



**BSc Business Analytics  
University of Amsterdam**

**Assessment of conditions**

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Project code P2120

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## Summary

The initial accreditation of the BSc Business Analytics in 2020 was conditionally positive, stating two conditions with regard to the alignment of the curriculum. Firstly, the programme was to review the curriculum to make sure that the analytics, business and computer science (ABC) components of the programme are sufficiently integrated and aligned with each other. Secondly, this alignment should be made visible in an overview that matches the intended learning outcomes of the programme with the content of the courses.

The panel studied the progress the programme made with regard to these conditions. It appreciates the work and the improvements that have been made. It particularly values the restructuring of the curriculum, including two new integrative courses that combine all three components. The analytics, business and computer science components have been better integrated in the curriculum, and their position in the curriculum has been made more visible. An update of the intended learning outcomes and an improved overview of their connection to the courses have resulted in a more insightful outline of the programme. To further improve the alignment of the curriculum, the panel recommends rephrasing the learning outcome that describes the research skills to better reflect bachelor level, and to make some last improvements in the table identifying the courses that cover the various learning outcomes of the programme.

Overall, the curriculum is more balanced and the alignment now fits the ambition to integrate the ABC components. The panel therefore concludes that the programme has adequately responded to the recommendations of the initial accreditation.

### Score table

The panel assesses the programme as follows:

#### *Bsc Business Analytics*

Standard 1: Intended learning outcomes

meets the standard

**Standard 2: Teaching-learning environment**

**meets the standard**

Standard 3: Student assessment

meets the standard

**General conclusion**

**positive**

Prof.dr.ir. K.I. (Karen) Aardal (chair)

Peter Hildering MSc (secretary)

Date: 18 januari 2022

# Introduction

## Procedure

### Assessment

On 7 December 2021, the BSc programme Business Analytics of the Faculty of Economics and Business of the University of Amsterdam was assessed by an independent panel to determine whether the programme has fulfilled the conditions imposed by the initial assessment panel on 29 October 2020. The assessment followed the procedure and standards of the NVAO Assessment Framework for the Higher Education Accreditation System of the Netherlands (September 2018).

Quality assurance agency Academion coordinated the assessment upon request of the University of Amsterdam. Peter Hilderling MSc of Academion acted as coordinator and secretary of the assessment. He has been certified and registered by the NVAO.

### Preparation

The programme prepared a status report in the form of a self-evaluation of the implemented recovery plan, which was made available to the panel members and secretary in preparation for the online visit. Prior to the visit, the panel studied this report as well as a number of supporting documents (cf. appendix 2). The panel members circulated their preliminary findings on the self-evaluation report and other materials, sharing these with the panel secretary.

The University of Amsterdam, NVAO, and Academion jointly decided to combine the assessment of conditions for the BSc Business Analytics with the initial accreditation of the MSc Data Science & Business Analytics at the same Faculty, where drs. F.J.M. (Frank) Wamelink acted as process coordinator. A single panel was tasked with both assessments in a shared online site visit. The University of Amsterdam composed a site visit schedule in consultation with the NVAO and Academion process coordinators (see appendix 3), and provided the panel with the opportunity to speak to the programme management about the conditions imposed on the BSc during the initial accreditation.

### Site visit

In a preparatory online meeting on 22 November 2021, the panel discussed its initial findings on the self-evaluation report. During this meeting, the panel decided to base its assessment on the documentation provided by the programme, and not use the opportunity for further discussion during the site visit.

### Report

The secretary wrote a draft report based on the panel's findings and submitted it to a colleague at Academion for peer assessment. Subsequently, the secretary sent the report to the panel for feedback. After processing this feedback, the secretary sent the draft report to the programme in order to have it checked for factual irregularities. The secretary discussed the ensuing comments with the panel chair and changes were implemented accordingly. The panel then finalised the report, and the secretary sent it to the Faculty of Economics and Business of the University of Amsterdam.

## Panel

The panel assessing the BSc Business Analytics at the University of Amsterdam consisted of the following members:

- Prof. dr. ir. K. I. (Karen) Aardal (*chair*);
- Prof .dr. ir. J. C. (Jan) Fransoo;
- Dr. L. R. J. (Lieven) Quintens;
- R. (Ruward) Karper (*student*).

Prof. dr. ir. K. I. (Karen) Aardal and dr. L. R. J. (Lieven) Quintens were also members of the original assessment panel that reviewed the programme in October 2020. The assessment panel was composed by the NVAO as part of the initial accreditation of the MSc Data Science & Business Analytics, and subsequently for the assessment of conditions of the BSc Business Analytics. The NVAO approved the panel on 3 November 2021.

## Information on the programme

Name of the institution:	University of Amsterdam
Status of the institution:	Publicly funded institution
Result institutional quality assurance assessment:	Positive

Programme name:	Business Analytics
CROHO number:	56856
Level:	bachelor
Orientation:	academic
Number of credits:	180 EC
Specialisations or tracks:	-
Location:	Amsterdam
Mode(s) of study:	Fulltime
Language of instruction:	English
Submission date NVAO (recovery):	23-03-2022

# Description of the assessment

## Introduction

The BSc Business Analytics was assessed by an external panel on 29 October 2020 seeking initial accreditation. In its report, the panel advised the NVAO to accredit the programme under two conditions with regard to Standard 2 of the assessment framework (Teaching-learning environment):

1. Review the curriculum to make sure that the three components (analytics, business and computer science) are attuned to each other, and that each component contains the relevant building blocks for the subsequent courses. Moreover, each course and its assessment should be aligned with the intended learning outcomes of the programme.
2. The overview of the connection between the intended learning outcomes and the curriculum components should be renewed in line with the alignment mentioned under condition 1.

The assessment panel made three additional recommendations for improvement.

- I. Keep a close connection with the Advisory Board of the programme.
- II. Incorporate an introductory integrative course in the first year to inform students on the components the programme is composed of, and build an academic learning community.
- III. Ask the Board of Examiners for their view on the alignment between the intended learning outcomes, courses and assessment.

The Board of the NVAO adopted these conditions and recommendations, and granted the BSc Business Analytics conditional accreditation on 10 March 2021. Based on the issues signaled by the panel, the programme formulated a Recovery Plan, and implemented this in 2021. This report uses this Recovery Plan and the implementation thereof as the basis for an assessment of the conditions imposed by the previous assessment panel.

## Standard 2. Teaching-learning environment

The curriculum, the teaching-learning environment and the quality of the teaching staff enable the incoming students to achieve the intended learning outcomes.

## Findings

### *Attuning analytics, business and computer science within the curriculum*

The previous panel concluded that the curriculum of the BSc Business Analytics needed further development with regard to its interdisciplinarity. The programme was in the process of developing new programme-specific courses, but in its initial curriculum it largely depended on courses in analytics, business and computer science from other BSc programmes. According to the panel, the different perspectives and methods in these courses might prove challenging for BSc students. Furthermore, the panel deemed some of the subjects taught in these courses to not be immediately relevant to a BSc in Business Analytics.

The programme responded to this observation by increasing the number of new, programme-specific courses in the curriculum. One of these courses is the introductory course *Analytics for a Better World*

(recommendation II) .This course is offered in the first semester of the first year. It provides students with an understanding of the role of analytics for business and society, an overview of the field of Business Analytics, basic techniques used in the field, and the application and implementation of these techniques in simple decision problems. This course contributes to the formation of an academic community, and makes students familiar with the role of the various components of the programme, preparing them for courses further on in the curriculum. A second integrative course has been integrated into the second year: the *Entrepreneurship: Hackathon* course, in which students combine the skills obtained so far to solve problems in a hackathon.

The programme provided the panel with an overview of the new curriculum, as well as with descriptions of the courses. Of the current 23 (planned) courses in the curriculum, 14 are new courses that have been specifically designed with the learning outcomes of the BSc Business Analytics in mind. Several courses are interdisciplinary, and combine elements from analytics (A), business (B) and computer science (C). Examples are the new introductory course *Analytics for a Better World* (ABC – see above), *Introduction Data Science* (AC), *Machine Learning* (ABC) and *OR – Stochastic Methods* (AB). The following first year courses are mainly devoted to disciplinary courses that make students familiar with the content and methods of each of the components. The second and third year mainly consist of interdisciplinary courses, that combine the three components of the programme in an integrative manner.

The panel studied the adaptations that the programme made to the curriculum, in particular with regard to the integration of the analytics, business and computer science components. It concludes that the programme has made improvements in this regard, in particular by adding the courses *Analytics for a better world* and *Entrepreneurship*, that integrate the three components. According to the panel, this makes the curriculum more balanced and insightful to students, and provides them with an opportunity for community-forming at the start of the curriculum.

#### *Alignment between intended learning outcomes, courses and assessment*

The previous panel felt that the alignment between courses and the intended learning outcomes should be improved. The table that was used to demonstrate the alignment between courses and the intended learning outcomes contained a number of inconsistencies with the course descriptions provided. The panel found that some courses seemed to be only vaguely linked to the intended learning outcomes. Furthermore, some learning outcomes were overrepresented in the courses, while others were rarely ticked.

In response, the programme reconsidered the structure of the curriculum (see appendix 2 and previous section), revised the intended learning outcomes (see appendix 1) to better reflect the content of the curriculum, and after careful analysis compiled a new overview of the alignment of the intended learning outcomes, the courses and their assessment. The programme director has been tasked with monitoring the coherence of the curriculum as well as the overarching alignment between the curriculum and the learning outcomes. He will keep this overview up-to-date and communicates this information to all lecturers involved.

The Advisory Board, which meets with the programme management twice per year, provided input for the revision of the curriculum as well as the new introductory course (recommendation I). The Examination Board was asked to provide input for the alignment between the intended learning outcomes, courses and assessment. Furthermore, the assessment expert of the Examination Board now checks the assessment plans of all courses within the Faculty. Through this policy, the Board is structurally involved in the alignment of the intended learning outcomes, courses and assessment within the programme (recommendation III).



The panel studied the new overview that demonstrates the alignment of the courses with the ILOs, as well as the reformulation of the ILOs themselves. It concludes that these documents reflect the improved alignment of the curriculum with the ILOs of the programme. The programme has identified the A, B and C components within the courses, and has taken care to address multiple components in most of the courses. The panel notes with approval that the Advisory Board and the Examination Board have been involved in this process. The panel concludes that the programme has adequately addressed the conditions provided during the initial accreditation of the programme.

To further improve the alignment of the curriculum, the panel thinks that the programme could make two further adaptations. First, the panel recommends rephrasing ILO 4 to better match the level of the programme. It considers that 'the ability to conduct research at an academic level' is too ambitious and does not reflect the intentions of the programme to provide academic BSc level research skills. Secondly, the programme should be more selective in identifying courses that cover each ILO. This applies in particular to ILOs 4 and 7. ILO 4 (research skills) is sometimes applied to courses that (based on the course descriptions) only deal with research skills to a limited extent. Examples are the first-year course Microeconomics for AE and the second-year courses Management Consulting and HR Analytics. The same is the case for ILO 7 (international teamwork and using a diversity of perspectives). The panel could not identify content related to this ILO in several of the course descriptions. The panel recommends paying attention to these issues in the ongoing updates of the programme.

#### Considerations

The panel appreciates the work and the improvements that have been made regarding the two conditions given in the previous assessment. It particularly values the restructuring of the curriculum, including the new integrative courses. The analytics, business and computer science components have been better integrated in the curriculum, and their position in the curriculum has been made more visible. Furthermore, the updated ILOs and the improved overview of their connection to the courses have resulted in a more insightful outline of the programme. Overall, the curriculum is more balanced and the alignment has improved. The panel therefore concludes that the programme has adequately responded to the recommendations in the initial accreditation. To further improve the alignment of the curriculum, the panel recommends rephrasing the ILO that describes the research skills to better reflect BSc level, and to make some last improvements in the table identifying the courses that cover the various ILOs of the programme (especially concerning learning outcome 4 and 7).

#### Conclusion

The panel concludes that the programme meets standard 2.

#### General conclusion

The panel's assessment of the BSc Business Analytics is positive.

## Appendix 1. Intended learning outcomes

Dublin Descriptors	Intended learning outcomes BSc Business Analytics
<b>Knowledge and insight</b>	1.thorough knowledge of the areas of Analytics (mathematics, statistics, econometrics, operations research), Business (accounting, entrepreneurship, finance, human resource management, marketing, operations management and strategy) and Computer Science (programming, AI/ML techniques, data processing and analysis);
<b>Applying knowledge and insight</b>	2.the ability to model business problems using analytical methods from data science, AI/machine learning & computer science;  3.thorough understanding of the role of data in organisations, enabling the shift towards data-driven decision making in business;  4.the ability to conduct research at an academic level;
<b>Making judgements</b>	5.insights in the ethical, legal and societal aspects of data science applied to business, as well as the ability to incorporate them in decision making;
<b>Communication</b>	6.the ability both to function independently and to cooperate constructively within a team based on a professional and multidisciplinary attitude;  7.the ability to effectively interact with an international team in the chosen professional field and to manage challenges from diverse perspectives;  8.the ability to clearly communicate and professionally present (orally and in writing) information for (non-) expert audience;
<b>Lifelong learning skills</b>	9.acquired academic and professional skills that enables the student to think critically and to analyse situations in their chosen professional field through analytical thinking skills.

## Appendix 2. Programme curriculum

### Study year 1

First semester			Second semester		
Period 1	Period 2	Period 3	Period 4	Period 5	Period 6
Mathematics 1: Calculus (6 ECTS): A	Probability Theory and Statistics 1 (6 ECTS): A	Introduction to Programming (6 ECTS): C New	Mathematics 2: Linear Algebra (6 ECTS): A	Probability Theory and Statistics 2 (6 ECTS): A	Introduction Data Science: Data Preprocessing (6 ECTS): CA
Analytics for a Better World (6 ECTS): ABC	Microeconomics for AE (6 ECTS): B		Finance for AE (6 ECTS): B	Business Law and Ethics for Business Analytics (6 ECTS): B New	

### Study year 2

First semester			Second semester		
Period 1	Period 2	Period 3	Period 4	Period 5	Period 6
Mathematics 3: Advanced Linear Algebra and Real Analysis (6 ECTS): A	Operations Research - Deterministic Methods (6 ECTS): AB New	Management Consulting - Operational Excellence (6 ECTS): B New	Econometrics 1 (6 ECTS): A	Operations Research - Stochastic Methods (6 ECTS): AB New	Entrepreneurship - Hackathon (6 ECTS): ABC New
Algorithms and Data Structures in Python (6 ECTS): AC New	Machine Learning (6 ECTS): ABC New		HR Analytics (6 ECTS): BA New	Accounting and Control (6 ECTS): C New	

### Study year 3

First semester			Second semester		
Period 1	Period 2	Period 3	Period 4	Period 5	Period 6
Minor (30 ECTS) or Exchange (30 ECTS) or Internship (12 ECTS) + Electives (18 ECTS) or Electives (30 ECTS)			Text Retrieval and Mining (6 ECTS): AC New	Computer Systems and Engineering - Information and Data Management (6 ECTS): C New	Bachelor's Thesis and Thesis Seminar (12 ECTS): ABC
			Marketing Analytics (6 ECTS): BA New		

## Appendix 3. Materials

The the panel considered the following additional materials:

- Overview alignment between the learning outcomes, courses and assessment
- Study guide with course overviews of all first-year courses
- Biography of the new programme director
- Newly hired faculty in the domain of data science and business analytics