Оглавление

ВВЕДЕНИЕ

Учебно-методическое пособие разработано в соответствии с требованиями программы дисциплины «Иностранный язык» для обучающихся по направлению подготовки 09.03.01 Информационные системы и технологии. Является дидактическим средством, обеспечивающим полноценную систематическую аудиторную работу, направленную на формирование профессиональной иноязычной компетенции обучающихся.

Представленные лексические упражнения (анализ интернациональной лексики, поиск синонимов, антонимов к заданным словам, поиск лишнего слова в цепочке) направлены на изучение и активизацию профессиональной лексики, а текстовые упражнения (ответы на вопросы по тексту, заполнение таблиц, определение ложных / истинных высказываний, выстраивание информации в хронологическом порядке, составление своего текста на основе прочитанного или с помощью дополнительных источников информации) способствуют формированию коммуникативных умений.

Отметим, что все упражнения созданы с опорой на прочитанный текст, поэтому при необходимости обучающиеся могут вернуться к тексту и найти нужную информацию. Такой подход создает дополнительные возможности для самостоятельной работы в случае вынужденного пропуска аудиторного занятия.

Некоторые тематические блоки содержат дополнительные задания, помеченные звездочкой (*) и предназначенные для обучающихся, имеющих более высокий языковой уровень. Включение таких заданий позволяет педагогу, осуществляющему образовательную деятельность, актуализировать в своей работе принцип дифференцированного подхода.

UNIT 1. HIGHER EDUCATION

Text 1. Higher Education in Russia

Russia's modern higher education system is based on the Bologna Process and includes such levels of education as bachelor's degree, specialist degree, master's degree, postgraduate, clinical internship etc.

Bachelor's Degree is a complete higher education course. Individuals who have completed general secondary education can enroll in a Bachelor's Degree course. The 4-year course provides general training in fundamental subjects. At the end of the programme, students defend their thesis. If successful, they are awarded with a Bachelor's Degree certificate (BA, BSc). The certificate grants the right to work in their professional field or to further their studies on a Master's Degree course.

Unlike Bachelor's Degrees, Specialist Programmes are more focused on practical work in the selected industry. The course is designed for 5 years. Based on the examination results and thesis defense students receive a Specialist Degree certificate (diploma) specifying the qualification (e.g., "Astronomer", "Teacher", "Information Security Specialist", etc.). Graduates may be hired in a number of national or foreign companies or further their studies on a Master's course.

This course allows in-depth specialisation in the student's chosen field. Applicants with Bachelor's or Specialist Degrees can enroll in Master's courses. For two years students are specifically trained for the research work. After the thesis defence a Master's Degree certificate is awarded with Master qualification. Graduates of Master's programmes may work in industry or further their studies on a postgraduate course which is a form of training for academics.

According to the Organisation for Economic Cooperation and Development (OECD), Russia has the most educated population in the world, outperforming Canada, Japan, Israel and the USA. More than half of Russians have higher education qualification due to the fact that there are about 740 universities in 82 regions of the country, more than 400 fields of study, from mathematics and natural sciences to arts, more than 650 subjects in Bachelor's, Master's, Specialist and Postgraduate Programmes. Russian universities also offer preparatory programmes (training for enrolment on Bachelor's, Master's and Specialist Degree courses), short courses (summer university, a single term in Russia, summer schools), professional development and additional vocational training.

Development of information technologies in Russia has passed its own and unique way. In 1951, the first computing machine in Europe, MESM, was built here. Scientists in Soviet computing facilities were trying to build computers based on non-binary logic. Russia gave the world dozens of scientists ahead of their time, including Mikhail Lavrientiev, Sergey Lebedev, Andrey Ershov and others. Getting a degree in Russian universities means obtaining fundamental theoretical knowledge, exchanging experience and getting a chance to meet leading scientists, engineers, programmers and to establish valuable scientific contacts. Modern programmes in computer science and IT, numerical mathematics, system programming and IT network administration are available in the universities in Moscow, Saint-Petersburg, Yekaterinburg, Kazan and others.

*1. Read and translate the following international words. *Make up your sentences with them:* system, process, fundamental, programme, certificate, practical, to focus, academics, industry, administration, theoretical, logic.

2. Translate the following words from the text into English. Combine the new word combination, using the first letter of every word: половина, включать в себя, предоставлять (гарантировать), нанимать на работу, опыт, исследовать, зарегистрироваться, защищать, уникальный, курс, награждать, обучение (тренировка), промышленность, превосходить, небинарный.

*3. Connect every word with its synonym. Translate the received pairs. *Make up sentences with them:*

1)	vocational	a)	useful
2)	complete	b)	twelve
3)	valuable	c)	professional
4)	to further	d)	full
5)	available	e)	introductory
6)	to obtain	f)	to advance
7)	dozen	g)	to get
8)	preparatory	h)	actual

*4. Explain the meaning of the following words. *Make up sentences with them:* degree, diploma, thesis, to establish, facility, in-depth, to exchange, to offer, field, scientific.

5. Are the following statements true or false? Correct the false ones:

1. Bachelor's Programmes are usually more focused on practical work in the selected industry.
2. It takes four years to obtain Bachelor's Degree in Russia.
3. Only applicants with Specialist Degrees can enroll in Master's courses.
4. Master's courses allow students to get further specialisation in their field.
5. Those who want to train for academics enroll in postgraduate programmes.
6. Russians are better educated than any other foreigners.
7. The field of computer science and IT is highly demanded in Russia nowadays and available in many universities.

6. Say why you have decided to get higher education in your university, what are your expectations and first impressions of it.

**7. Make an advertisement of your university and your major.*

Text 2. Higher Education in Great Britain

After finishing compulsory secondary school or college young British can apply to a university, polytechnic, college of education or they can continue to study in a college of further education.

The academic year in Britain's universities, Polytechnics, Colleges of education is divided into 3 terms, which usually run from the beginning of October to the middle of December, the middle of January to the end of March, from the middle of April to the end of June or the beginning of July.

There are 46 universities in Britain. The oldest and best-known universities are located in Oxford, Cambridge, London, Leeds, Manchester, Liverpool, Edinburgh, Southampton, Cardiff, Bristol and Birmingham.

Good A-level results in at least 2 subjects are necessary to get a place at a university. However, good exam passes alone are not enough. Universities choose their students after interviews. For all British citizens a place at a university brings with it a grant from their local education authority.

English universities greatly differ from each other in date of foundation, size, history, tradition, organization, methods of instruction and way of student life.

After three years of study a university graduate will leave with the Degree of Bachelor of Arts, Science, Engineering, Medicine, etc. Some courses, such as languages and medicine, may be one or two years longer. The degrees are awarded at public degree ceremonies. Later a Bachelor may continue to take Master's Degree and then a Doctor's Degree.

The 2 intellectual eyes of Britain — Oxford and Cambridge Universities — date from the 12 and 13 centuries. They are known for all over the world and are the oldest and most prestigious universities in Britain. They are often called collectively Oxbridge, but both of them are completely independent. Only education elite go to Oxford and Cambridge.

The Scottish universities of St. Andrews, Glasgow, Aberdeen and Edinburgh date from the fifteenth and sixteenth centuries.

In the nineteenth and the early part of the twentieth centuries the so-called Redbrick universities were founded. These include London, Manchester, Leeds, Liverpool, Sheffield, and Birmingham. During the late sixties and early seventies some 20 "new" universities were set up. Sometimes they are called "concrete and glass" universities. Among them are the universities of Sussex, York, East Anglia and some others.

During these years the government set up 30 Polytechnics. The Polytechnics, like the universities, offer first and higher degrees. Some of them offer full-time and sandwich courses (combination of professional study with work in production — for working students).

There's an interesting form of studies called the Open University. It's intended for people who study in their own free time and who "attend" lectures by watching TV and listening to the radio. They keep in touch by phone and letter with their tutors and attend summer schools. The Open University students have no formal qualifications and would be unable to enter ordinary universities.

Some 80,000 overseas students study at British universities or further education colleges or train in nursing, law, banking or in industry. Education in IT and Engineering is also highly demanded. About 15 universities in Great Britain provide those majors. Three of them are situated in London: City University, Queen Mary University and Goldsmiths University; two in Glasgow: Caledonian University and University of Glasgow; one in Belfast; there are also Aston University in Birmingham, Coventry University, Newcastle University, Manchester University, Liverpool University and some others. All of them include School of Mathematics, Computer Science and Engineering with several departments: Mathematics, Library and Information Science, Electrical and Electronic Engineering, Computer Science, Civil Engineering, Mechanical Engineering and Aeronautics. The curriculums are predominantly similar: students at their compulsory and elective lessons are theoretically and practically prepared for solving professional tasks comprehensively connected with computer use.

*1. Read and translate the following international words. *Make up your sentences with them:* interview, intellectual, elite, exam, ceremony, polytechnic, prestigious, academic, local, grant, commerce, qualification, ordinary.

*2. Connect every word with its synonym. Translate the received pairs. *Make up sentences with them:*

1)	independent	a)	specialty
2)	major	b)	to require
3)	government	c)	conversation
4)	to demand	d)	jet set
5)	to solve	e)	separate
6)	interview	f)	cabinet
7)	elite	g)	usual
8)	ordinary	h)	to decide

*3. Explain the meaning of the following words. *Make up sentences with them:* term, level, degree, major, curriculum, similar, comprehensive, government.

*4. Choose the right noun for each given verb. *Make up sentences with them:*

1)	to apply	a)	in capital cities
2)	to divide	b)	classes
3)	to locate	c)	to an educational institution
4)	to differ	d)	for people
5)	to award	e)	into terms
6)	to intend	f)	specialists in IT
7)	to attend	g)	from each other
8)	to demand	h)	the degree

5. Answer the following questions:

1. What are possible ways for young British to continue their study?
2. The academic year in Britain's universities is divided into 2 terms, isn't it?
3. What British Universities do you know?
4. Which of them are the most prestigious?
5. What procedures are necessary to be followed to apply to a university?
6. What majors do universities mostly provide?
7. What Britain's universities offer major in IT? Where are they situated?

6. Fill in the table comparing Russian and British educational system (табл. 1).

Таблица 1

Russian educational system	British educational system
Similarities	
Differences	Differences

7. Think about pros and cons of getting higher education in Great Britain.

**8. Find information and make an advertisement of any foreign university offering the same major as you are getting.*

Text 3. Difference between a Computer Science and Information Technology Degree

To the layperson, computer science and information technology may seem like the same thing. In actuality, three fields are typically associated with the study of computers at the college level. Computer engineering, information technology and computer science are all disciplines within the same realm of study. However, each specialty focuses on specific aspects of the field, and careers within the three areas vary greatly.

Computer Science Careers in Computer Science

Computer scientists are generally concerned with software, operating systems and implementation. Computer science students will learn the fundamentals of different programming languages, linear and discrete mathematics, and software design and development. Computer scientists study the machine itself and understand how and why various computer processes operate the way they do.

Computer science is a rapidly growing field and is expected to see large increases in employment opportunities. Applications software developers, systems engineers, and web developers have already been and, for sure, will continue to be in great demand.

Computer Engineering

To put it bluntly, computer engineers make computer parts work together. Computer engineers are responsible for the research, design and development of computer equipment like circuit boards, microchips, routers, video cards, etc.

It is beneficial for computer engineers to have a grasp of computer science. Computer engineers often deal with hardware-to-software integration, meaning they have to design and build processors and hardware that can support a given program. As technology advances and our devices become smaller and smaller, a main goal of computer engineers is to create microchips and microprocessors that work economically and efficiently.

Computer engineering students will study concepts in computer science, engineering and mathematics. By combining these three fields, computer engineers are able to solve hardware problems and create state-of-the-art machines that can handle the many tasks computers perform.

There's not a lot of diversity in job titles in the computer engineering world. Diversity in the job comes from the various industries that employ computer engineers. The majority of computer engineers work in computer and electronic product manufacturing. Many computer engineers work in systems design. Some computer engineers are employed by research firms.

Information Technology

IT professionals are the users of technology. IT utilizes existing operating systems, software and applications in tandem to create a larger system that solves a specific business problem. IT constructs a network from established building blocks to carry out a task, such as an automated supplies ordering service. Due to the nature of the work, IT professionals are more likely to interact with clients and co-workers outside of their department. They may help explain to a client how to solve technology problems or work with executives and business owners to construct a technology plan that will meet their business needs.

IT students will study network and database design in depth, and receive an introduction to basic theory and applied mathematics.

Information security analysts work to prevent cyber attacks by monitoring their business' network for breaches and weak spots and to create emergency plans in the event of an attack.

Network architects (sometimes called network engineers) design and build communication networks, such as local area networks (LANs), wide area networks (WANs), and intranets.

Computer support specialists provide advice and troubleshooting help to individuals and businesses that have questions about their software.

Database administrators use software and programs to organize and store data for businesses that range from financial firms to shipping companies.

Systems administrators conduct the day-to-day maintenance and operation of a business' networks, including LANs, WANs, intranets, and other communication systems.

*1. Read and translate the following international words. *Make up your sentences with them:* design, economically, concept, manufacturing, discipline, efficiently, service, client, monitoring, communication, industry, technology, electronic, system, product.

*2. Write down the following international words into one of the two columns (табл. 2). *Make up pairs of sentences with the words from the second column to demonstrate the difference in their usage:* fundamental, beneficial, multinational, professional, individual, financial, typical, special, general, functional.

Таблица 2

Words that can be only adjectives	Words that can be both adjectives and nouns

*3. Connect every word with its synonym. Translate the received pairs. *Make up sentences with them:*

1)	to implement	a)	to develop
2)	to concern	b)	to operate
3)	to advance	c)	to cooperate
4)	to utilize	d)	to deal with
5)	to handle	e)	to keep
6)	to interact	f)	to carry out
7)	to store	g)	to unite
8)	to combine	h)	to use

*4. Explain the meaning of the following words. *Make up sentences with them*: realm, maintenance, research, equipment, application, mean, increase, grasp.

*5. Choose the right noun for each given verb. *Make up sentences with them:*

1)	to solve	a)	a plan
2)	to provide	b)	a block
3)	to support	c)	maintenance
4)	to construct	d)	a service
5)	to establish	e)	a task
6)	to conduct	f)	a problem
7)	to carry out	g)	an application
8)	to design	h)	a program

6. Fill in the table with the information about the subjects which students of different computer directions learn, the positions which they can apply to and the main features of their future job (табл. 3).

Таблица 3

Study	Subjects	Positions	Features
Computer Science			
Computer Engineering			
Information Technology			

7. Which of the three given fields suit your future profession and your career preferences more? Say about it.

UNIT 2. HISTORY OF COMPUTERS

Text 1. Predecessors of computers

The first counting device was used by the primitive people. They used sticks, stones and bones as counting tools. As human mind and technology improved with time more computing devices were developed. The history of computer begins with the birth of abacus which is believed to be the first computer. Chinese are said to have invented Abacus around 4,000 years ago. It was a wooden rack which has metal rods with beads mounted on them. The beads were moved by the abacus operator according to some rules to perform arithmetic calculations of addition and subtraction. Abacus is still used in some countries.

The 17th century saw the first attempts to create a kind of calculating machines undertaken by European scientists. A Scottish mathematician John Napier (1550–1617) invented manually-operated calculating device in which he used 9 different ivory strips or bones marked with numbers for multiplication and division. So, the tool became known as ”Napier’s Bones”. It was also the first machine to use the decimal point.

Between 1642 and 1644 ”Pascaline” also known as ”Arithmetic Machine” or ”Adding Machine” was invented by a French mathematician-philosopher Blaise Pascal. It is believed to be the first mechanical and automatic calculator. Pascal invented this machine to help his father, a tax accountant. It could only perform addition and subtraction. It was a wooden box with a series of gears and wheels. When a wheel is rotated one revolution, it rotates the neighboring wheel. A series of windows is given on the top of the wheels to read the totals.

Stepped Reckoner or Leibnitz wheel was developed by a German mathematician-philosopher Gottfried Wilhelm Leibnitz in 1673. He improved Pascal’s invention to develop more efficient machine. It was a digital mechanical calculator which obtained its name as instead of gears it was made of fluted drums.

In the early 1820s, English mathematician Charles Babbage known as ”Father of Modern Computer” designed ”Difference Engine”. It was a mechanical steam driven calculating machine which could perform simple calculations and solve tables of numbers like logarithm tables. Analytical Engine was also developed by Charles Babbage in 1830. It was a mechanical computer that used punch-cards as input. It was capable of solving any mathematical problem and storing information as a permanent memory.

Since the 19th centuries it has been Americans who contributed into the development of computers. Tabulating machine was invented in 1890, by Herman Hollerith, an American statistician. It was a mechanical tabulator based on punch cards. It could tabulate statistics and record or sort data or information. This machine was widely used in the U.S. Census of 1890. Hollerith also started the ”Hollerith’s Tabulating Machine Company” which later became International Business Machine (IBM) in 1924.

The first electronic computer was introduced in the United States in 1930. It was Differential analyzer — an analog device created by Vannevar Bush and his colleagues from the Massachusetts Institute of Technology. This machine has vacuum tubes to switch electrical signals to perform calculations. It could do 25 calculations in few minutes.

The next major changes in the history of computer began in 1937 when an American engineer Howard Aiken planned to develop a machine that could perform calculations involving large numbers. In 1944, Mark I computer was built as a partnership between IBM and Harvard. It was the first programmable digital computer and the beginning of a new computer era.

*1. Read and translate the following international words. *Make up your sentences with them:* calculator, mechanical, automatic, electronic, analog, colleague, programmable, permanent, signal, statistics, design, card.

2. Translate the following words from the text into English. Combine the new word, using the first letter of every English word: постоянный, счетчик, двигатель (машина), цифровой, эпоха (эра), изменение, эффективный (работоспособный), наука, ряд (серия), приобретать (получать), вращать(ся), шаг.

*3. Choose the right noun for each given verb. Translate the received collocations. *Make up sentences with them:*

1)	to improve	a)	large numbers
2)	to store	b)	technologies
3)	to undertake	c)	into the development
4)	to solve	d)	a machine
5)	to perform	e)	information
6)	to develop	f)	problems
7)	to contribute	g)	attempts
8)	to involve	h)	calculations

*4. Explain the meaning of the following words. *Make up sentences with them:* decimal, census, partnership, data, to tabulate, memory, accountant, punch-card.

*5. Find in the text nouns which mark mathematical actions. They were formed with the help of suffixes from the corresponding verbs. Change them back to obtain original verbs. *Make up sentences with them.*

6. Answer the following questions:

1. What device may be called the first computer? Prove your opinion.
2. Who is called ”Father of modern computer”? Do you agree with that?
3. Why were scientists so involved into the development of calculating devices? Prove your opinion.
4. What functions are the most important in a calculating device? Why?
5. What functions are the least important in a calculating device? Why?
6. Give examples of socially significant application of calculating machines.
7. What are the main differences between calculating machines of different generations?

7. Arrange the following devices in the chronological order of their emergence and describe any of them: Tabulating machine, Analytical Engine, Mark I, Differential analyzer, Abacus, Difference Engine, Arithmetic Machine, Napier’s Bones, Stepped Reckoner.

**8. Name a scientist who made the greatest contribution into the development of computers. Prove your opinion.*

Text 2. Five generations of computers

The computers of today find their roots in the second half of the twentieth century. 1946 saw many technological improvements in physics and electronics, the most significant being electronic pathways called circuits. They replaced the gears and other mechanical parts used for counting in previous computing machines. In each new generation, the circuits became smaller and more advanced which helped to increase the speed, memory and power of computers. In other words, this has eventually led to revolutionary developments in the hardware and software of computers — the computer has started to evolve, and each such technological advancement marks a generation of computers.

Computers developed between 1946–1959 are **the first generation of computers**. They were large and limited to basic calculations. They consisted of large devices like the vacuum tubes. The input method of these computers was a machine language known as the 1GL or the first generation language. The physical methods of using punch cards, paper tape, and magnetic tape were used to enter data into these computers.

Examples of the first generation computers include ENIAC, EDVAC, UNIVAC, IBM-701, and IBM-650. These computers were large and very unreliable. They would heat up and frequently shut down and could only be used for very basic computations.

Computers developed between 1959–1965 represent **the second generation**. These computers were more reliable and in place of vacuum tubes, used transistors. This made them far more compact than the first generation computers. Higher level languages like COBOL, FORTRAN etc. were the input for these computers. Primary memory in them was stored on the magnetic cores and magnetic tape and they used magnetic disks as secondary storage devices.

Examples of the second generation computers include IBM 1620, IBM 7094, CDC 1604, CDC 3600, UNIVAC 1108. As a result, they worked on AC and therefore were faster than their predecessors.

Computers developed during the period of 1965–1971 are called **the third generation of computers**. These computers differed from the first and the second generations simply by the fact that a new circuit element like IC's (Integrated Circuits) was used. An integrated circuit is a small device that can contain thousands and thousands of devices like transistors, resistances and other circuit elements that make up a computer. Jack Kilby is credited with the invention of the Integrated Circuit or the IC chips. With the invention of IC's, it became possible to fit thousands of circuit elements into a small region and hence the size of the computers eventually became smaller and smaller.

Another salient feature of these computers was that they were much more reliable and consumed far less power. The input languages for such computers were COBOL, FORTRAN-II up to FORTRAN-IV, PASCAL, ALGOL-68, BASIC, etc. These languages were much better and could represent more information. Consequently more and more complex calculations became possible.

Examples of the third generation computers include IBM-360 series, Honeywell-6000 series, PDP (Personal Data Processor), and IBM-370/168.

The fourth generation of computers appeared between 1971 and 1980. These computers used the Very Large Scale Integrated (the VLSI) circuits technology. Therefore they were also known as the microprocessors. Intel was the first company to develop a microprocessor. The first "personal computer" or PC developed by IBM, belonged to this generation. VLSI circuits had almost about 5,000 transistors on a very small chip and were capable of performing many high-level tasks and computations. These computers were thus very compact and thereby required a small amount of electricity to run.

Examples are STAR 1000, CRAY-X-MP (Super Computer), DEC 10, PDP 11, CRAY-1. This generation of computers had the first "supercomputers" that could perform many calculations accurately. They were also used in networking and also used higher and more complicated languages as their inputs. The computer languages like languages like C, C+, C++, DBASE etc. were the input for them.

The fifth generation of computers is the present generation and is the most advanced one. The generation began somewhere around 1981. The methods of input include the modern high-level languages like Python, R, C#, Java etc. These are extremely reliable and employ the ULSI or the Ultra Large Scale Integration technology. These computers are at the frontiers of the modern scientific calculations and are used to develop the Artificial Intelligence or AI components that will have the ability to think for themselves: Intel P 4, I3–I12, AMD Athlon, etc.

*1. Read and translate the following international words. *Make up your sentences with them*: electronics, physics, revolutionary, compact, magnetic, transistor, method, calculation, electricity, personal, complex, chip, company, technology, information.

*2. Connect every word with its antonym. Translate the received pairs. *Make up sentences with them*:

1)	complicated	a	bulky
2)	predecessor	b)	at first
3)	compact	c)	follower
4)	to evolve	d)	to worsen
5)	eventually	e)	easy
6)	salient	f)	to produce
7)	to improve	g)	to degrade
8)	to consume	h)	ordinary

*3. Find the word according to the explanation. *Make up sentences with them.*

1. All of the people living and all of the technical objects created at about the same time:
   a) representation; b) revolution; c) generation; d) invention.
2. A closed system of wires through which electricity can flow:
   a) circuit; b) tube; c) transistor; d) microprocessor.
3. The basic cause, source or origin of something:
   a) limit; b) science; c) input; d) root.
4. A person or an object that has been followed or replaced by another:
   a) data; b) predecessor; c) consumer; d) frontier.
5. Consistently good in quality and performance, able to be trusted:
   a) eventual; b) salient; c) reliable; d) capable.

4. Read the descriptions. Say which generation of computers they belong to?

1. Such computers were more compact, powerful, fast and affordable as they used very large scale integrated (VLSI) circuits; a chip containing millions of transistors and other circuit elements.

2. These computers were expensive, slow and huge with vacuum tubes as the basic components of processor and memory.

3. This generation represented the era of the transistor computers in which magnetic cores were used as the primary memory and magnetic disc and tapes were used as the secondary storage.

4. In this generation computers the VLSI technology was replaced with ULSI (Ultra Large Scale Integration) which made possible the production of microprocessor chips with ten million electronic components.

5. The computers of this generation became more reliable, efficient and smaller in size; they used integrated circuits (ICs) instead of transistors.