COURSE DESCRIPTION CARD - SYLLABUS

Course name
Internship [S1DSwB1>PrZaw]

Course

Field of study
Data Science in Business

Year/Semester
3/6

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
0

Laboratory classes
0

Other
160

Tutorials
0

Projects/seminars
0

Number of credit points

5,00

Coordinators

dr inż. Anna Mazur prof. PP
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Lecturers

Prerequisites

Before starting the internship, the student should have a basic understanding of data analysis, statistics, and data exploration methods, as well as the ability to use analytical tools. It is also essential to understand business processes and basic information systems that support data management in organizations. The student should be prepared to work in a team, communicate analysis results, and independently solve problems related to data quality and integration.

Course objective

The goal of the professional internship is to provide students with experience in a real business environment by applying data analysis methods to solve real-world business problems. Students will have the opportunity to familiarize themselves with business processes, identify and analyze data sources, utilize Business Intelligence (BI) and Data Science tools for data exploration and modeling, and formulate recommendations based on the results obtained. The internship aims to develop analytical, programming, and soft skills such as business communication and teamwork.

Course-related learning outcomes

Knowledge:

Charakterizes key business processes in an organization, including its organizational structure, data sources, and market environment [DSB1_W07].
Describes the principles of starting, managing, and developing a business in the context of data analysis and business decision-making [DSB1_W10].

Skills:
Selects appropriate data sources and information necessary for analyzing business processes in an organization [DSB1_U01].
Formulates specifications for analytical and engineering problems based on real business data [DSB1_U05].
Plans and organizes individual and team work in analyzing and optimizing business processes [DSB1_U13].
Effectively collaborates in interdisciplinary teams, analyzing and implementing data-driven solutions [DSB1_U14].

Social competences:
Utilizes scientific and expert knowledge to solve practical business problems [DSB1_K02].
Engages in initiatives aimed at improving business processes and data management within organizations [DSB1_K03].
Takes responsibility for roles within the organization, making decisions based on reliable data analysis [DSB1_K05].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

According to the regulations for student internships at Poznań University of Technology, the verification of learning outcomes includes:
1. Completion of the internship in full-time duration - The student must complete the internship according to the study program and the scope established for the Data Science in Business program.
2. Internship report - The student is required to prepare and submit a detailed report on the progress of the internship (Annex No. 8).
3. Certificate of internship completion - The internship supervisor from the company confirms the completion of the internship program, which is documented in the Certificate of Internship Completion (Annex No. 3).
4. Internship supervisor's evaluation - The supervisor at the internship site evaluates the student's engagement, quality of tasks performed, and achievement of learning outcomes according to the internship program.
5. Possible consultations and interim reports - During the internship, the student may be required to submit interim reports and discuss progress with the academic supervisor.
6. Presentation and defense of internship results (optional) - In justified cases, the student may be asked to give a brief presentation of the key conclusions from the internship to the academic supervisor.

Programme content

The curriculum covers the practical aspects of Data Science in business within enterprises according to the internship program for the Data Science in Business degree.

Course topics

1. PRESENTATION OF THE ENTERPRISE
• Legal form of the company.
• Company size (number of employees, classification as small, medium, large).
• Business subject and scope.
• Main business processes carried out by the company.
• Characteristics of customers and the market in which the company operates.
2. IDENTIFICATION AND ANALYSIS OF DATA SOURCES IN THE ENTERPRISE
• Identification of key data collected in the company (e.g., sales, operational, logistical, financial, marketing data).
• Data sources: ERP systems, CRM, Excel files, SQL/NoSQL databases, external APIs.
• Structure of available data sets (type, quality, completeness, update frequency).

• Identification of data quality issues (missing values, duplicates, errors, data formats).
• Assessment of the integration potential of various data sources.
3. FORMULATION OF DATA SCIENCE PROBLEMS IN THE CONTEXT OF THE COMPANY'S ACTIVITY
• Identifying key areas where data analysis can bring business benefits. Example problems to solve:
o Sales forecasting.
o Inventory turnover analysis and warehouse management optimization.
o Customer segmentation and offer personalization.
o Anomaly detection and potential fraud.
o Production performance analysis and bottleneck detection.
o Customer sentiment analysis based on reviews.
o Evaluation of marketing campaign effectiveness.
4. DATA PREPARATION AND ANALYSIS
• Selection of the appropriate data set for analysis.
• Data preprocessing:
o Data cleaning and transformation.
o Removal of outliers and missing values.
o Standardization of data formats.
• Exploratory data analysis (EDA):
o Descriptive statistics and value distributions.
o Data visualization (e.g., plots, heatmaps, histograms).
o Identifying correlations between variables.
5. USE OF BI & DATA SCIENCE TOOLS FOR DATA ANALYSIS
• Use of tools for data analysis and visualization (e.g., Excel, Power BI, Tableau, Python, R).
• Building dashboards for visualizing key KPI indicators.
• Predictive analysis (e.g., simple regression models, trend analysis).
• Classification and data segmentation (e.g., customer clustering).
• Use of basic machine learning methods (if data and resources allow).
6. INTERPRETATION OF RESULTS AND FORMULATION OF RECOMMENDATIONS
• Presenting analysis results in the form of reports and visualizations.
• Conclusions and recommendations for improving business processes.
• Proposals for actions based on data analysis (e.g., inventory optimization, changes in marketing strategy, improvements in operational processes).
• Identifying limitations and challenges related to data analysis in the company.
7. Other content agreed upon with the thesis supervisor relevant to the topic of the engineering project.

Teaching methods

Practical workshops, case studies, project-based method, group work, moderated discussions, and brainstorming, interactive lectures, individual consultations.

Bibliography

Basic:
• Internship regulations for students of degree programs implemented at WIZ PP, edition 11
• Procedures, instructions, and process descriptions of the enterprise.
• Company regulations and other standards.

Additional:
Enterprise documentation provided during the internship.

Breakdown of average student's workload

	Hours	ECTS
Total workload	160	5,00
Classes requiring direct contact with the teacher	160	5,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	0	0,00