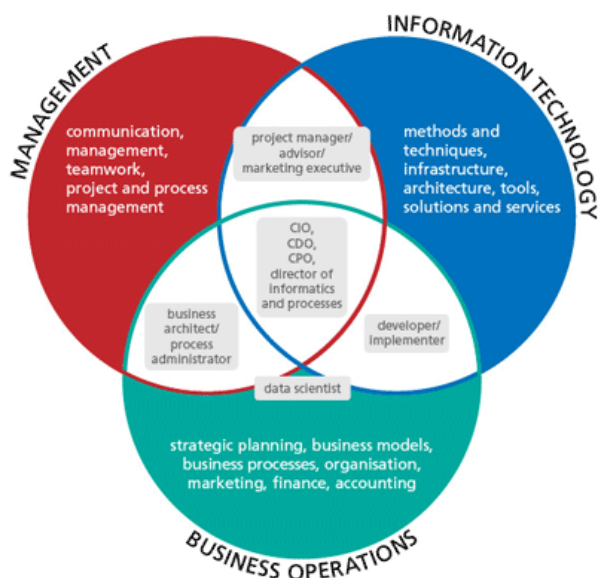


Business Informatics

Duration of study	2 years (4 semesters)
Scope of ECTS	120 ECTS
Study status	full-time & part-time
Degree	magister poslovnih ved (mag. posl. ved) – second cycle graduate in Business Informatics

Knowledge and skills acquired by taking this programme



Organisations/institutions/companies with employment prospects

Programme

Professions

Curriculum

1st year

Semester	Course	Type	ECTS
1. (winter)	Organization and management	9	7
1. (winter)	Research Methods and Techniques	9	7
1. (winter)	Business Process Management	10	7
1. (winter)	Accounting Information for Decision-Making	10	7
2. (spring)	Strategic Management 2	9	7
2. (spring)	Digital Business	10	7
2. (spring)	Business Intelligence and Analytics	10	7
2. (spring)	ELECTIVE COURSE	13	7
2. (spring)	Business Skills Development 1	/	4

2nd year

Semester	Course	Type	ECTS
3. (winter)	Information Systems Management	10	7
3. (winter)	* Big Data Management and Technologies	11	7
	* Information Systems Analysis and Design	11	7

3. (winter)	** Developing Software Solutions	11	7
	** IT Project Management	11	7
3. (winter)	MASTER'S THESIS PROPOSAL	/	7
4. (spring)	ELECTIVE COURSE	13	7
4. (spring)	Business Skills Development 2	/	4
4. (spring)	MASTER'S THESIS	/	21

* Student selects one of the two offered courses type 11.

II.3. Fields of study: learning outcomes, courses, plan of studies

II.3.1. Field of study - ADVANCED ANALYTICS – BIG DATA

II.3.1.1. Learning outcomes

FIELD OF STUDY: ADVANCED ANALYTICS – BIG DATA	
<p>The second-cycle studies in <i>Advanced Analytics – Big Data</i> at the SGH Warsaw School of Economics provide advanced knowledge and competencies in the area of data acquisition from variety of sources and their analysis. A student graduating from the program is able to be employed as a specialist in advanced data analysis in manufacturing companies, banks, insurance and telecommunications companies, public administration and research centers specializing in advanced data analytics. The studies also prepare students to conduct research and to take up doctoral education.</p>	
Knowledge	<p>A graduate of the second-cycle studies in the field of <i>Advanced Analytics – Big Data</i> at the SGH Warsaw School of Economics has advanced knowledge:</p> <ul style="list-style-type: none">• in the area of computer science regarding acquiring, clearing, storing and processing of structured and unstructured data• regarding knowledge discovery based on complex data structures and representing knowledge in computer systems• regarding mathematical, statistical and computer methods and techniques of data analysis required in social and economic problem-solving• about methods and tools required to build forecasting and simulating models with relation to social and economic processes where the models are applied• regarding formulating and interpreting results of data analysis.
Skills	<p>A graduate of the second-cycle studies in the field of <i>Advanced Analytics – Big Data</i> at the SGH Warsaw School of Economics can:</p> <ul style="list-style-type: none">• acquire data from a variety of sources including databases, text files, multimedia files, social networks, sensor data, geolocation data• create queries to both SQL and non-SQL databases• prepare data for analysis• build models for data analysis using a variety of mathematical, statistical and computer science tools and formulate hypotheses and opinions using the models• design representation research and conduct statistical analysis used in studying economic processes and phenomena• analyze multidimensional data, apply the methods of multidimensional analysis in business and economic problem-solving, surveys and social analysis• analyze spatial data• adjust visualizations to clients' requirements• implement computer systems based on knowledge processing• implement results of data analysis in business solutions• implement results of data analysis in business solutions• use fluently at least one foreign language, can present research results in writing and speaking in a foreign language and in Polish.

Social competencies

A graduate of the second-cycle studies in the field of *Advanced Analytics – Big Data* at the SGH Warsaw School of Economics demonstrates:

- can understand and use the quantitative approach to describe economic processes, social interactions and business issues
- is aware of the performed professional and social role, specifically in areas where mathematics, statistics, econometrics and computer tools are used
- sets benchmarks for professional ethics
- understands own and collective responsibility for important social and political events.

II.3.1.2. Compulsory courses

FIELD OF STUDY: ADVANCED ANALYTICS – BIG DATA			
Course code	Compulsory courses	No of hours	ECTS credits
		FT ¹ , FTA ²	
Basic courses			
210111	Business Law	30	4,5
210101	History of Economic Thought	30	4,5
Total		60	9
Major courses			
226161	Advanced Business Analytics – Power of Predictive Modeling	30	4,5
222801	Advanced Optimization Methods	60	6
223111	Basic and Advanced Programming in SAS with Statistics	30	3
220521	Basic R Programming	14	1,5
223091	Big Data	30	3
224391	Cloud Computing	30	3
220551	Cybersecurity	30	4,5
223121	Data Mining	30	3
223061	Databases Build and Exploitation	30	3
223481	Logistic Regression with SAS	30	3
220541	Python Programming	30	3
223101	Querrying, Data Presentation, Data Visualisation and Reporting	30	3
222891	Real-Time Analytics	30	3
223491	Statistical Learning Methods	45	6
Total		449	49,5

¹ FT – full time studies.

² FTA – full-time studies afternoon mode.

The list of major courses related to **ADVANCED ANALYTICS – BIG DATA** –Major elective courses (minimum 15 ECTS to be taken)¹

Course code	Course title	ECTS credits
233531	Advanced R Programming	3
234061	Advanced Simulation Modelling	3
222001	Algebra and Mathematical Analysis	6
239201	Applied Cryptography	3
222051	Applied Econometrics	3,5
231791	Approximation Approaches - from Fourier Analysis to Deep Learning	4,5
220621	Artificial Intelligence	3
230201	Bayesian Econometrics	3
233071	Business Intelligence	3
238311	Credit Scoring and SAS Macro-programming	3
236481	Database application building. PL/SQL language	3
231451	Database Systems II	3
231221	Development of Business Applications	3
222991	Econometrics of Panel Data	3,5
223471	Event History Analysis with SAS	3
233181	Financial Econometrics II	6
222091	Managerial Economics	4,5
234971	Mathematical Logic	3
220581	Mathematical Statistics I	3
220341	Microeconometrics	3
235411	Modern Econometric Theory	3
230241	Nonlinear Econometric Models	3
236811	Numerical Methods	3
222581	Probability Theory and Stochastic Processes	6
26...	Selected Challenges of the Contemporary World II (economy, politics, culture, society, sustainable development) – Lectures of Visiting Professor	3
230891	Spatial Econometrics	3
222061	Time Series Econometrics	6

¹ Not all the courses have to be open during a particular academic year.

II.3.1.3. Plan of studies

FIELD OF STUDY: ADVANCED ANALYTICS – BIG DATA				
Semester of studies ³	Course code	Course title	No of hours	ECTS credits
			FT ¹ , FTA ²	
	223111	Basic and Advanced Programming in SAS with Statistics	30	3
	220521	Basic R Programming	14	1,5
	223091	Big Data	30	3
	224391	Cloud Computing	30	3
	210111	Business Law	30	4,5
	223061	Databases Build and Exploitation	30	3
	223121	Data Mining	30	3
	210101	History of Economic Thought	30	4,5
	220541	Python Programming	30	3
	223101	Querying, Data Presentation, Data Visualisation and Reporting	30	3
	24996	Training on Fundamentals of Intellectual Property Protection (e-learning) ⁴	4	-
	24999	Training on Occupational Health and Safety – BHP (e-learning) ⁴	5	-
	24998	Library Training (e-learning) ⁴	2	-
Total			31,5	
2 nd	222801	Advanced Optimization Methods	60	6
	223481	Logistic Regression with SAS	30	3
	223491	Statistical Learning Methods	45	6
	.	<i>Elective courses</i>	.	13,5
	Total			28,5
3 nd	226161	Advanced Business Analytics – Power of Predictive Modeling	30	4,5
	220551	Cybersecurity	30	4,5
	.	<i>Elective courses</i>	.	13
	29...	Master’s Seminar	30	8
	Total			30
4 th	222891	Real-time analytics	30	3
	.	<i>Elective courses</i>	.	15
	29...	Master’s Seminar	30	12
	Total			30
Total I-IV				120

¹ FT – full time studies.

² FTA – full-time studies afternoon mode.

³ Student may pursue one semester of his/her studies at another Polish or foreign university.

⁴ Obligatory for students who have not graduated the first-degree studies at SGH Warsaw School of Economics.



hereby certifies that

The SGH Warsaw School of Economics

has, after assessment of the appropriateness and quality of its mission, strategy and activities, been awarded

IQA

CEEMAN International Quality Re-Accreditation until 1 February 2024

5 February 2018

Professor Danica Purg
CEEMAN President

Overview

Become tomorrow's technological expert by enrolling in our Master Program which combines the fields of Data Analytics and Decision Science. Learn how to develop state-of-the-art predictive models and how to make decisions that optimize business objectives.

Our world and businesses in particular face disruptive change due to exponential growth of both the amount of data which can be captured from a wide range of data-sources and the computational capabilities to process the data. Future experts and managers will need to understand how to leverage Operations Research and Analytics to create value from data – this is what you will learn in our M.Sc. Data Analytics and Decision Science (DDS).

The master program is designed at the intersection of the fields of Data Analytics and Decision Science (Operations Research) and graduates will learn how to combine machine learning and deep learning techniques with mathematical optimization approaches, heuristic algorithms and simulation techniques to create value in specific application areas – a distinct set of skills needed to succeed in a digitized and globalized economy.

Program type	Master
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Language	English
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Duration	4 semesters full-time, including 1 semester Master thesis
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Start	01.10.2022
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Qualification	at least 12 months of professional work experience
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Curriculum

Future Data Analytics and Decision Science experts will need to bring together expertise from a wide range of fields, like machine learning, deep learning, and artificial intelligence or mathematical optimization, heuristic algorithms and simulation techniques

Hence, the M.Sc. DDS offers a comprehensive program of core courses in the mentioned fields. These courses are accompanied by a wide range of elective courses offering deep-dives into specific application areas. Our courses combine demanding and cutting-edge research with practical projects and challenges. We continuously review and expand the set of electives to cover the latest trends and stay abreast of technological change.

The two-year full-time program consists of seven key building blocks, some of which can be customized to meet your individual needs and interests. You acquire 120 ECTS points. You may also enroll in a German language course at no extra cost.

Semester 1 Refresh your knowledge

- DDS Essentials (Compulsory, 10 CP)
 - ✓ Statistics and Mathematics
 - ✓ Algorithms and Data Structures
- Data Analytics (Compulsory, 10 CP)
 - ✓ Machine Learning
 - ✓ Predictive Modeling
- Decision Science (Compulsory, 10 CP)
 - ✓ Optimization Models
 - ✓ Design and Analysis of Algorithms

Semester 2 Sharpen your profile

- Decision Science (Compulsory, 5 CP)
 - ✓ Heuristic Optimization
- Analytics Project (Compulsory, 10 CP)
 - ✓ Analytics Project
- Management Electives (2 out of 4, 10 CP)
 - ✓ Management and Technology Perspectives
 - ✓ Strategic Negotiations
 - ✓ Start-up and Growth Management
 - ✓ Service and Technology Marketing
- Data Analytics & Technology Electives (1 out of 3, 5 CP)
 - ✓ Advanced Machine Learning
 - ✓ Principles of Data Mining
 - ✓ Intelligent Monitoring of Engineering Systems

Semester 3 Apply your skills










- Application Areas (Compulsory, 15 CP)
 - ✓ Digital Operations and Supply Chain Management
 - ✓ Optimization of Logistics Systems
 - ✓ Economic Modeling of Energy and Climate Systems
- Internship (15 CP)

Semester 4 Final Dissertation

Master Thesis 30 CP



The “DDS Essentials” consist of two courses that cover and refresh relevant essentials in mathematics, statistics, algorithms and data structures. These modules lay the foundation to participate successfully in the core courses in Data Analytics and Decision Science, as well as in some of the application areas and specializations.

Data Analytics	
Decision Science	
Analytics Project	
Management Electives	
Data Analytics & Technology Electives	
Internship	
Application Areas	
Master Thesis	
German Language Course	

Rankings & Accreditation

Top positions in international rankings.

In 2022, the **Times Higher Education (THE) World University Ranking** ranked RWTH Aachen University among the top 30 of the world's best universities for engineering sciences and technology, while the **QS World University Ranking** ranked RWTH Aachen University in Germany 2nd for "Engineering & Technology" and 6th in the category "Business & Management Studies". RWTH Aachen ranks 7th across all subjects, with a very high score in terms of employer reputation.

According to the QS World University Ranking, RWTH Aachen ranks among the top 13% of universities worldwide. In the category "Statistics & Operational Research", the Faculty of Economic Sciences was placed in the 51-100 ranking group. Concerning the number of students from abroad, RWTH is distinctly above both national and international averages – 23.9 percent of the University's student body are international students. By comparison, the international average is 10.8 percent.

In the **Academic Ranking Of World Universities by ShanghaiRanking** 2021, RWTH Aachen also ranked among the top 10 for Germany, especially in the engineering and social sciences, for example 5th for management and 8th in business administration. In the **WirtschaftsWoche** ranking of the most research-intensive universities in German-speaking countries in business administration, the faculty ranked 13th out of around 200 universities. In Germany, this is the 9th place. 2022 RWTH also achieves 1st place for electric and industrial engineering in the **Wirtschaftswoche university ranking**. 28.5 percent of the HR managers surveyed for the ranking said they would prefer to recruit their graduates at RWTH Aachen University.

Among the most important strengths of the faculty, which the **Center for Higher Education Development (CHE)** has highlighted in a current ranking, are state-of-the-art digital and blended learning approaches, a strong international orientation of all programs, close connections to industry, and excellent research, measured by internationally recognized publications. In total, the Faculty of Business and Economics is represented in nine top groups.

Association to Advance Collegiate Schools of Business

The school of business and economics at RWTH Aachen University is one of the few faculties in Germany to bear the international seal of approval of the renowned accreditation agency **Association to Advance Collegiate Schools of Business (AACSB)**. The first accreditation of the faculty took place in April 2011, the successful re-accreditation in 2016 and 2021.