

STARTUP BUSINESS ANALYTICS

COURSE SYLLABUS

Code and name of specialty	121 Software Engineering 122 Computer Science 126 Information Systems and Technologies	Institute / faculty	Faculty of Computer Science and Software Engineering
Program name	Software Engineering Computer Science and Intelligent Systems Information Systems Software	Department	Software Engineering and Management Information Technologies
Type of program	Educational and Professional	Language of instruction	Ukrainian, English

LECTURER

Full name, e-mail

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Ph.D., Associate Professor at the Department of Software Engineering and Management Information Technologies of NTU «KhPI». Prepared and published more than 60 research papers and textbooks (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>; Publons: <https://publons.com/researcher/2967953/andrii-kopp/>).

Leading lecturer of courses: *Data Models and Structures (in Ukrainian and English), Design and Development of Databases (in Ukrainian and English).*

GENERAL DESCRIPTION OF THE COURSE

Summary	The course “Startup Business Analytics” is an optional course in the profiled discipline package 02 “Software Development and Startup” of the specialties 121 “Software Engineering”, 122 “Computer Science”, and 126 “Information Systems and Technologies”. It is taught in the fifth semester in the amount of 120 hours (4 ECTS credits), in particular: lectures – 32 hours, laboratory classes – 16 hours, independent work – 72 hours. There are no individual tasks. The study of the discipline ends with the test.
Course objectives	Formation of students’ theoretical and practical knowledge necessary for collecting data from different sources and deliver data reports useful for business organization.
Types of classes and control	Lectures, laboratory classes. Continuous assessment – laboratory works, intermediate modular assessment. Final assessment – test.
Term	5

Student workload (credits) / Type of course

4 / Optional

Lectures (hours)

32

Laboratory classes (hours)

16

Self-study (hours)

72

Program competences

121-GC 01. Ability to abstract thinking, analysis and synthesis.
121-GC 02. Ability to apply knowledge in practical situations.
121-GC 05. Ability to learn and master modern knowledge.

121-GC 06. Ability to search, process and analyze information from various sources.
 121-GC 07. Ability to work in a team.
 121-PC19. Knowledge of information data models, the ability to create software for data storage, retrieval and processing.
 122-GC1. Ability to abstract thinking, analysis and synthesis.
 122-GC2. Ability to apply knowledge in practical situations.
 122-GC3. Knowledge and understanding of the subject area and understanding of professional activity.
 122-GC6. Ability to learn and master modern knowledge.
 122-GC7. Ability to search, process and analyze information from various sources.
 122-GC8. Ability to generate new ideas (creativity).
 122-GC9. Ability to work in team.
 122-PC2. Ability to detect statistical patterns of non-deterministic phenomena, the use of computational intelligence methods, including statistical, neural network and fuzzy data processing, machine learning and genetic programming methods, etc.
 122-PC11. Ability to conduct intelligent data analysis based on methods of computational intelligence, including large and poorly structured data, their operational processing and visualization of analysis results in the process of solving applied problems.
 126-GC 1. Ability to abstract thinking, analysis and synthesis.
 126-GC 2. Ability to apply knowledge in practical situations.
 126-GC 3. Ability to understand the subject area and professional activity.
 126-GC 5. Ability to learn and master modern knowledge.
 126-GC 6. Ability to search, process and summarize information from various sources.
 126-GC 7. Ability to develop and manage projects.
 126-PC 6. Ability to use modern information systems and technologies (production, decision support, data mining, etc.), cybersecurity techniques and techniques in the performance of functional tasks and responsibilities.
 126-PC 14. Ability to form new competitive ideas and implement them in projects (startups).

Learning outcomes	Teaching and learning methods	Forms of assessment (continuous assessment CAS, final assessment FAS)
<p>121-PLO18. Know and be able to apply information technology processing, storage and transmission of data. 122-PLO4. 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 management objects, etc. 122-PLO12. Apply methods and algorithms of computational intelligence and intelligent data analysis in the tasks of classification, prediction, cluster analysis, search for associative rules using software tools to support multidimensional data analysis based on technologies DataMining, TextMining, WebMining. 126-PLO 3. To use basic knowledge of informatics and modern information systems and technologies, programming skills, technologies of safe work in</p>	<p>Interactive lectures with presentations, discussions, laboratory classes, teamwork, case method, student feedback method, problem-based learning</p>	<p>Written individual assignments for laboratory works (CAS), assessment of knowledge in laboratory classes (CAS), express surveys (CAS), online tests (CAS), final/semester control in the form of a semester test, according to the schedule of the educational process (FAS)</p>

computer networks, methods of creation of databases and Internet resources, technologies of development of algorithms and computer programs in high-level languages with application of project-oriented programming to solve problems of design and use of information systems and technologies.
126-PLO 6. Demonstrate knowledge of the current level of information systems technology, practical skills of programming and use of applied and specialized computer systems and environments for their implementation in professional activities.

ASSESSMENT AND GRADING

Range s of points corres pondi ng to grades	core (points) for all types of learning activities	ECTS grading scale	The national grading scale	Allocation of grade points
	90-100	A	excellent	
	82-89	B	good	
	74-81	C		
	64-73	D	satisfactory	
	60-63	E		
	35-59	FX	Unsatisfactory (with the exam retake option)	
	0-34	F	Unsatisfactory (with mandatory repetition of the course)	

100% Final assessment as a result of Final test (30%) and Continuous assessment (70%).
30% Final test
70% Continuous assessment:
 Test №1 (15%)
 Test №2 (15%)
 Laboratory works (40%)
 Laboratory work №1 (10%)
 Laboratory work №2 (10%)
 Laboratory work №3 (10%)
 Laboratory work №4 (10%)

Course policy

Students must attend all classes according to the study schedule and adhere to the norms of academic ethics. To study the course, students need to have their personal computer and (or) use computers of the computer center at the department. Students must work with compulsory and recommended reading, including Internet resources. Students must complete and submit all laboratory works during the semester in which the course is taught, before the examination session. The final assessment is not carried out without the personal presence of students.

COURSE STRUCTURE AND CONTENT

Topic	Content	Laboratory work	Self-study
Topic 1	Introduction to startup business analytics	Laboratory work 1	Data life cycle and analytics methodology
Topic 2	Business analytics deliverables and stakeholders		Collecting and preparing data for analytical processing <i>Innovation Campus: SBA-Sprint01</i>
Topic 3	Data tools for business analytics: R and SQL languages	Laboratory work 2	Using Python, Julia, and Octave for business analytics
Topic 4	Charts and graphs for data visualization		Solving analytical tasks using R and SQL languages <i>Innovation Campus: SBA-Sprint01</i>
		Laboratory work 3	
			Developing analytical dashboard using Microsoft Power BI tool <i>Innovation Campus: SBA-Sprint02</i>

Topic 5	Essentials machine learning for data analytics	Laboratory work 4	Solving machine learning tasks using R and Python <i>Innovation Campus: SBA-Sprint02</i>	Decision trees and text analytics
Topic 6	Data collection, cleansing, summarizing, and exploration			Big data analytics problems

RECOMMENDED READING

Compulsory	1. Jeffrey, D., Camm et al. (2020). Business Analytics, Cengage AU, 816 p.	Recommended	1. Leslie Turner et al. (2020). Accounting Information Systems: Controls and Processes. John Wiley & Sons, 592 p.
	2. Majid Nabavi et al. (2020). Introduction to Business Analytics. Second Edition. Business Expert Press, 192 p.		2. Khusboo Saxena et al. (2018). DATA MINING AND WAREHOUSING, BPB Publications, 121 p.
	3. U. Dinesh Kumar. (2017). Business Analytics: The Science of Data-driven Decision Making. Wiley India, 714 p.		3. G. Sudhamathy, C. Jothi Venkateswaran. (2019). R Programming: An Approach to Data Analytics, MJP Publisher, 383 p.
	4. Vanessa Ratten, Ted Hayduk. (2020). Statistical Modelling and Sports Business Analytics. Routledge, 190 p.		4. 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.
	5. Sneha Kumari et al. (2020). Application of Big Data and Business Analytics. Emerald Group Publishing, 208 p.		5. Jesus Rogel-Salazar. (2018). Data Science and Analytics with Python. CRC Press. 400 p.
	6. V. V. L. N. Sastry. (2020). Business Analytics and Business Intelligence Machine Learning Model to Predict Bank Loan Defaults, Idea Publishing.		6. Adrian Salceanu, (2018). Programming Projects: Learn Julia 1.x by building apps for data analysis, visualization, machine learning, and the web. Packt Publishing Ltd, 500 p.
	7. Celina M. Olszak. (2020). Business Intelligence and Big Data: Drivers of Organizational Success. CRC Press, 194 p.		7. Brian Larson. (2020). Data Analysis with Microsoft Power BI, McGraw Hill Professional.

Academic integrity

Students must adhere to the Code of Ethics of Academic Relations and Integrity of NTU "KhPI": to show discipline, politeness, friendliness, honesty, responsibility

The content of this syllabus is consistent with the course program.