Startup Business Analytics

Specialty 121 – Software Engineering 122 – Computer Science	**Institute** Institute of Computer Science and Information Technology
Educational program Software Engineering Computer Science and Intelligent Systems	**Department** Software Engineering and Management Intelligent Technologies (321)
Level of education Bachelor's level	**Course type** Special (professional), Elective
Semester 7	**Language of instruction** English, Ukrainian

Lecturers and course developers

Andrii Kopp

andrii.kopp@khpi.edu.ua
Doctor of Philosophy (Ph.D.), Associate Professor, Associate Professor of Software Engineering and Management Intelligent Technologies Department

Google Scholar: https://scholar.google.com/citations?user=B8fggLEAAAAJ
ORCID: https://orcid.org/0000-0002-3189-5623
Scopus: https://www2.scopus.com/authid/detail.uri?authorId=57202887287
Web of Science: https://www.webofscience.com/wos/author/record/T-4283-2018).
More about the lecturer on the department's website

General information

Summary

Students will gain the knowledge and skills to use data analytics in startup projects. By studying the data lifecycle, the roles of data analysts, and tools (R, SQL, Python, Julia, Octave), students will learn important aspects of data visualization, statistical methods, machine learning basics, and big data analysis issues. As a result, students will be able to make informed decisions based on data and contribute to the success of a startup project.

Course objectives and goals

Providing students with knowledge and skills in data analytics so that they can effectively use data to make informed decisions, increase competitiveness, and achieve success in startup projects.

Format of classes

Lectures, laboratory classes, consultations, self-study. Final control in the form of a credit.

Competencies

121 - Software Engineering
K01. Ability to think abstractly, analyze and synthesize.
K02. Ability to apply knowledge in practical situations.

K05. Ability to learn and master modern knowledge.

K06. Ability to search, process and analyze information from various sources.

K07. Ability to work in a team.

K19. Knowledge of data information models, ability to create software for storing, extracting and processing data.

122 - Computer Science and Intelligent Systems

GC1. Ability to think abstractly, analyze and synthesize.

GC2. Ability to apply knowledge in practical situations.

GC3. Knowledge and understanding of the subject area and understanding of professional activities.

GC6. Ability to learn and master modern knowledge.

GC7. Ability to search, process and analyze information from various sources.

GC8. Ability to generate new ideas (creativity).

GC9. Ability to work in a team.

SC2. Ability to identify statistical regularities of non-deterministic phenomena, apply methods of computational intelligence, in particular statistical, neural network and fuzzy data processing, machine learning and genetic programming methods, etc.

SC11. Ability to intelligently analyze data based on computational intelligence methods, including large and poorly structured data, their operational processing and visualization of analysis results in the process of solving applied problems.

Learning outcomes

121 - Software Engineering

PO18. To know and be able to apply information technologies for data processing, storage and transmission.

122 - Computer Science and Intelligent Systems

PO4. To use methods of computational intelligence, machine learning, neural network and fuzzy data processing, genetic and evolutionary programming to solve problems of recognition, prediction, classification, identification of control objects, etc.

PLO 12. To apply methods and algorithms of computational intelligence and data mining in the tasks of classification, forecasting, cluster analysis, search for associative rules using software tools to support multidimensional data analysis based on DataMining, TextMining, WebMining technologies.

Student workload

The total volume of the course is 120 hours (4 ECTS credits): lectures - 16 hours, laboratory classes - 16 hours, self-study - 88 hours.

Course prerequisites

Internet marketing

Features of the course, teaching and learning methods, and technologies

Teaching and learning methods:

interactive lectures with presentations, discussions, laboratory classes, teamwork, case method, student feedback, problem-based learning.

Forms of assessment:

written individual assignments for laboratory work (CAS), assessment of knowledge in laboratory classes (CAS), express surveys (CAS), online tests (CAS), final/semester control in the form of a semester exam, according to the schedule of the educational process (FAS).

Program of the course

Topics of the lectures

Topic 1: Introduction to startup business analytics

Data lifecycle and data analytics methodology.

Topic 2. Business intelligence results and stakeholders

National Technical University "Kharkiv Polytechnic Institute"

Roles of data analyst and data scientist.
Topic 3: Data tools for business intelligence
Using R, SQL, Python, Julia, and Octave to analyze startup project data.
Topic 4. Charts and graphs for data visualization
Statistical methods in business analytics.
Topic 5. Machine learning basics for data analysis
Decision trees and text analysis.
Topic 6. Collecting, cleaning, summarizing and using data
Problems of big data analysis.

Topics of the workshops

Workshops are not provided within the discipline.

Topics of the laboratory classes

Topic 1: Collecting and preparing data for analytical processing
Topic 2. Solving analytical problems using R and SQL languages
Topic 3. Developing an analytical dashboard using the Microsoft Power BI tool
Topic 4. Solving machine learning problems with R and Python

Self-study

Individual assignments are not provided in the curriculum.
Students are recommended with additional materials (videos, articles) for self-study and processing.

Course materials and recommended reading

Key literature

1. Jeffrey, D. Camm et al. (2020). Business Analytics. Cengage AU, 816 p.
2. Majid Nabavi et al. (2020). Introduction to Business Analytics. Second Edition. Business Expert Press, 192 p.
3. Vanessa Ratten, Ted Hayduk. (2020). Statistical Modelling and Sports Business Analytics. Routledge, 190 p.
4. Sneha Kumari et al. (2020). Application of Big Data and Business Analytics. Emerald Group Publishing, 208 p.
5. V. V. L. N. Sastry. (2020). Business Analytics and Business Intelligence Machine Learning Model to Predict Bank Loan Defaults, Idea Publishing.

Additional literature

1. Leslie Turner et al. (2020). Accounting Information Systems: Controls and Processes. John Wiley & Sons, 592 p.
2. G. Sudhamathy, C. Jothi Venkateswaran. (2019). R Programming: An Approach to Data Analytics. MJP Publisher, 383 p.
3. Upom Malik et al. (2019). SQL for Data Analytics: Perform fast and efficient data analysis with the power of SQL. Packt Publishing Ltd, 386 p.
4. Brian Larson. (2020). Data Analysis with Microsoft Power BI. McGraw Hill Professional.
5. Celina M. Olszak. (2020). Business Intelligence and Big Data: Drivers of Organizational Success. CRC Press, 194 p.
6. Orlovskyi, D., Kopp, A. A business intelligence dashboard design approach to improve data analytics and decision making. CEUR Workshop Proceedings, 2021, 2833, pp. 48-59. http://ceur-ws.org/Vol-2833/Paper_5.pdf

National Technical University
"Kharkiv Polytechnic Institute"

Assessment and grading

Criteria for assessment of student performance, and the final score structure

100% Final assessment as a result of Final test (30%) and Continuous assessment (70%).
40% Final test
60% Continuous assessment:
Test №1 (10%)
Test №2 (10%)
Laboratory works (40%)
Laboratory work №1 (10%)
Laboratory work №2 (10%)
Laboratory work №3 (10%)
Laboratory work №4 (10%)

Grading scale

Total points	National	ECTS
90–100	Excellent	A
82–89	Good	B
75–81	Good	C
64–74	Satisfactory	D
60–63	Satisfactory	E
35–59	Unsatisfactory (requires additional learning)	FX
1–34	Unsatisfactory (requires repetition of the course)	F

Norms of academic integrity and course policy

The student must adhere to the Code of Ethics of Academic Relations and Integrity of NTU "KhPI": to demonstrate discipline, good manners, kindness, honesty, and responsibility. Conflict situations should be openly discussed in academic groups with a lecturer, and if it is impossible to resolve the conflict, they should be brought to the attention of the Institute's management.
Regulatory and legal documents related to the implementation of the principles of academic integrity at NTU "KhPI" are available on the website: http://blogs.kpi.kharkov.ua/v2/nv/akademichna-dobrochesnist/

Approval

Approved by	08.06.2023	Head of the department Ihor HAMAIUN
	08.06.2023	Guarantors of the educational programs Andrii KOPP Uliya LITVINOVA