Introduction to Computer Science

COURSE SYLLABUS

Code and name of specialty	**073 – Management**	**Institute**	**Institute of Education and Science in Economics, Management and International Business**
Program name	**Management of Organizations and Administration**	**Department**	**Management**
Type of program	**Educational and Professional**	**Language of instruction**	**English / Ukrainian**

LECTURER

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Senior Business Analyst, PhD student (NTU “KhPI”)
Courses: Introduction to Computer Science

GENERAL DESCRIPTION OF THE COURSE

Summary	The course provides an overview of fundamental concepts of computer science. It empowers students to make technological decisions through developing computational thinking, mastering programming languages, internet technologies, web development, and cloud computing,
Course objectives	● to focus on basic principles of thinking and solving problems with computers and computation ● to deepen students’ understanding of programming languages and web development ● to equip students with hands-on experience with Python and SQL
Types of classes and control	Lectures, workshops, consultations. The course ends with a final exam
Term	6

Student workload (credits) / Type of course	4 / Elective	**Lectures (hours)**	32	**Workshops (hours)**	32	**Self-study (hours)**	56

Program competences	GC03. The ability to abstract thinking, analysis, synthesis. GC08. Skills of information and communication technology usage. GC09. The ability to learn and to master modern knowledge SC07. The ability to choose and to use modern tools of management. SC2.1. Ability to collect and process primary accounting and management information in the service sector.

Learning outcomes	Teaching and learning methods	Forms of assessment (continuous assessment CAS, final assessment FAS)
LO06. To show skills of search, collecting and analysis of information, calculation of indicators to substantiate management decisions	Interactive lectures with presentations, discussions, workshops, individual and teamwork, problem-based learning	Written individual assignments (CAS), practical assessment (CAS), written exam (FAS)
LO 16. To demonstrate skills of independent work, flexible thinking, openness to new knowledge, be critical and self-critical	Workshops, individual and teamwork, case-based learning, research work, problem-based learning	Written individual assignments (CAS), practical assessment (CAS), peer small group presentations (CAS), written exam (FAS)
LO 17. To conduct research individually and/or in a group under the leadership of the leader	Workshops, case-based learning, individual and teamwork, problem-based learning	Written individual assignments (CAS), practical assessment (CAS), data collection and reporting (CAS), written exam (FAS)
LO2.1. Demonstrate skills in the use of information technology processing, storage and transmission of data, determine the principles and life cycle of software development	Interactive lectures with presentations, discussions, workshops, individual and teamwork, problem-based learning	Written individual assignments (CAS), practical assessment (CAS), peer small group presentations (CAS), written exam (FAS)

ASSESSMENT AND GRADING

Ranges of points corresponding 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		**100% Final assessment** as a result of Final exam (40%) and Continuous assessment (60%). **40% Final exam**: written exam **60% Continuous assessment:** - 20% practical assessment - 40% individual assignments
	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)		

Course policy	Students are expected to attend classes regularly, to get to class on time and stay for the duration of the class. In the case of absence, students will be required to submit all assignments to make up for the missed classes. Students are also expected to come to class having read all the required material and being ready to productively participate in the class discussions. Written assignments should be submitted before the specified deadlines.

COURSE STRUCTURE AND CONTENT

Lecture 1-2	Computational Thinking	**Workshop 1-2**	Binary. Algorithms. Pseudocode. Bucketizing cards	**Self-st**	Assignment 1 on Computational Thinking
Lecture 3-6	Programming languages	**Workshop 3-6**	Writing in Scratch, C, Python, Hello.c		Assignment 2 on Programming Languages (create an own Scratch project, write a program in pseudocode with which a human could make a peanut butter and jelly sandwich (correctly).

Lecture 7-8	Internet Technologies	**Workshop 7-8**	Protocols - DHCP, TCP, UDP, HTTP, and DNS	**u d y**	Assignment 3 on Internet Technologies. Read up on "DNS hijacking" as via https://www.wired.com/story/what-is-dns-hijacking/ and describe what steps might an adversary perform to perpetuate a DNS hijacking attempt
Lecture 9-12	Web Development	**Workshop 9-12**	HTML в CS50 Integrated development environment. Introducing to JavaScript		Assignment 4 “Dive into HTML” - making an actual website with multiple pages at replit.com (main page should live in index.html, website must include at least one image, must be stylized with at least several CSS properties)
Lecture 13-14	Technology Stacks	**Workshop 13-14**	Front End and Back End. Databases and SQL		Assignment 5 on Technology Stacks
Lecture 15-16	Cloud Computing	**Workshop 15-16**	When and how to cache data. Single point of failure. Infrastructure, Platform and Software as a service		Assignment 6 on Cloud Computing

RECOMMENDED READING

Compulsory

1. Evans, D. (2011). *Introduction to computing*. Charlottesville, EE. UU.: Computing Book.
2. Abelson, H., Jay, G., & Zhong, F. (2015). *Structure and Interpretation of Computer Programs*. The MIT Press.
3. Gleick, J. (2011). *The information: A history, a theory, a flood*. Vintage.

Recommended

1. Ходаков В.Є Пилипенко Н.В., Соколова Н.А. (2005). *Вступ до компьютерних наук*. Центр навчальної літератури
2. Schneider, G. M., & Gersting, J. (2018). *Invitation to computer science*. Cengage Learning.
3. Brookshear, J. G. (2012). *Computer science: an overview*. Boston: Addison-Wesley.
4. Хайрова Н. Ф., Петрасова С. В. (2020). *Сучасні технології Web-програмування* : навч. посібник. Нац. техн. ун-т "Харків. політехн. ін-т".
5. О. О. Водка [та ін.] (2021). *Основи програмування на С++*. Нац. техн. ун-т "Харків. політехн. ін-т". – URI: http://repository.kpi.kharkov.ua/handle/KhPI-Press/52280.

Academic integrity

Students are expected to adhere to the Code of Ethics of Academic Relations and Integrity” of NTU “KhPI”.

The content of this syllabus is consistent with the Introduction to Computer Science course program.