data science solutions to offer data-driven insights for management, including the need for appropriate ethical practice, governance and regulation.

2. Introduction to the syllabus

The syllabus for Data Science Professional (SDS), starts by introducing candidates to business problem identification and the relationship between business problems and technical solutions. This requires the design of project scope, stakeholder management, data discovery activities and success metrics. Candidates will also learn how to apply the CRISP-ML framework.

Quantitative and statistical thinking are essential for accountants and programming skills are becoming increasingly important so the next two sections of the syllabus focus on mathematical and statistical methods and programming for business. Candidates will have to apply statistical metrics to support business decisions and evaluate the application and use of Python and SQL.

Next the syllabus moves on to data science techniques where candidates will have to consider different types of data science models, how to prepare and clean data, evaluate predictive models, use appropriate performance criteria to validate models and advise on model findings. The syllabus also covers anomaly detection, clustering and segmentation and practical considerations for model deployment.

The syllabus then includes all the accounting and finance topics which could form the contexts in which the syllabus is examined. Candidates will be expected to have a broad technical knowledge across a range of accounting areas.

Governance, ethics and risk management are important considerations in relation to technology and data and so the syllabus addresses ethical practice in data science, the governance required for data driven models, the risks which can arise and the mitigation strategies needed.

Finally, the syllabus focuses on professional data storytelling as the creation of compelling data narratives are vital for an accountant. Consideration of stakeholder-focused communication is essential to build trust and effective relationships.

The professional skills section of the syllabus focuses on the range of professional skills candidates should be expected to demonstrate in the examination.

3. Main capabilities

On successful completion of this course of study, candidates should be able to:

- Evaluate business problems and advise on business needs for data science projects
- Apply mathematical and statistical methods to draw statistically sound conclusions and support business decision making
- Advise on the practical considerations for business around the use of programming tools
- Design and evaluate data science models to meet business requirements and build value
- Evaluate the application of data science across a range of finance and accounting contexts
- Recommend appropriate governance and mitigation strategies following the application of ethical principles and risk frameworks to data models
- Advise on how to communicate data insights in a clear and compelling manner tailored to the audience which enhances business understanding and builds trust

4. Intellectual levels

The ACCA Qualification syllabus is designed to progressively broaden and deepen the technical knowledge, skills and professional values demonstrated by the candidate on their journey through the qualification.

The specific learning outcomes within the detailed syllabuses and study guides are assessed at one of three intellectual or cognitive levels:

Level 1:	Knowledge and comprehension
Level 2:	Application and analysis
Level 3:	Synthesis and evaluation

Very broadly these intellectual levels relate to the three levels of the ACCA Qualification: Knowledge, Expertise and Strategic Professional.

Each learning outcome included in the detailed study guide is given a 1, 2 or 3 superscript, denoting its intellectual level. This gives an indication of the intellectual depth at which a learning outcome could be assessed within the examination. However, while Level 1 broadly equates with the Knowledge level, Level 2 to the Expertise level and Level 3 to the Strategic Professional level of the ACCA Qualification, some lower-level skills can continue to be assessed as the candidate progresses through each level. This reflects that at each stage of study there will be the requirement to broaden, as well as deepen, capabilities.

5. The syllabus

A Business problem identification and data readiness

1. Business problem identification
2. Stakeholder engagement for project success
3. Business problem scoping
4. Data discovery and quality audit
5. CRISP-ML framework

B Mathematical and statistical methods

1. Descriptive statistics
2. Inferential statistics
3. Probability and decision theory
4. Business applications

C Programming for business

1. Python
2. SQL

D Data science techniques

1. Data science modelling concepts
2. Data preparation and cleaning
3. Predictive modelling
4. Model validation and interpretation
5. Anomaly detection, clustering and segmentation
6. Model deployment

E Applications in accounting and finance

1. Audit, risk and fraud
2. Financial planning, reporting and analysis

3. Costing, budgeting and performance management
4. Environmental, social and governance (ESG) reporting

F Governance, ethics and risk management

1. Ethical data science practice
2. Data privacy and security
3. Governance of data-driven models
4. Risk management

G Professional data storytelling

1. Data storytelling
2. Data visualisation
3. Explaining uncertainty and probability
4. Audience-specific communication

H Professional skills

1. Communication
2. Analysis and evaluation
3. Scepticism
4. Commercial acumen

6. Detailed study guide

A Business problem identification and data readiness

1. Business problem identification

- a) Evaluate the relationship between business problems and technical solutions recognising that successful analytics projects must begin with clear business understanding.^[3]
- b) Design a clear project scope using SMART criteria, including timelines for data collection and model development phases and align objectives with business strategy.^[3]
- c) Recommend measurable outcomes for data science projects for both technical and business success metrics.^[3]
- d) Evaluate trade-offs between technical performance and business value.^[3]

2. Stakeholder engagement for project success

- a) Advise on the importance of early stakeholder engagement to enable project success.^[3]
- b) Evaluate stakeholder influence and interest levels using structured frameworks.^[3]
- c) Plan engagement strategies for different stakeholder types and design communication plans.^[3]
- d) Recommend effective methods to collecting, documenting and validating business requirements from diverse stakeholders.^[3]
- e) Evaluate stakeholder interdependencies and potential conflicts to design optimal solutions which address multiple

stakeholders needs and prioritise requirements using business value criteria.^[3]

3. Business problem scoping

- a) Evaluate structured frameworks for systematic problem identification, including root cause analysis, problem trees and the ‘5 Whys’ method.^[3]
- b) Design clear, actionable problem statements using structured frameworks and ensure problem statements align with organisational capabilities.^[3]
- c) Evaluate root causes versus symptoms using analytical techniques.^[3]
- d) Advise on project scope including inclusion and exclusion criteria and taking into consideration available resources and constraints.^[3]
- e) Evaluate project viability across technical, economic, operational and schedule dimensions.^[3]
- f) Calculate tangible and intangible benefits from data science projects and advise stakeholder on the financial impact.^[2]
- g) Evaluate implementation costs, including data acquisition and system development.^[3]

4. Data discovery and quality audit

- a) Assess potential data sources within and outside the organisation using systematic approaches.^[2]
- b) Evaluate data relationships and dependencies across systems, including mapping system architecture and how data flows work.^[3]
- c) Assess data accessibility and legal restrictions, data gaps and acquisition needs, and integration challenges.^[2]

- d) Evaluate data quality across six key dimensions: accuracy, completeness, consistency, timeliness, validity and uniqueness.^[3]
- e) Assess the business impact of different data quality issues and recommend improvements with cost-benefit analysis.^[3]

5. CRISP-ML framework

- a) Apply each of the six phases of the CRISP-ML framework to practical accounting data science projects.^[3]

B Mathematical and statistical methods

1. Descriptive statistics

- a) Calculate measures of central tendency (mean, median, mode) and dispersion (standard deviation, range, coefficient of variation) and assess typical values, variability and outliers in financial datasets.^[2]
- b) Evaluate the shape, skewness and kurtosis of financial data distributions to assess reliability and predictability of financial metrics e.g. using visual tools such as histograms and box plots.^[3]
- c) Apply descriptive statistics to summarise and interpret financial data.^[3]

2. Inferential statistics

- a) Apply inferential tools to estimate population characteristics and test hypotheses, including sampling theory, confidence intervals and hypothesis testing, and draw statistically sound conclusions.^[3]

3. Probability and decision theory

- a) Apply probability and decision-theoretic approaches to support decision making under uncertainty, including probability distributions (binomial, normal, Poisson),

conditional probability and decision trees.^[3]

4. Business applications

- a) Evaluate the appropriate use of statistical metrics for business decisions.^[3]
- b) Evaluate the reliability and validity of statistical outputs from third-party vendors, including assessment of methodologies, data quality, and potential biases.^[3]
- c) Recommend appropriate confidence levels for different business decisions, balancing statistical rigour with practical business constraints.^[3]

C Programming for business

1. Python

- a) Evaluate the application and use of Python in a range of business contexts.^[3]
- b) Assess the need for approved ‘sandboxed’ environments for analytics e.g. cloud-hosted notebooks and corporate tools.^[2]
- c) Evaluate the licensing and commercial risks of using open-source programming applications and tools.^[3]
- d) Evaluate the need for a ‘Safe Practice Checklist’ which provides guidance on best practice.^[3]

2. SQL

- a) Assess the variability of SQL across platforms e.g. Oracle, Snowflake, BigQuery etc.^[2]
- b) Evaluate the application and use of SQL in a range of business contexts.^[3]
- c) Evaluate typical data architectures including data lakes, warehouses and silos.^[3]

D Data science techniques

1. Data science modelling concepts

- a) Assess different types of data science models and their applications for use in accounting processes.^[3]
- b) Assess the data modelling process from problem definition to deployment.^[3]
- c) Evaluate appropriate data modelling techniques for business problems and connect the modelling capabilities to business value creation.^[3]

2. Data preparation and cleaning

- a) Assess patterns of missing data in accounting datasets and advise on appropriate missing value handling strategies to ensure the preservation of data integrity and model validity.^[3]
- b) Evaluate statistical methods for outlier detection in financial data, distinguish between data errors and legitimate extreme values and advise on outlier treatment options.^[3]
- c) Evaluate data transformation methods, including scaling, normalisation, encoding categorical variables and creating derived features, which support accounting analysis.^[3]
- d) Assess the need for feature engineering to respond to business problems.^[2]
- e) Design business-relevant features which enhance datasets and improve model performance while preserving interpretability and business understanding.^[3]

3. Predictive modelling

- a) Evaluate linear regression models for financial forecasting and analysis and apply logistic regression to classification problems in accounting.^[3]

- b) Evaluate regression coefficients and advise on their business meaning.^[3]
- c) Assess the limitations and appropriate applications of regression techniques.^[2]
- d) Evaluate time series analysis models to identify underlying trends and recurring seasonal patterns.^[3]
- e) Evaluate different modelling options, including the trade-offs between model complexity and interpretability and make informed model-selection decisions which reflect business constraints and objectives.^[3]
- f) Evaluate the use of the following techniques:^[3]
 - (i) cross-validation methods (including k-fold cross validation)
 - (ii) hyperparameter tuning
 - (iii) stratified sampling
- g) Assess model generalisability and prevent overfitting to obtain reliable performance estimates for business decision-making.^[3]

4. Model validation and interpretation

- a) Recommend metrics, including regression metrics (RMSE, MAE and R-squared) and classification metrics (accuracy, precision, recall, F1-score and AUC-ROC) to suit specific business contexts and evaluate metric values.^[3]
- b) Assess whether model performance meets business requirements and advise stakeholders on model performance.^[3]
- c) Evaluate models using multiple performance criteria.^[3]
- d) Assess model validity to identify problems and improvements while staying aligned with business requirements and practical constraints.^[3]

- e) Evaluate techniques for identifying the variables which drive model predictions, including coefficient interpretation, permutation importance and feature contribution analysis, and validate model logic against business understanding.^[3]
- f) Advise on model findings and make recommendations based on model outputs, including regression.^[3]

5. Anomaly detection, clustering and segmentation

- a) Apply statistical approaches to anomaly detection, including z-score analysis, interquartile range methods and distribution-based techniques, and interpret the results within business contexts.^[3]
- b) Evaluate machine learning methods for anomaly detection, including isolation forests, one-class SVM and clustering-based approaches.^[3]
- c) Evaluate machine learning approaches for anomaly detection against business requirements.^[3]
- d) Evaluate principles for effective anomaly alert systems, including threshold setting, alert prioritisation, investigation workflow integration and false-positive management.^[3]
- e) Prepare data for clustering, select an appropriate number of clusters, interpret the results and apply insights to business decision-making and process improvement.^[3]
- f) Evaluate hierarchical clustering methods, including agglomerative and divisive approaches to business classification problems.^[3]
- g) Assess dendrograms for cluster analysis using appropriate distance measures and linkage criteria and interpret the results for decision-making.^[3]

6. Model deployment

- a) Evaluate practical considerations for deploying data science models, including integration requirements, monitoring systems, performance tracking and maintenance procedures.^[3]
- b) Plan for model lifecycle management taking into consideration scalability and reliability requirements to ensure sustainable model operations.^[3]
- c) Design continuous improvement processes to keep models effective over time and adapt them to changing business conditions and needs.^[3]

E Applications in accounting and finance

1. Audit, risk and fraud

- a) Assess the use of data analytics to focus audit efforts on high-risk areas, including stratified sampling, monetary unit sampling and predictive risk modelling.^[2]
- b) Design efficient sampling strategies and calculate appropriate sample sizes.^[3]
- c) Evaluate risk indicators to optimise audit resource allocation while meeting professional auditing standards.^[3]
- d) Assess the use of predictive models for fraud risk assessment, including feature engineering for fraud indicators, model training with historical fraud cases, and the implementation of scoring systems which support ongoing fraud prevention.^[3]
- e) Evaluate model sensitivity with acceptable false-positive rates and produce actionable fraud risk scores to prioritise investigations.^[3]

2. Financial planning, reporting and analysis

- a) Assess advanced time-series forecasting for financial planning, including seasonal adjustment, trend analysis and multivariate forecasting models.^[2]
 - b) Design robust forecasting models to support strategic planning while accounting for uncertainty and enabling scenario planning.^[3]
 - c) Design comprehensive scenario models for strategic planning, including best case, worst case and most likely scenarios and apply Monte Carlo simulation for risk assessment.^[3]
 - d) Advise management on scenario results to support their understanding of potential outcomes.^[3]
 - e) Evaluate the use of cash flow forecasting models which incorporate accounts-receivable ageing, payment-pattern analysis and working capital optimisation.^[3]
 - f) Advise management on potential liquidity issues and provide insights to support treasury management and investment planning decisions.^[3]
- 3. Costing, budgeting and performance management**
- a) Evaluate cost analysis techniques, including cost behaviour analysis, variance investigation and cost optimisation modelling to identify cost reduction opportunities while maintaining quality and areas for efficiency improvement.^[3]
 - b) Advise management on insights from cost analysis to support strategic cost management decisions and balance cost optimisation with service level requirements.^[3]
 - c) Evaluate the use of automated variance analysis to identify and explain budget differences, including root cause analysis, trend identification and predictive variance forecasting.^[3]
- d) Advise management with insights into underlying business drivers and actionable variance reports.^[3]
 - e) Evaluate profitability analysis techniques, including customer profitability modelling, product line analysis and activity-based costing applications to support pricing decisions and optimise resource allocation.^[3]
 - f) Design key performance indicators (KPIs) using appropriate design principles and measurement methodologies to drive business performance.^[3]
 - g) Advise management on insights from KPI analysis to enable continuous improvement and support strategic decision making.^[3]
- 4. Environmental, social and governance (ESG) reporting**
- a) Evaluate systemic approaches to collecting, validating and analysing ESG data, including data-source identification and quality assessment.^[3]
 - b) Evaluate ESG measurement frameworks and provide analytics to support sustainability reporting.^[3]
 - c) Assess the development and implementation of key sustainability metrics, including carbon footprint calculations, resource-efficiency measures and social-impact indicators.^[3]
 - d) Advise management on insights from ESG analysis to support ESG-informed business decision making.^[3]
- F Governance, ethics and risk management**
- 1. Ethical data science practice**

- a) Assess the importance of ethical practice in data science applications, including professional responsibility for stakeholder protection.^[3]
- b) Apply ethical principles to practical implementation decisions.^[3]
- c) Apply ethical decision-making frameworks to business and accounting situations.^[3]
- d) Evaluate biases in data and models, including their consequences and the mitigation strategies required.^[3]

2. Data privacy and security

- a) Evaluate the impact of data protection regulations and principles in business intelligence tools and accounting software.^[3]
- b) Design compliant data flows and apply anonymisation techniques.^[3]
- c) Assess the use of privacy-by-design principles embedded in business intelligence tools and accounting software.^[3]

3. Governance of data-driven models

- a) Evaluate the need for accounting and audit models to be reviewed, tested and documented to meet regulatory, organisational and professional requirements.^[3]
- b) Advise on the practical development of model validation procedures, approval workflows and governance committee structures to ensure accountability and traceability of decisions and to support business agility.^[3]

4. Risk management

- a) Assess the risks which financial models are exposed to e.g. data quality, model misuse, failure etc.^[3]

- b) Evaluate data quality, access control and audit trail integrity.^[3]

- c) Design mitigation strategies, including the preparation of contingency and disaster recovery procedures.^[3]

G Professional data storytelling

1. Data storytelling

- a) Evaluate the importance of effective communication in data science applications, including the components of compelling data narratives.^[3]
- b) Assess how professional storytelling converts analytical insights into business value and bridges the gap between technical analysis and business understanding.^[3]
- c) Evaluate how analytical findings are transformed into actionable business recommendations, including insight prioritisation, development and implementation guidance.^[3]
- d) Assess how to manage stakeholder resistance to analytical insights and data-driven changes and build support through clear communication and relationship management.^[3]
- e) Evaluate presentation structures for analytical content, focusing on logical flow, narrative development and audience engagement techniques.^[3]

2. Data visualisation

- a) Evaluate the application of visual design principles to business communication to create clear and simple visualisations which enhance understanding.^[3]
- b) Advise on the choice of chart types to meet specific business analysis tasks.^[3]
- c) Evaluate the effectiveness of charts based on audience and purpose,

recognising the need to avoid misleading or ineffective visual representations.^[3]

- d) Advise management accurately on chart output to support financial decision-making.^[3]

3. Explaining uncertainty and probability

- a) Advise management in business-friendly language on statistical uncertainty, including confidence intervals, probability ranges and analytical limitations.^[3]
- b) Evaluate the need to communicate model limitations and assumptions transparently, including scope boundaries, data constraints and methodological considerations.^[3]
- c) Assess statistical results to translate them into business meaning and explain significance testing in accessible terms.^[3]
- d) Advise management on when statistical findings carry practical business importance and connect results to decision-making requirements.^[3]

4. Audience-specific communication

- a) Evaluate the use of visually compelling dashboards for senior leadership to provide clear executive summaries, highlight KPIs and critical business metrics and support strategic decision making.^[3]
- b) Assess client-focused communication approaches which build trust, demonstrate value and strengthen business relationships.^[3]

H Professional skills

1. Communication

- a) Inform concisely, objectively and unambiguously, adopting a suitable style and format, and using appropriate technology.^[3]

- b) Advise using compelling and logical arguments, demonstrating the ability to counter argue where appropriate.^[3]

- c) Clarify and simplify complex issues to convey relevant information in a way which adopts an appropriate tone and is easily understood by and reflects the requirements of the intended audience.^[3]

2. Analysis and evaluation

- a) Investigate relevant information from a range of sources, using appropriate data science techniques, to establish reasons and causes of issues, to assist in decision making and to identify opportunities or solutions.^[3]

- b) Consider information, evidence and findings in a careful and structured way, reflecting on their implications and how they can be used in the interests of the individual business function, division and the wider organisational goals.^[3]

- c) Assess and apply appropriate judgement when making decisions in relation to data science activities, taking into account the implications of such decisions on the organisation and those affected.^[3]

- d) Appraise information objectively and logically with a view to balancing the costs, risks, benefits and opportunities before advising on or recommending appropriate solutions or decisions.^[3]

3. Scepticism

- a) Apply professional scepticism to analytics interpretations and evaluate analytics outputs with objectivity and integrity.^[3]

- b) Question opinions, assertions and assumptions by seeking justifications and obtaining sufficient evidence for either their support and acceptance, or rejection.^[3]

- c) Challenge and critically assess the information presented or decisions made in a professional and courteous manner, where this is clearly justified to be in the wider professional, ethical, organisational or public interest .^[3]

4. Commercial acumen

- a) Demonstrate awareness of organisational and wider external factors affecting the work of an individual or team in contributing to the wider organisational objectives.^[3]
- b) Recognise key issues in determining how to address or resolve problems and use judgement in proposing and recommending commercially viable solutions.^[3]
- c) Show insight and perception in understanding work-related and organisational issues, demonstrating acumen in arriving at appropriate solutions or outcomes.^[3]

7. Approach to examining the syllabus

The Data Science Professional (SDS) examination builds upon the technical knowledge and skills developed in the Digital Tech and Innovation Essential Employability Module. At the Strategic Professional level, candidates will be expected to demonstrate an integrated approach to the subject combined with professional skills to evaluate data science applications in order to drive decision making and create value. The study guide specifies the wide range of contextual application which is required to achieve a satisfactory standard at this level.

The syllabus is assessed by a three-hour 15-minute computer-based examination.

The examination will consist of two sections:

Section A will contain one 50-mark question

Section B will contain two 25-mark questions

Section A

Section A of the examination will be a 50-mark scenario-based question. The 50 marks will comprise 40 technical marks and 10 professional skills marks. All four of the professional skills will be examined in Section A.

This question will include a requirement from syllabus section F.

Section B

Candidates will be required to answer a further two 25-mark questions in Section B of the examination. Both questions will be scenario based. Each 25-mark question will comprise 20 technical marks and five professional skills marks. Each question will examine a minimum of two professional skills from analysis and evaluation, scepticism and commercial acumen as appropriate to the question.

One of the Section B questions will always test syllabus section C.

The examination will always contain a requirement from syllabus section G which could feature in either Section A or Section B of the examination.

Syllabus section B can appear anywhere in the examination as these concepts and methods underpin the other syllabus areas.

Each question in the examination will have a scenario based on a different accounting and finance topic from syllabus section E.

8. Guide to ACCA examination structure and delivery mode

The structure of examinations varies, depending on the level of the qualification.

The Strategic Professional level is comprised of Essentials and Options examinations. The Strategic Professional examinations contain 100% compulsory questions to encourage candidates to study across the breadth of each syllabus.

The Essential examinations are S1 Business and Sustainability Reporting and S2 Strategic Business Leader.

The S1 Business and Sustainability Reporting examination contains two sections and is comprised of 80 technical marks and 20 professional ethics and professional skills marks.

S2 Strategic Business Leader is ACCA's case study examination and includes pre-seen information which is released to candidates two weeks prior to the examination sitting. The pre-seen information contains background and contextual details in order for candidates to familiarise themselves with the fictitious organisation which they will be examined on and the industry in which it operates. This examination contains 80 technical marks and 20 professional skills marks.

All Options examinations have two sections and contain a total of 80 technical marks and 20 professional skills marks.

All Strategic Professional examinations are assessed by three-hour 15-minute computer-based examinations. ACCA will provide permitted reference materials for candidates to use during the examinations.

The pass mark for all Strategic Professional examinations is 50%.

9. Guide to ACCA examination assessment

ACCA reserves the right to examine anything contained within the study guide at any examination session. This includes knowledge, techniques, principles, theories, and concepts as specified.

For specified financial accounting, audit and tax examinations, except if indicated otherwise, ACCA will publish examinable documents once a year to indicate exactly what regulations and legislation could potentially be assessed within identified examination sessions. Regulation issued, or legislation passed on or before 31 August annually, will be assessed from 1 September of the following year to 31 August of the year after. Please refer to the examinable documents for the examination (where relevant) for further information.

Regulations issued or legislation passed in accordance with the above dates may be examinable if the effective date is in the future, unless explicitly stated otherwise in the syllabus and study guide or examinable documents. The terms 'issued' or 'passed' relate to when regulation or legislation has been formally approved.

The term 'effective' relates to when regulation or legislation must be applied to entity transactions and business practices.

The study guide offers more detailed guidance on the depth and level at which the examinable documents will be examined. The study guide should therefore be read in conjunction with the examinable documents list, where applicable.

10. Learning hours and education recognition

The ACCA Qualification does not prescribe or recommend any particular number of learning hours for examinations because study and learning patterns and styles vary greatly between people and organisations. This also recognises the wide diversity of personal, professional and educational circumstances in which ACCA candidates find themselves.

As a member of the International Federation of Accountants, ACCA seeks to enhance the education recognition of its qualification on both national and international education frameworks, and with educational authorities and partners globally. In doing so, ACCA aims to ensure that its qualifications are recognised and valued by governments and regulatory authorities and employers across all sectors. To this end, ACCA qualifications are currently recognised on the educational frameworks in several countries. Please refer to your national education framework regulator for further information about recognition.