NATIONAL UNIVERSITY OF LIFE AND ENVIRONMENTAL SCIENCES OF UKRAINE

Department Information systems and technologies

«CONFIRMED»
Dean of the faculty of Agrarian Management
_____Anatolii OSTAPCHUK
"____" _____ 20__ y

«APPROVED»
at the meeting of the department
_____
Protocol № 10 dated "16" 05 2023 y
Head of Department
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«REWIEVED»
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PROGRAM OF THE COURSE
«ECONOMIC INFORMATICS»

Specialization 073 – «Management»
Educational program «Management»
Faculty Information technology
Developer: PhD of Economics, Associate Professor V. Kharchenko

Kyiv – 2023

1. Description of the course

«Economic Informatics»

Field of knowledge, specialization, educational program, educational degree		
Educational degree	*07 «Management and administration»*	
Specialization	*073 «Management»*	
Educational program	*Bachelor*	
Characteristics of the course		
Type	*Compulsory*	
Total number of hours	*120*	
Number of ECTS credits	*4*	
Number of content modules	*4*	
Course project (work) (if applicable)	-	
Form of assessment	*Exam*	
Indicators of the course for full-time and part-time forms of study		
	Full-time form of study	Part-time form of study
Course (year of study)	*1*	
Semester	*1*	
Lecture classes	*15 hrs.*	
Practical, seminar classes	-	
Laboratory classes	*45 hrs.*	
Self-study	*60 hrs.*	
Individual assignments	-	
Number of weekly classroom hours for the full-time form of study	*4 hrs.*	

2. Purpose, objectives, and competencies of the course

Purpose – to get theoretical and practice knowledge of modern information technology, which will give the opportunity to work on a personal computer, rapidly and properly solve the problem for future profile specialty.

The course «Economic Informatics» highlights the main principles and methods of applying modern information technologies in solving economic problems. The purpose of the course is to form in future professionals the necessary level of information and computer culture, the acquisition of practical skills in PC and the use of modern information technology to solve various problems in the process of learning and working in the specialty. The acquired skills of working on a personal computer with an operating system and major software packages such as MS Word, MS Power Point, MS Excel and online systems will enhance the performance of the tasks by future specialists.

Objectives: learning theoretical basics of information systems and forming skills in working with operating system, service programs, text processing, creating digital presentations and spreadsheet.

At the finishing students have to know:

- theoretical fundamentals of computer science and operational characteristics of computer technology and modern information systems;
- main features and capabilities of the MS Windows operating system;
- main features and features of the word processor MS Word;
- main features and features of the MS Power Point;
- main features and features of the MS Excel spreadsheet;
- mechanisms for the search and protection of information on the Internet;
- theoretical foundations of data banks and databases, information systems;
- peculiarities of solving managerial tasks taking into account the current practice of managers.

Ability and skills at the end of study of course:

- have basic skills on the PC: MS Windows operating system, MS Word processor, MS Excel spreadsheet;
- to carry out the analysis of economic information, to have skills in work with systems of processing of economic information;
- apply office automation technologies to solve economic and managerial tasks;
- own Internet search engines and use programs for communication over the Internet;
- use information resources of the World Wide Web in management activities;
- work on a personal computer, quickly and qualitatively solving tasks on profile of the future specialty;

Acquisition of competencies:

Integrated competency (IC): The ability to solve complex specialized tasks and practical problems, which are characterized by complexity and uncertainty of conditions, in the field of management or in the learning process, which involves the application of theories and methods of social and behavioral sciences.

General competencies (GC):
GC 3 Ability to abstract thinking, analysis and synthesis.
GC 4 Ability to apply knowledge in practical situations
GC 8 Skills of using information and communication technologies.
GC 10. Ability to conduct research at the appropriate level.
GC 11. Ability to adapt and act in a new situation.
GC 12. The ability to generate new ideas (creativity)
GC 14. Ability to work in an international context.

Professional (special) competencies (PC):
PC 1. The ability to define and describe the characteristics of the organization.
PC 2. The ability to analyze the results of the organization's activities, to compare them with the factors of influence of the external and internal environment
PC 9. Ability to work in a team and establish interpersonal interaction when solving professional tasks.
PC 10. The ability to evaluate the performed work, ensure their quality and motivate the personnel of the organization.
PC 12. Ability to analyze and structure organizational problems, form reasonable solutions.

Program learning outcomes (PLO): PLO 4. Demonstrate skills in identifying problems and justifying management decisions
PLO 6. Demonstrate the skills of searching, collecting and analyzing information, calculating indicators to substantiate management decisions.
PLO 17. Carry out research individually and/or in a group under the guidance of a leader.

3. The program of the course

Module 1. Theoretical basis of economic informatics

Topic 1. Theoretical basics of economic informatics

Classification of economic information. Concepts of informatics, information and data. Information, its types and quantitative measurement. Data, their types and structure. Data carriers. The main directions of the development of informatics. Determine of information and computer science, information technology (IT) and information system (IS).The importance of computer technology in increasing the efficiency of the manager's work.

Structure of modern computer hardware. The composition, purpose, interaction and characteristics of the main devices (processor, memory, external devices). Structural and functional diagram of a PC. Modern PC hardware market.

Structure of modern computer software. Composition, purpose, and main functions. System software. Tool software (programming systems). Application software. Modern PC software market. Work with PC software for the economic sphere. Determination of the necessary software for the work of the future manager. Distribution of programs by categories. Implementation of the description of programs in accordance with the functional purpose. Peculiarities of working on the Internet. Configuring the operating system and data management skills in the Windows environment. Command line of Windows.

Search for information on the Internet. Search rules. Keywords. Selection of search results by relevance. Familiarity with online systems for finding economic and legal information.

Network office. Working with Google Apps. Introduction to the principles of the work of the network office. Overview of Google Apps Types and Features. Create and collaborate on editing Google documents and acquiring hands-on collaborative calendar skills.

Topic 2. Basics of working with business documentation

Work with text documents in MS Word. Creating a text document. Text document formats. Entering, saving and uploading documents. Text formatting. Display of non-printable characters. Character formatting: font setting; the Formatting toolbar; insertion of non-standard and special characters; capital letter Formatting paragraphs: creating bulleted lists; insertion of mathematical formulas and symbols; converting text into a table.

Working with non-text objects in MS Word. Creating and removing tables. Editing the table. Formatting tables. Calculations in the table. Creation of formulas. Editing formulas. Placement of formulas in the text. Tables and diagrams in MS Word. Inserting charts and graphs into the document. Editing diagrams. Types of charts. Inserting pictures. Placing pictures in the text. Formatting pictures. Drawing

graphic constructions using MS Word, working in the WordArt program. Import of graphic objects. Creating an organizational chart. Editing an organization chart.

Working with the structure of a text document. Document templates. Use of auto text styles and elements in text documents. Structuring the finished text by sections and subsections. Formatting of structured documents. Page numbering. Automatic content generation. Work in a document with references to the literature.

Topic 3. Visualization of information and the basics of working with computer graphics

Formats of electronic documents. Basic rules for working with the presentation. Basics of working with data presentation technology. Creating illustrative material with desktop publishing tools and developing an animation movie using MS PowerPoint. Review and use online designers for presentations.

Creating illustrative material for printing. Overview of types of advertising illustrative materials and programs for their creation. Create an illustrative booklet with desktop publishing tools, as an example for MS Publisher. Study of the features of the development of illustrative material for scientific information.

Basic principles of work with raster graphics. Tricks for creating and editing illustrative material using graphic editors (for example, Photoshop online). Opportunities and rules for working with layers (layers). Overview of image editing tools and color replacements.

Module 2. Processing and analysis of economic information in MS Excel

Topic 4. Presentation and visualization of economic information in MS Excel

Data entry. Entering formulas. Select cells, cell ranges, rows, or columns. Entering sequences of numbers, dates and text. Using AutoComplete. Cell formatting: number format, alignment, border creation, and background fill.

Working with simple formulas. Creating a formula. Mathematical operators. Absolute and relative addressing. Entering dates and times into formulas. Errors in formulas. Replacing the formula with its calculated value. Using the built-in functions Connection of formulas.

Data visualization. Structural elements of diagrams. Create and customize charts. Construction of diagrams of various types. Bind the data label in the chart to the cells on the page. Stages of creating charts. Creating a basic (implemented) chart. Improvements to the base diagram. Move the base chart to a separate sheet. Examples of visualization of economic processes using business graphics.

Topic 5. Using spreadsheet functions for data analysis

Acquaintance with the possibility of making calculations using MS Excel functions to analyze activities. The IF function and its application. AND, OR and NOT functions and their application. Calculation of values of logical functions with

many conditions. Using Boolean functions when their value is text for certain conditions.

Simple and complex interest problems. Calculations of financial functions. COUNT and SUM functions and their application. Implementation of branched computing processes in Microsoft Excel.

Topic 6. Tools for consolidation and analysis of economic data in MS Excel

Database organization. Creating lists. Data entry. Search records. Arrangement of records. Using AutoFilter. Using Autoformat. Advanced filter. Functions for working with databases.

Summary tables. Formation of summary tables. Data consolidation. Intermediate results. Automation of procedures in MS Excel due to the creation of macros and the use of an analysis package for financial and scientific data. «Solver» tools in MS Excel.

Reports of summary tables. Compact, tabular and structured forms of the summary table report. Construction of a summary table report. Means of analysis of the summary table report. Visualization of Pivot table report results using conditional formatting. Changing the number of columns and rows of the report. Removing and adding report fields. Using slices. Pivot Chart Reports. Building a pivot chart report. Data forecasting. Building a trend line. Using sparklines (info curves) to analyze trends in pivot table report data. Construction of graphs and charts for visualization of information and its analysis.

3. Structure of the course «Economic Informatics»

Names of content modules and topics	Number of hours												
	Full-time form							Part-time form					
	weeks	total	including					total	including				
			l	p	lab	ind	self		l	p	lab	ind	self
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Content Module 1. Theoretical basis of Economic Informatics													
Topic 1. Theoretical basis of Economic Informatics	1,2	20	4		6	10							
Topic 2. Basics of working with business documentation	3-5	20	2		8	10							
Topic 3. Visualization of information and the basics of working with computer graphics	6-8	18	2		6	10							
Module 1	8	2			2								
Total for content module 1	60		8		22	30							
Content Module 2. Processing and analysis of economic information in MS Excel													
Topic 4. Presentation and visualization of economic information in MS Excel	9-11	20	2		8	10							
Topic 5. Using spreadsheet functions for data analysis	12-14	20	2		8	10							
Topic 6. Tools for consolidation and analysis of economic data in MS Excel	14-15	18	1		7	10							
Total for content module 2	15	2			2								

Total hours	60	7		23	30							
Course project (work) on (If included in the curriculum)		-	-	-		-		-	-	-		-
Total hours	120	15		45	60							

4. Seminar topics

are not provided with the curriculum

5. Practical topics

are not provided with the curriculum

6. Laboratory class topics

№	Topic title	Number of hours
1.	Hardware of the modern PC.	2
2.	Software of the modern PC.	2
3.	Network office. Working with Google Apps.	2
4.	Formatting a document. Working with tables.	2
5.	Basics of working with text documents. Creating Formulas. Graphs and charts in MS Word.	2
6.	Work with charts and drawings in MS Word.	2
7.	Automatic formatting of large documents. Structure of the document. Link.	2
8.	Create a presentation of scientific work in MS PowerPoint.	2
9.	Creation of advertising and illustrative material for printing by means of MS Publisher.	2
10.	Basics of bitmap graphics.	2
11.	Module 1	2
	Total for 1 module	**22**
1.	Create and format tables in MS Excel.	2
2.	Construction of complex charts and diagrams.	2
3.	AutoFill and Auto Summing.	2
4.	Work with different books and sheets in MS Excel.	2
5.	Logical features of the Excel spreadsheet.	2
6.	Financial features of the Excel spreadsheet.	2
7.	Data rows in MS Excel.	2
8.	Pivot tables in MS Excel.	2
9.	Add-on "Data Analysis" and the "Solver" tool in MS Excel.	2
10.	Macros in MS Excel.	3
11.	Module 2	2
	Total for 2 module	**23**
	Total of the course	**45**

7. Independent work topics

№	Topic title	Number of hours
1	Theoretical basis of economic informatics	10
2	Basics of working with business documentation	10
3	Visualization of information and the basics of working with computer graphics	10

4	Presentation and visualization of economic information in MS Excel	10
5	Using spreadsheet functions for data analysis	10
6	Tools for consolidation and analysis of economic data in MS Excel	10
7	**Total**	**60**

8. Samples of control questions, tests for assessing the level of knowledge acquisition by students.

National University of Life and Environmental Sciences of Ukraine			
Educational qualification level bachelor	Department of Information systems and technologies 20__ – 20__	Examination ticket № 1 by discipline Economic Informatics	Approved Head of the department M. Shvydenko ___.____.____
Test questions			
Question 1. Which of the following is an example of Binary? a. 123; b. 7B; c. 111 1011; d. All of the above.			
Question 2. Choose true matches. Binary numbers are on the right. a. 17_{10} 10000 b. 16_{10} 1111 c. 15_{10} 10001			

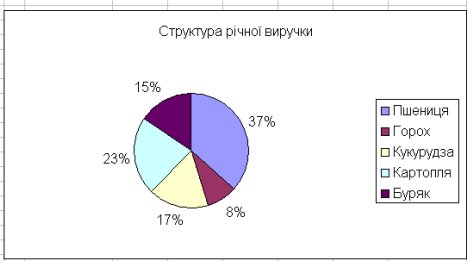
Question 3. Choose true expression for fraction
a. =1+A2-2/1+A3/2*A1;
b. =1+(A2-2)/(1+A3/(2*A1));
c. =1+(A2-2)/1+A3/(2*A1);
d. =1+(A2-2)/(1+A3/2*A1).			

Question 4. Which one is a STORAGE device? a. CPU; b. Printer; c. CD; d. Floppy Disk; e. Headphones.			
Question 5. How can you highlight text without using the mouse? a. Use the F6 key; b. Use the arrow keys while holding down a Ctrl key; c. Use the arrow keys while holding down a Shift key; d. It is impossible.			
Question 6. Choose a system software a. Office tools; b. Development system; c. Antiviruses; d. Hardware diagnostic tools;			

e. Drivers.

Question 7. What sell intervals we need to build the chart?

	A	B	C	D	E	F	G	H	I
2									
3			Виручка від продажу, тис. грн.						
4		№	Товар	1 кв.	2 кв.	3 кв.	4 кв.	За рік	Структура
5		1	Пшениця	150	175	160	168	653	36,60%
6		2	Горох	38	42	40	29	149	8,35%
7		3	Кукурудза	70	81	76	75	302	16,93%
8		4	Картопля	99	95	100	110	404	22,65%
9		5	Буряк	75	70	65	66	276	15,47%
10			Всього	432	463	441	448	1784	100,00%



a. C5:C9 and H5:H9;
b. H5:H9 and I5:I9;
c. C5:C9 and I5:I9;
d. C4:I4 and C9:I9.

Question 8. How we can select few different areas on the sheet?
a. holding CTRL key;
b. using Edit menu;
c. just using mouse;
d. holding ALT key.

Question 9. What a difference between 0,03 and 3%?
a. there is no difference;
b. different values;
c. different formats;
d. different data types.

Question 10. What type of address 5F?
a. mixed;
b. relative;
c. it is not correct cell address;
d. absolute.

Exam Questions

Open question (5 points)

What is an operating system? (Give examples and describe them)

Practical task "Calculations in MS EXCEL" (10 points)

Using EXCEL and using sales data (file provided by the teacher), calculate the salaries of managers, payroll taxes and bonus for the maximum amount of the agreement for January 2015.
You work at the company "X", which sells food products.
The salary to managers is calculated according to the rule
guaranteed 2500 UAH + percentage of the amount of the concluded agreement, at which:

- for the sale of confectionery goods (cookies or wafers or crackers), the manager owns 10% of the amount of the transaction,
- for the sale of cereals - 20% of the transaction amount;
- for sale of canned food or fish - 30% of the transaction amount.

Progress of the work:

1. Copy the source data from Sheet 1 to Sheet2 and calculate the amount for the transaction.
2. In Sheet 2, calculate % of the manager from the transaction amount (logical function IF).

	A	B	C	D	E	F	G	H	I
1		Дата	Менеджер	Продукт	Ціна	Кількість	**Сума угоди**	**% менеджеру від суми угоди**	
2	1	01.01.2015	Коваленко	Вафлі	10,20	78	795,60	159,12	
3	2	01.01.2015	Бондаренко	Консерви	35,65	35	1247,75	374,33	
4	3	01.01.2015	Ткаченко	Крекер	7,80	89	694,20	138,84	
5	4	01.01.2015	Мельник	Крупи	25,65	149	3821,85	764,37	

1. In Sheet 3, calculate the total% of managers from the transaction amount for JANUARY 2015 (Pivot Table).

2		
3	**Позначки рядків**	**Сума з % менеджеру від суми угоди**
4	**янв**	**49053,256**
5	Бойко	6554,785
6	Бондаренко	8811,935
7	Іванов	7040,414
8	Коваленко	10432,575
9	Мельник	8519,558
10	Ткаченко	7693,989

2. In Sheet 3, calculate the salaries of managers for JANUARY 2015 and pay withholding (employees were not sick and have no social benefits).

	A	B	C	D	E	F	G	H	I	J	K
1		**Менеджер**	**Сума зароблених %**	**Сума зарплати**	**Єдиний соціальний внесок**	**Податок на доходи фізичних осіб**	**Військовий збір**	**Сума утримань**	**Аванс**	**Премія за максимальну суму угоди**	**До виплати**
2		Бойко	Переносимо з зведеної таблиці	**S** =Сума зароблених % +2500	=S *3,6%	- якщо S<=12180, то прибутковий податок = S * 96,4% *15% - якщо S>12180, то прибутковий податок = 12180 * 96,4% *15%+(S-12180) * 96,4% *20%	=S *1,5%	=Єдиний соціальний внесок + Податок на доходи фізичних осіб + Військовий збір	Всім по 2500	1000 грн. отримує тільки той, хто в місяць вашого варіанту мав максимальну суму угоди	= S - Сума утримань - Аванс + Премія
3		Бондаренко									
4		Іванов									
5		Коваленко									
6		Мельник									
7		Ткаченко									
8		**Всього**									
9											

3. With the help of database functions, find the manager who entered into an agreement for the maximum amount in January and give him a prize of UAH 1,000.
4. Make calculations in accordance with the sample.

	A	B	C	D	E	F	G	H	I	J	K	L
1		**Менеджер**	**Сума зароблених %**	**Сума зарплати**	**Єдиний соціальний внесок**	**Податок на доходи фізичних осіб**	**Військовий збір**	**Сума утримань**	**Аванс**	**Премія за максимальну суму угоди**	**До виплати**	
2		Бойко	6554,79	9054,79	325,97	1309,32	135,82	1771,12	2500,00		4783,67	
3		Бондаренко	8811,94	11311,94	407,23	1635,71	169,68	2212,61	2500,00		6599,32	
4		Іванов	7040,41	9540,41	343,45	1379,54	143,11	1866,10	2500,00		5174,31	
5		Коваленко	10432,58	12932,58	465,57	2015,15	193,99	2674,71	2500,00		7757,87	
6		Мельник	8519,56	11019,56	396,70	1593,43	165,29	2155,43	2500,00	1000,00	6364,13	
7		Ткаченко	7693,99	10193,99	366,98	1474,05	152,91	1993,94	2500,00		5700,04	
8		**Всього**	**49053,26**	**64053,26**	**2305,92**	**9407,20**	**960,80**	**12673,91**	**15000,00**	**1000,00**	**36379,34**	
9												

Practical task "MS WORD" (5 points)

Using MS Word to create a document as shown below. The value 77980,76 of the column Amount earned% must be calculated using tool MS Word

«*Manager's salary report for*
JANUARY (month of your variant) *for 2018 year*»

Manager	Amount earned%	Amount of salary	Single social contribution	Income tax	Military tax	Amount of deductions	Advance	Award for the maximum transaction amount	To pay
Boiko	13661,45	16161,45	581,81	2528,85	242,42	3353,09	2500,00		10308,37
Bondarenko	12281,40	14781,40	532,13	2262,78	221,72	3016,63	2500,00		9264,77
Ivanov	10677,83	13177,83	474,40	1953,61	197,67	2625,68	2500,00		8052,15
Kovalenko	14684,51	17184,51	618,64	2726,10	257,77	3602,51	2500,00		11082,00
Melnyk	15553,64	18053,64	649,93	2893,67	270,80	3814,40	2500,00	1000,00	12739,24
Tkachenko	11121,93	13621,93	490,39	2039,23	204,33	2733,95	2500,00		8387,98
Total	**77980,76**	**92980,76**	**3347,31**	**14404,24**	**1394,71**	**19146,25**	**15000,00**	**1000,00**	**59834,51**

9. Teaching methods

The material taught in lectures, laboratory works and independent works in computer class that is equipped of local area networks, the Internet and the latest software. Lectures are accompanied by the use of presentations, training films and multimedia equipment to facilitate the assimilation of the material.

10.Forms of assessment

Control knowledge in the students of the course «Economic Informatics» provides the following control measures:

• *Self-control* is the primary form of control knowledge's that are provided by the distance learning courses provide students with a list of questions (questions and answers);

• *Current control* – through direct teacher evaluation system laboratory practical workshops and assignments for independent work;

• *Modular control* – performed remotely in an automated mode or full-time mode, which is the main form of testing;

• *Final control* – a test that consists of full-time during the designated dean's office or individual schedule, approved curriculum. The basic form of the final control is tested.

11.Distribution of grades received by students.

Evaluation of student knowledge is carried out on a 100-point scale and is converted to national grades according to Table 1 "Regulations and Examinations and Credits at NULES of Ukraine" (order of implementation dated 26.04.2023, protocol №10).

Student rating, points	**National grade based on exam results**	
	Exams	**Credits**

90-100	Excellent	Passed
74-89	Good	
60-73	Satisfactory	
0-59	Unsatisfactory	Not passed

In order to determine the rating of a student (listener) in the discipline $\mathbf{R_{dis}}$ (up to 100 points), the rating from the exam $\mathbf{R_{ex}}$(up to 30 points) is added to the rating of a student's academic work $\mathbf{R_{aw}}$ (up to 70 points): $\mathbf{R_{dis} = R_{aw} + R_{ex}}$ **.**

12. Educational and methodological support

1. Kharchenko V.V., Kharchenko H.A., Soroka P.M., Information systems in management. Textbook, CP «Comprint», 2022. 335 p.
2. Kharchenko V.V., Kasatkina O.M. Structure of the personal computer and basics of operating systems Methodical manual K. CP «Comprint», 2014, 135 p.
3. Kharchenko V.V., Kasatkina O.M. Modern information systems and technologies. Methodical manual K. CP «Comprint», 2014 p. 121.
4. The electronic training course, developed on the basis of the Moodle platform, Electronic address: https://elearn.nubip.edu.ua/course/view.php?id=2749

13.Recommended sources of information

1. Paul McFedries Excel 2016 Formulas and Functions Wiley, 2018, 800 p.
2. Curtis Frye Microsoft Excel 2016 Step by Step Microsoft Press, 2019, 550 p.
3. Joan Lambert Microsoft Word 2016 Step by Step Microsoft Press, 2018, 600 p.
4. Microsoft PowerPoint 2016 Step by Step Microsoft Press, 2018, 480 p.
5. Касаткін Д.Ю., Глазунова О.Г., Блозва А.І., Касаткіна О.М. «Практикум з інформатики». Навчальний посібник (2 видання) К ЦП «Компринт», 2017. 382 с.
6. Касаткін Д.Ю., Блозва А.І., Касаткіна О.М. «Інформатика і системологія» Підручник. К ЦП «Компринт», 2017. 421 с.
7. Сорока П.М. Харченко В.В. Харченко Г.А. Інформаційні системи і технології в управлінні організацією К. «Компринт», 2019. 518 с.
8. Сорока П.М. Харченко В.В. Практикум з інформаційних систем в управлінні організацією К. ЦП «Компринт» 2017 р. 378 с.
9. Дистанційні курси "Word та Excel: інструменти і лайфхаки" на платформі Prometheus [Електронний ресурс] Джерело: https://edx.prometheus.org.ua/courses/course-v1:DNU+PRIN-101+2017_T1/about
10. Дистанційні курси "Цифрові комунікації в глобальному просторі" на платформі Prometheus [Електронний ресурс] Джерело:

https://courses.prometheus.org.ua/courses/course-v1:Prometheus+ITArts101+2017_T1/about
11. Microsoft Imagine Academy https://imagineacademy.microsoft.com/?whr=default
12. Microsoft Azure Fundamentals: Describe core Azure concepts. https://docs.microsoft.com/en-us/learn/paths/az-900-describe-cloud-concepts/
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