CORVINUS UNIVERSITY of BUDAPEST

Data Science in Business Bachelor program

training program description

For students who start in the fall semester of 2023/2024

Data Science in Business Bachelor program

Valid: For students starting their studies in the 2023/2024/1 semester
Update: 19.05.2025
General information:

Person responsible for the major: Borbásné Szabó Ildikó
Place of the training: Budapest
Training schedule: full-time
Language of the training: English
Is it offered as dual training: no

Specialisations:
There is no specialisation.
Program and outcome requirements:

1. **Name of the Bachelor's program in Hungarian:** üzleti adattudomány
   Name of the Bachelor's program in English: Data Science in Business
2. **The level of qualification to be acquired in the Bachelor's study program and the specification of the professional qualification in the diploma:**
   - level of qualification: baccalaureus, bachelor (abbreviated: BSc-) degree
   - Hungarian specification of the professional qualification: üzleti adattudós
   - English specification of the professional qualification: Data Scientist in Business
3. **Field of study:** economics
4. **Duration of the program in semesters:** 8 semesters
5. **Number of credits to be collected to acquire the BA degree:** 210+30 credits
   - orientation of the study program: practically oriented (60-70%)
   - minimal credit value of continuous practical training outside the university: 30 credits, of which the credit value assigned to the preparation of the thesis: 10 credits,
   - minimum credit value to be assigned to free elective subjects: 12 credits.
6. **Classification of the professional qualification according to the unified classification system of fields of study:** 34/0488
7. **The training purpose and professional competences**
   The aim of the program is to train professionals with the methodological, IT and business skills required for data analysis and modelling, who are able to combine and apply these skills in independent problem solving and, after acquiring the necessary knowledge and practical experience, to map problems in new business areas into data analysis problems, and who are ready to continue their studies in a master programme.

   7.1. Professional competences to be acquired

   7.1.1. Data scientists in business can be described as follows in terms of their

   a) knowledge

   - Knowledge and understanding of the principles and methods of organising, managing and analysing of business processes, including the processes of the supply chain, sales, marketing, finance, accounting and human resources, and the problems encountered in these processes and to be typically examined by data analysis.
   - Knowledge of problem identification and management, awareness of the methodological foundations of decision preparation and decision support, and the role of data analysis in decision support.
   - Understanding of the main antecedent variables determining the decision, and its main consequences, risks, professional and behavioural aspects.

- Understanding of the operational logic of IT systems supporting business process automation as a data source for data analysis tasks.
- Familiarity with the key principles and methods of project management, the structure, phases and specificities of the implementation of data analysis and data modelling projects.
- Possession of the following knowledge elements necessary to carry out data analysis and modelling projects:
    - programming, software development and technology, agile software project management, software lifecycle, software quality assurance
    - database design and management, data warehouse development and management,
    - knowledge of the analysis, application and development of mathematical, statistical, machine learning models,
    - knowledge of non-structured data processing methods,
    - network theory underlying the description of social and economic systems,
    - knowledge of methods and tools for data visualisation,
    - knowledge of legal, privacy and ethical aspects of data analysis and modelling projects.
- Knowledge of methods for creating business rules based on the results of data analysis and modelling.
- Knowledge of methods for writing business specifications and integrating them into processes and parameterising the related transactions.

b) skills

- Ability to understand the conceptual framework of different business processes and to identify and interpret business process problems that can be solved by data analysis, based on organisational objectives.
- Ability to define the scope of data required to solve a data analysis problem mapped from a business problem, to explore, analyse and understand the architecture of different data sources, operational systems, database types, data storage languages, data file formats and web data sources.
- Ability to identify and implement the range of data manipulations required for data analysis and to unify the different data structures of data derived from different sources.
- Ability to apply mathematical and algorithmic methods, methodologies and thinking to the execution of data analysis processes and data-driven business problem solving and decision making.
- Ability to explore which models or families of models of statistics and machine learning can or need to be applied for the identified data analysis problem.
- Ability to apply and develop programming languages and software for data analysis, data modelling and data visualisation according to business needs.
- Ability to identify facts, patterns and relationships, make predictions and draw business conclusions from the results generated by models and, where necessary, add new analytical aspects, and to examine the problem from multiple perspectives simultaneously. Ability to integrate parts of knowledge into a coherent, holistic framework.
- Ability to produce clear and understandable decision preparation documentation based on the results of the analysis, and to propose business process optimisation based on the results of the modelling.
- Ability to communicate the results of their work, or their proposals or positions in a professional manner, both orally and in writing.

c) attitude

- Readiness to accept new information and learn new professional skills and methodologies.
- Flexible adaption to new situations and changes.
- Readiness to use new IT tools and to learn about them.
- Readiness to integrate the knowledge acquired in the performance of their tasks.
- Striving for precision in their analyses.
- Holistic approach to work with a systems perspective.
- Representation of the importance of an interdisciplinary approach and thinking.
- Knowledge-sharing attitude and acceptance of the need to apply a communication strategy appropriate for a diverse group of stakeholders.
- Acceptance of the importance of compliance with legal and ethical rules.
- Openness and receptiveness to feedback and critical comments.

d) autonomy and responsibility

- Independent performance of the analytical work under general professional supervision.
- Seeking information on the economic, social and legal context of the organisation or phenomenon in question with the support of an expert, experienced colleague.
- Seeking possible ways to solve a problem in a creative manner.
- Proposing data analysis and data modelling solutions that best meet business needs.
- Formulation of independent proposals based on own findings and the ability of self-monitoring.
- Acceptance of the responsibility for their own analyses and conclusions.
- Independent documentation of the findings of the analysis and the understanding of documentation methodology.

8. The characteristics of the bachelor program

8.1. Professional characteristics

8.1.1. Branches of science leading to the professional qualification, fields of expertise comprising the study program:

- Business studies: 58–70 credits
  - Business studies (business economics, activity management, accounting analysis, finance, marketing management, human resource management, process management, project management, electronic business management, specialised business areas),
  - decision theory (problem solving, decision techniques, decision making).
- Mathematics, statistics: 56–62 credits
  - mathematics, statistics (calculus, linear algebra, probability theory, descriptive statistics, inferential statistics, time series analysis, optimisation, data visualisation),
  - statistics for the analysis of unstructured data,
  - application, evaluation and interpretation of machine learning algorithms (tree-based algorithms, neural networks, cluster analysis, dimensionality reduction),
  - network science.
- IT studies 45-60 credits

- programming (programming languages, software technology, software development),
- databases (data modelling, database design, SQL programming),
- knowledge of operational systems,
- machine learning technologies (self-service analytics, big data architectures).

– Inter- and transdisciplinary knowledge in business methodology and informatics: 15-35 credits
- business studies (7-15 credits);
- mathematics, statistical methodology (4-12 credits)
- IT studies (4-8 credits).

8.2. Requirements for the practice

The internship is a minimum of 480 hours (twelve weeks) of continuous practice after completing seven active semesters or 200 credits.

9. Thesis

The aim of writing a thesis is to demonstrate the student's knowledge and expertise on a topic of his/her choice, in the collection, systematisation, analysis and processing of scientific data related to the chosen topic, in the discussion of the phenomenon or problem chosen as a topic, in creating hypotheses, in problem-solving, in the analysis of alternative hypotheses, in arguing and disproving counter-arguments, and in expressing one's ideas, views, positions and messages in a coherent, consistent and linguistically sound written form.

10. The type of the thesis

Project thesis,
Research thesis,
Artistic thesis.

11. Requirements for the issue of the final certificate

The University shall issue a final certificate to a student who has
– met the academic and examination requirements determined in the curriculum and
– completed the required practice period and
– obtained the required number of credits.

12. Conditions for admission to the final exam

Joint conditions for admission to the final exam:
a) the student has obtained the final certificate,
b) the student has submitted the thesis by the deadline,
c) the thesis has been assessed and awarded a mark other than insufficient by the deadline,
d) the student has applied for the final exam by the deadline,
e) the student owes no overdue debt owed to the University in the given programme,
f) the student has accounted for the assets of the University (e.g. books, sports equipment, etc. borrowed).

A student who has not fulfilled any of the conditions in paragraphs a) - f) may not be admitted to the final exam.

13. The parts of the final exam

The final exam consists of a defence of the thesis. In the final examination, the student defends the thesis in an oral examination before a final examination board

14. Determining the result of the final exam

The arithmetic mean of the following two digits, rounded to two decimal places:
a) the grade given to the dissertation by the reviewer (s) - determined with a five-point qualification - in case of several reviewers the average of the marks of the reviews is rounded to two decimal places, and

b) the grade obtained for the defense of the dissertation, for the answers to the questions related to the dissertation - established with a five-level qualification.

16. Components of the diploma grade, method of calculation

The grade of the diploma is the arithmetic mean of the following two grades, rounded to two decimal places:

a) the credit-weighted average of the marks of the compulsory and compulsory elective subjects (if the student has taken more than the compulsory elective subjects, then all the subjects taken) in the amount of credits prescribed in the curriculum, and
b) a final examination result (grade).

17. Conditions for issuing a diploma

The issuing of a diploma attesting to the completion of higher education studies is subject to the successful completion of the final exam.

CORVINUS UNIVERSITY of BUDAPEST

BNÜZAD22ABP - Data Science in Business bachelor programme in Budapest, in English, full time training Curriculum for 2023/2024. (1.) fall semester for beginning students

Subject code	Subject name	Type	Number of hours per week		credit	evaluation	fall or spring semester	2023/24 Academic year		2024/25 Academic year		2025/26 Academic year		2026/27 Academic year		Credit	course leader	Institute	Pre-requisites		Equivalents		PSO
								1	2	3	4	5	6	7	8				Code	Name	Code	Name	
			lecture	seminar				Fall semester	Spring semester	Fall semester	Spring semester	Fall semester	Spring semester	Fall semester	Spring semester								
Core courses								**30**	**30**	**30**	**30**	**30**	**18**	**12**	**0**	**180**							
293NBUSK276B	Business Economics	C	2	2	6	ex	fall	6									Attila Kajos	Institute of Entrepreneurship and Innovation					
ADIN001NABB	Mathematics I.	C	4	4	12	ex	fall	12									Miklós Pálfia	Institute of Data Analytics and Information Systems					no
ADIN002NABB	Introduction to Data Science and Programming	C	1	3	6	pg	fall	6									Géza Molnár	Institute of Data Analytics and Information Systems					no
ADIN003NABB	Advanced Programming	C	1	3	6	pg	spring		6								Johannes Wachs	Institute of Data Analytics and Information Systems	ADIN002NABB	Introduction to Data Science and Programming			no
ADIN004NABB	Database Systems	C	0	4	6	pg	fall	6									Melinda Magyar	Institute of Data Analytics and Information Systems					no
ADIN005NABB	Advanced Database Systems	C	1	3	6	pg	fall			6							Melinda Magyar	Institute of Data Analytics and Information Systems	ADIN004NABB	Database Systems			no
ADIN006NABB	Project Management in Data Science	C	2	2	6	pg	spring		6								Gábor György Klimkó	Institute of Data Analytics and Information Systems	293NBUSK276B	Business Economics			no
SZAM010NABB	Foundations of Accounting	C	2	2	6	ex	spring		6								László Péter Lakatos	Institute of Accounting and Law	-	-			no
SZAM011NABB	Managerial Accounting	C	1	3	6	ex	fall			6							László Péter Lakatos	Institute of Accounting and Law	SZAM010NABB	Foundations of Accounting			no
ADIN007NABB	Mathematics II.	C	4	4	12	ex	spring		12								Attila Tasnádi	Institute of Data Analytics and Information Systems	ADIN001NABB	Mathematics I.			no

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			lecture	seminar				1 Fall semester	2 Spring semester	3 Fall semester	4 Spring semester	5 Fall semester	6 Spring semester	7 Fall semester	8 Spring semester				Code	Name	Code	Name	
OPDO002NABB	Management of Processes and Operations	C	1	3	6	pg	fall			6							Zsolt Matyusz	Institute of Operations and Decision Sciences	293NBUSK276B	Business Economics			yes
ADIN008NABB	Fundamentals of Statistics and Data Visualization	C	0	4	6	pg	fall			6							László Kovács	Institute of Data Analytics and Information Systems	ADIN007NABB ADIN004NABB	Mathematics II. Database systems			yes
ADIN009NABB	Enterprise Data Analysis	C	0	4	6	pg	fall			6							Ildikó Borbásné Szabó	Institute of Data Analytics and Information Systems	SZAM010NABB	Foundations of Accounting			no
MARK005NABB	Marketing	C	2	2	6	pg	spring				6						József Hubert	Institute of Marketing and Communication Sciences	293NBUSK276B	Business Economics			yes
ADIN010NABB	Statistical Modelling	C	2	6	12	pg	spring				12						László Kovács	Institute of Data Analytics and Information Systems	ADIN008NABB ADIN003NABB	Fundamentals of Statistics and Data Visualization Advanced Programming			no
ADIN011NABB	Software Engineering	C	1	3	6	pg	spring				6						László Mohácsi	Institute of Data Analytics and Information Systems	ADIN005NABB	Advanced Database Systems			yes
ADIN012NABB	Large-Scale Data Architectures	C	2	2	6	ex	fall					6					Ildikó Borbásné Szabó	Institute of Data Analytics and Information Systems	ADIN005NABB	Advanced Database Systems			yes
ADIN013NABB	Self-Service Data Mining	C	0	2	3	pg	spring				3						Réka Franciska Vas	Institute of Data Analytics and Information Systems	ADIN006NABB	Project Management in Data Science			no

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			lecture	seminar				1 Fall semester	2 Spring semester	3 Fall semester	4 Spring semester	5 Fall semester	6 Spring semester	7 Fall semester	8 Spring semester				Code	Name	Code	Name	
ADIN014NABB	Data Warehousing and Business Analytics	C	1	3	6	pg	fall					6					Tibor Kovács	Institute of Data Analytics and Information Systems	ADIN009NABB	Enterprise Data Analysis			yes
ADIN015NABB	Data Wrangling – Project Course	C	0	2	3	pg	spring				3						Ildikó Borbásné Szabó	Institute of Data Analytics and Information Systems	ADIN005NABB ADIN008NABB	Advanced Database SystemsFundamentals of Statistics and Data Visualization			yes
ADIN016NABB	Data-Driven Business Decisions – Project Course	C	0	1	6	pg	fall							6			Réka Franciska Vas	Institute of Data Analytics and Information Systems	OPDO003NABB ADIN014NABB ADIN012NABB	Machine Learning in Practice II. Data Warehousing and Business Analytics Large-Scale Data Architectures			yes
PENZ002NABB	Corporate Finance	C	2	2	6	ex	fall					6					Nóra Ágota Felföldi-Szűcs	Institute of Finance	ADIN008NABB SZAM010NABB	Fundamentals of Statistics and Data Visualization Foundations of Accounting			yes
PENZ003NABB	Financial Market Data Analysis – Project Course	C	2	2	6	pg	spring						6				Samet Günay	Institute of Finance	ADIN010NABB PENZ002NABB	Statistical Modelling Corporate Finance			no
ADIN017NABB	Statistical Methods for Time Series	C	0	4	6	pg	fall					6					Tibor Keresztély	Institute of Data Analytics and	ADIN010NABB	Statistical Modelling			no

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			lecture	seminar				1 Fall semester	2 Spring semester	3 Fall semester	4 Spring semester	5 Fall semester	6 Spring semester	7 Fall semester	8 Spring semester				Code	Name	Code	Name	
																		Information Systems					
ADIN018NABB	Machine Learning in Practice I.	C	2	2	6	ex	fall					6					Szabina Eszter Fodor	Institute of Data Analytics and Information Systems	ADIN010NABB	Statistical Modelling			no
OPDO003NABB	Machine Learning in Practice II.	C	2	2	6	ex	spring						6				Ádám Balázs Csapó	Institute of Data Analytics and Information Systems	ADIN018NABB ADIN017NABB	Machine Learning in Practice I. Statistical Methods for Time Series			yes
ADIN019NABB	Text Mining and Analysis	C	2	2	6	pg	spring						6				Andrea Kő	Institute of Data Analytics and Information Systems					yes
OPDO004NABB	Network Analysis	C	2	2	6	ex	fall							6			Balázs Róbert Sziklai	Institute of Operations and Decision Sciences	ADIN008NABB ADIN003NABB	Fundamentals of Statistics and Data Visualization Advanced Programming			no
Compulsory elective subjects								**0**	**0**	**0**	**0**	**0**	**9**	**9**	**0**	**18**							
Business Administration (minimum of 15 credits)								**0**	**0**	**0**	**0**	**0**	**6**	**9**	**0**	**15**							
FENT017NABB	Methods for Economic Geographical Analyses	CE	0	2	3	pg	spring						3				Ágnes Jeneyné Varga	Institute of Sustainable Development					no
ADIN021NABB	Data Science in Supply Chain Management	CE	0	2	3	pg	spring						3				Tibor Kovács	Institute of Data Analytics and Information Systems	ADIN017NABB	Statistical Methods for Time Series			yes

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			lecture	seminar				1	2	3	4	5	6	7	8				Code	Name	Code	Name	
								Fall semester	Spring semester	Fall semester	Spring semester	Fall semester	Spring semester	Fall semester	Spring semester								
OPDO005NABB	Decision Techniques	CE	1	1	3	pg	spring						3				Richárd Szántó	Institute of Operations and Decision Sciences	293NBUSK276B	Business Economics			no
ADIN022NABB	Cases on Business IT management	CE	0	4	6	pg	fall							6			Péter Fehér	Institute of Data Analytics and Information Systems	293NBUSK276B	Business Economics			no
VALL002NABB	Analysis of Sports Economy Data	CE	1	1	3	pg	fall							3			Attila Kajos	Institute of Entrepreneurship and Innovation					yes
OPDO006NABB	Data Science in Health Economics	CE	1	1	3	pg	fall							3			László Mohácsi	Institute of Data Analytics and Information Systems	ADIN010NABB	Statistical Modelling			no
Mathematics and Statistics (minimum of 3 credits)								**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**3**							
ADIN023NABB	Statistical Methods for Panel Data	CE	0	2	3	pg	spring						3				Tibor Keresztély	Institute of Data Analytics and Information Systems	ADIN017NABB	Statistical Methods for Time Series			yes
OPDO007NABB	Operational Research	CE	0	2	3	pg	fall							3			Kolos Csaba Ágoston	Institute of Operations and Decision Sciences					no
Thesis								**0**	**0**	**0**	**0**	**0**	**0**	**3**	**7**	**10**							
ADIN024NABB	Thesis work I.	C			3	pg	fall							3			Ildikó Borbásné Szabó	Institute of Data Analytics and					yes

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			lecture	seminar				1 Fall semester	2 Spring semester	3 Fall semester	4 Spring semester	5 Fall semester	6 Spring semester	7 Fall semester	8 Spring semester				Code	Name	Code	Name	
																		Information Systems					
ADIN025NABB	Thesis work II.	C			7	pg	spring								7		Ildikó Borbásné Szabó	Institute of Data Analytics and Information Systems	ADIN024NABB	Thesis work I.			yes
Elective courses								**0**	**0**	**0**	**0**	**0**	**6**	**6**	**0**	**12**							
	Foreign language	E			3		fall, spring	3	3									Centre of Foreign Language Education and Research					yes
	the full list of elective courses for bachelor students (in English) are available in Neptun	E					fall, spring						6	6									
Criterion courses								**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**							
	Sports/Physical Education	CR	0	2	0	a		0	0														
IOK0001NABB	Hungarian Language SHI I.*	E/C	0	4	3	pg	fall	3									Judit Magyar	Centre of Foreign Language Education and Research					no
IOK0004NABB	Hungarian Language SHI II.*	E/C	0	4	3	ex	spring		3								Judit Magyar	Centre of Foreign Language Education and Research					no
Internship								**0**	**0**	**0**	**0**	**0**	**0**	**0**	**20**	**20**							
ADIN026NABB	Internship	C			20	pg									**20**		Ildikó Borbásné Szabó	Institute of Data Analytics and Information Systems					
Credits overall								**30**	**30**	**30**	**30**	**30**	**33**	**30**	**27**	**240**							

Remarks
Type: C-compulsory courses, CE-core elective courses, E-elective (optional) courses CR-Criterion courses
Methods of assessment: ex-exam (exam at the end of the semester, but other forms of assessment are possible during the semester), pg- grade based on the practical assignments given during the course of the semester, a=signature, ce- Comprehensive examination
A subject that can be completed in a preferential study order (PSO) on the basis of Section 92 of the Study and Examination Regulation (TVSZ).

Physical education
Physical education is a criterion subject, the condition for obtaining a diploma is the completion of two semesters. The two semesters of physical education can be completed at any time during the program. Students who have fulfilled the criterion can only take the subject in the form of reimbursement for a fee.

Foreign language
During their studies, students can study a foreign language free of charge for two semesters, including a specific language, within the framework of the elective subjects.
Students who have completed two semesters of language subjects may take additional language subjects only upon payment of a specified fee.

Curriculum
It is recommended to include the subjects in the schedule according to the sample curriculum. The student may deviate from this, taking into account:
1. the pre-study order,
2. semester of announcing subjects
3. completion of an average of 30 credits per semester
4. in addition to the compulsory subjects, students may take elective subjects from the offer of elective subjects (see Neptun) as well as foreign languages.
5. a minimum of 2/3 of the required amount of credit must be completed at Corvinus University.

*: Hungarian Language is a compulsory subject for the students participating in the Stipendium Hungaricum scholarship program in the first two semesters.

The detailed rules related to the admission of the subjects and the completion of the subjects are included in the Study and Examination Regulations!

Please note that curriculum changes are possible!