МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
ХАРКІВСЬКИЙ НАЦІОНАЛЬНИЙ ЕКОНОМІЧНИЙ УНІВЕРСИТЕТ ІМЕНІ СЕМЕНА КУЗНЕЦЯ

Кафедра інформаційних систем

«ЗАТВЕРДЖУЮ»
Проректор з навчально-методичної роботи

_____ Каріна НЕМАШКАЛО

РОБОЧА ПРОГРАМА ПЕРЕДДИПЛОМНОЇ ПРАКТИКИ

рівень вищої освіти	другий (магістерський)
галузь знань	12 "Інформаційні технології"
спеціальність	126 Інформаційні системи та технології
освітньо-професійна програма	Інформаційні системи та технології

Завідувач кафедри інформаційних систем

Дмитро БОНДАРЕНКО

Гарант освітньо-професійної програми Інформаційні системи та технології

підписано КЕП

Олександр КОЛГАТІН

Харків
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MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
SIMON KUZNETS KHARKIV NATIONAL UNIVERSITY OF ECONOMICS

Department of Information Systems

AGREED
Vice-rector for educational and methodical work
_____ Karina NEMASHKALO

PRE-GRADUATE PRACTICE
Programme of the course

Field of knowledge	**12 "Information Technologies"**
Specialty	**126 "Information Systems and Technologies"**
Study cycle	**second (master)**
Study programme	**"Information Systems and Technologies"**

Head of Information Systems Department _____ Dmytro BONDARENKO

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Kharkiv
2024

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The programme was agreed with the Head of study program "Information Systems and Technologies"

The programme was approved at a meeting of the Information Systems Department
Protocol №1 from August 27, 2024

The programme has been prolonged:

20__/20__ year Head of the Department of Information Systems

Dmytro BONDARENKO

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The programme has been prolonged:
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Introduction

Specialty 126 "Information systems and technologies" is a practically oriented and, at the same time, scientific field of modern information technologies development. Therefore, pre-graduate practice in information systems and technologies provides a combination of scientific theory and practice of the work of enterprises and is an important stage in the training of future specialists in this specialty.

This programme contains a description of the processes of passing the practice and practical tasks that will help the students to use the methodologies of subject area analysis, modelling, teamwork and project management, technologies for development and improvement of information systems. As part of the pre-graduate practice, students will have the opportunity to work with real projects, using modern tools and technologies. They will be able to improve their communication, teamwork and problem-solving skills in the design process.

The programme of the pre-graduate practice was developed in accordance with the educational programme "Information systems and technologies" of the second (master's) level of higher education, specialty 126 "Information systems and technologies".

1. Characteristics, purpose, tasks and results of pre-graduate practice

1.1. Characteristics of pre-graduate practice (Table 1).

Table 1

<table>
<tr><th>Number of credits</th><th colspan="2">Total hours</th><th>type of control</th><th>Semester</th></tr>
<tr><td rowspan="4">12</td><td colspan="2">360</td><td rowspan="4">report</td><td rowspan="4">3</td></tr>
<tr><td colspan="2">Of them:</td></tr>
<tr><td>practice</td><td>self-study work</td></tr>
<tr><td>-</td><td>360</td></tr>
</table>

1.2. Purpose pre-graduate practice is the generalization, systematization, consolidation and deepening of students' theoretical knowledge in specialized disciplines, acquisition of skills in the analysis of information systems of the management object for the purpose of independent design and development of information system elements using modern information technologies, tools and CASE-means.

1.3. The main tasks of pre-graduate practice include:

– organization of communication processes with practice managers and students;

– acquaintance of students with the organizational structure of the practice base, management processes, activities or projects performed at the practice base;

– formulation of requirements for the tasks of the diploma project (pre-graduate practice);

– development of skills in conducting pre-project analysis and software development;

– carrying out pre-project analysis of the subject area of research (diploma topics) using various tools and technologies;

– development of communication skills in cooperation with specialists of the practice base.

Tasks of pre-graduate practice students are:

– collection of material on the topic of the diploma project;

– analysis of the activity and organizational structure of the management object;

– carrying out a pre-project analysis on the topic of the diploma project;

– analysis of available analogues of the solution;

– comparative analysis of found analogues;

– formation of a pre-graduate practice report.

The main task of pre-graduate practice is the formation of the ability to solve problems of research and innovation nature in the field of information systems and technologies as the integral competence, other general and special competences that are needed for the future profession. After completing practice, students must achieve results in accordance with the educational programme (Table 2).

Table 2

Planned competencies and learning outcomes by types of practices

Learning outcomes	Competences
LO01	Integral Competence
LO02	GC03
LO04	GC03
LO05	GC03
LO08	Integral Competence
LO09	Integral Competence
LO11	Integral Competence, GC03

LO12	GC03

where:

LO01. Searching for necessary information in scientific and technical literature, databases, other sources, analyse and evaluate this information.

LO02. Communicating freely in national and foreign languages in scientific, industrial and social spheres of activity.

LO04. Managing ICT development, implementation and operation processes that are complex, unpredictable and require new strategic and team approaches.

LO05. Determining the requirements for ICT on base of business processes and needs of interested parties' analysis, to develop technical tasks.

LO08. Developing models of information processes and systems of various classes, to use methods of modelling, formalisation, algorithmization and implementation of models using modern computer tools.

LO09. Developing and use data warehouses, to perform data analysis for supporting decision-making.

LO11. Solving the problems of digital transformation in new or unknown environments based on specialised conceptual knowledge, including modern scientific achievements in the field of information technology, researches and integration of knowledge from various fields.

LO12. Improving the information system on the base of business processes analysis.

Integral Competence – The ability to solve problems of a research and innovation nature in the field of information systems and technologies.

GC03. Ability to communicate with representatives of other professional groups at different levels (with experts from other fields of knowledge/types of economic activity).

2. Content and organization of pre-graduate practice

2.1. Pre-graduate practice.

Pre-graduate practice is an important component of the educational process of students for specialty «Information Systems and Technologies» because it allows students to gain their practical experience in the field of computer technologies and expand their knowledge and skills.

Organisation of practice includes:

– coordination of the pre-graduate practice plan taking into account the tasks and purpose of the practice, time schedule and requirements;

– determination of the practice base, where students will be able to gain practical experience and learn modern technologies;

– approval of diploma project topics - students carries out the research on the practice base (an enterprise, an institution, an organization) within the framework of the topic of their diploma projects;

– consultation on practice;

– communication with practice managers;
– monitoring of the practice process;
– evaluation of practice results.

Pre-graduate practice can be carried out in institutions (in particular, educational and scientific divisions of higher education institutions), in enterprises (state or private, in particular in IT companies), organisations where it is possible to collect and study materials related to the information support of business processes, and where there are specialists who have experience in the field of use, maintenance, improvement and development of information systems and technologies.

The organization of practice at all stages is aimed at ensuring the continuity and consistency of students' mastery of professional skills and abilities in accordance with the requirements according to the level of master's training. Practice is conducted in accordance with the individual programme of pre-graduate practice agreed upon by the student and the academic supervisor based on general approaches to its content and structure.

The appointment of supervisors is carried out by the graduation department and agreed by rector's order. After signing the order, changes in organizational matters of the practice are not allowed. Before the start of the internship, the supervisors of the internship from the graduation department of KhNU named after S. Kuznets conducts preparatory meetings for pre-graduate practice, where students are introduced to the purpose and tasks of pre-graduate practice, the calendar plan for the practice, requirements for writing reports on practice, and the duties of students during practice. Safety instruction is given at the introductory meeting during pre-graduate practice, which is recorded in the safety instruction book.

According to the results of the meetings, students fill in practice diaries. The higher education student is provided with a template and an example of the diary. In the diary, students fill in: information about themselves, the title of the practice base, the type of practice, the period of practice, a calendar schedule with a list of scheduled work. Entries in the diary must be certified by the signature and seal of the head of the Institute of Information Technologies (which is a structural unit of our university - S. Kuznets Kharkiv National University of Economics), the signature and seal (if available) of the head of the practice base, the signatures of the supervisors-consultants appointed for the student from our university and the base of practice. If necessary, the student is provided with a referral from the university to the practice base.

During pre-graduate practice, the student must:

– undergo training in rules of occupational health and safety, strictly follow these rules;
– to obtain assignments for pre-diploma practice;
– to comply with the rules of internal labour regulations;
– fully and independently perform the tasks provided for by the programme and practice schedule plan;
– to ensure the necessary quality of the work performed;
– regularly keep records in the practice diary about the nature of the work performed and tasks, provide it in a timely manner for control by the practice managers;
– prepare and defend a report based on the results of the internship.

In the first week of practice, a student has to:

– receive assignments for pre-graduate practice;

– coordinate the schedule of consultations with the supervisor at the department and familiarize yourself with the schedule of visits to this practice base by authorized teachers-consultants;

– certify the calendar schedule with the signature of the supervisors from our university and from the practice base (for students who undergo practice at the "Information Systems" department – supervisor from the practice base is the head of the department);

– certify with the signature and seal of the management of the practice base that the student has arrived for practice.

In the last week of practice, the student has to:

– make all work records in the diary;

– submit the diary to the supervisors to receive written feedbacks based on the results of completed work (appendixes A and B);

– certify with the signature and seal of the management of the practice base the withdrawal of the student from the practice;

– create a report, the title page of which is signed by the student, the supervisor from the university and the supervisor from the practice base (should be certified by the seal of practice base).

The student's individual pre-graduate practice plan must be coordinated with the work plan of the organization that is the practice base. During the internship, students follow all the rules of the internal safety regulations established in the practice base and at workplaces. After the internship, students prepare the necessary documentation in accordance with the content of the pre-graduate practice (Table 3).

Table 3

Programme of pre-graduate practice with distribution by days

No. z/p	The content of the work	Weeks of practice
1	Passing safety training	at the beginning of practice
2	Familiarization with the IT project management system used by the enterprise (institution, organization) - the basis of practice	1
3	Familiarization with the object of management and its organizational management structure according to the topic of the diploma work	1
4	Creation of models of the organizational structure of the management object using CASE tools	1–2
5	Analysis of business processes of the subject area of a specific management object with the implementation of CASE tools	1–2

6	Acquaintance with existing analogues that implement the functions of the subject area	2–3
7	Performing a comparative analysis of found analogues and developing proposals for improving the functions of the subject area for the management object	3–4
8	Acquaintance with available methods and technologies for solving the problem	3-4
9	Building an innovation model and a plan for continuing research	4–6
10	Implementation of research results	5–6
11	Preparing the report	during practice

Practice supervisor from the university:

– carries out general management and control over students' practice;

– provides students with consultations regarding the procedure for completing practice;

– provides students with the necessary documents: the work programme of the practice, individual assignments, etc.;

– advises students on collecting and preparing materials necessary for writing a practice report;

– ensures high quality of practice passage in accordance with the work programme of the practice in cooperation with the supervisor from the practice base;

– supervises students' implementation of the work programme of practice and individual tasks;

– participates in the work of the commission for the protection of practice reports; verifies the content of the report and its compliance with the work programme of the practice;

– participates in the discussion of the practice results.

Practice supervisor from the practice base performs the following functions:

– organizes students' practice in full compliance with the regulations and practice programme;

– provides students with workplaces and creates conditions for them to receive information during the practice period for the implementation of the practice programme;

– ensures instruction of students on occupational health and safety rules;

– provides students with assistance in developing their individual calendar plans for practice and supervises their implementation together with the practice supervisor from the university;

– provides students with the necessary consultations on issues that are part of the practice assignment and the diploma project, with the involvement of the practice base specialists;

– carries out methodical guidance and provides assistance to students when performing their research and project activity;

– provides students with the opportunity to discuss at the enterprise (in the unit) the results of systematization and analysis of initial information and solving practice tasks;

– prepares conclusions about the students' work with an assessment of fundamental, general professional and special training, attitude to tasks and the practice programme;

– prepares a feedback on completing the internship for each student with an assessment of attitude to work, compliance with labour discipline, level of theoretical and practical training, acquired skills and abilities, conscientiousness and initiative in work.

3. Requirements for the bases of pre-graduate practice

The requirements for the practice bases ensure the efficiency and quality of the organization of practice processes.

Consolidation of practice bases should contribute to the establishment and strengthening of long-term contacts of the university with enterprises (organizations), as well as the development of cooperation between them for the purpose of high-quality training of specialists. The determination of bases of practice should be preceded by the constant work of the S. Kuznets Kharkiv National University of Economics and, particularly, of the Information System Department on studying the production and economic capabilities of enterprises (organizations) from the point of view of their suitability for the practice of students by specialty "Information Systems and Technologies". In addition, the prospects of modern trends in the development of the IT industry, economic, social and environmental development of society should be taken into account.

Practice bases must meet the following requirements: the organization's activities must correspond to the research topic, the organization must have basic business processes for designing, developing, implementing, supporting information systems and technologies, IT solutions or services; the availability of an appropriate level of technical support to ensure the intern's workplace, the use of modern information technologies; the possibility of conducting practice individually or in a group of students in compliance with the practice programme; availability of communication with representatives of the higher education institution.

4. Individual practice tasks

Individual tasks are determined by practice supervisors in accordance with the practice programme.

The tasks of students for pre-graduate practice are:

– undergo safety procedures at the control facility;

– familiarizing with the IT project management system used by the practice base;

– collecting material on the subject of the master thesis for project

development and data for the implementation of project solutions;

– familiarizing with the object of management according to the master thesis objectives, its organizational structure and the structure of its individual divisions;

– developing models of the organizational structure of the management object using CASE tools;

– performing an analysis of the business processes of the subject area of a specific management object with the implementation of CASE tools;

– familiarizing yourself with the available analogues that implement the functions of the subject area, using the resources of the "Internet" network;

– performing a comparative analysis of the found analogues and, on this basis, develop proposals for improving the business processes of the subject area for the object of management based on the creation of project solutions;

– write and defend a report on pre-graduate practice.

5. Requirements for the pre-diploma practice report

The structure of the content of the pre-graduate practice report and the recommended number of pages are given in the table. 4.

Table 4

An example of the pre-diploma practice report structure

Section of the report	Number of pages
Title page	1
Content	1
Introduction	1
1. Management of the <NAME> project during the pre-diploma practice 1.1. Characteristics of the enterprise (institution, organization) that is the base of practice (main directions and types of activities; main products (services) and potential users; organizational structure; dynamics of enterprise (institutions, organizations) development 1.2. Peculiarities of enterprise (institution, organization) management (management system analysis; work organization analysis, etc.) 1.3. Peculiarities of an internship for the student (role and functions of the unit in which the student is undergoing practice in the company's activities; the intern's place in the unit's activities; the purpose of the practice, the tasks that were set to the	5

student during the practice, student's master thesis work management as a part of IT-project management in the unit)	
2. Statement of the master thesis problem 2.1. Analysis of the subject area by the topic of the master thesis (it is necessary to show the value of innovations, which are provided by the task of the thesis, for the development of the subject area; it is advisable to analyse the business process, which is aimed at the implementation of certain tasks within the limits of the subject area; BE CAREFUL - if the research base does not coincide with the practice base (for example, practice in an IT company that serves a certain enterprise) you need to show here the organizational structure and business process of the enterprise (institution, organization) in which the implementation of the innovation is planned) 2.2. Modelling of the subject area (the analysis of the business process must be carried out on the basis of its graphic model built in one of the generally accepted notations, in some cases it is advisable to use information-logical or mathematical modelling) 2.3. Available methods and technologies for solving the problem (a description of the methods and technologies used at the enterprise for management and implementation of the tasks set in the master thesis (for all management functions); analysis of methods and technologies that can be used to solve the business tasks set to the student; analysis and comparison of known solutions to achieve the goal in a similar situation) 2.4. Tasks and research plan (justification of the choice of methods and technologies recommended by the student of higher education with the aim of the most expedient solution of business problems to achieve the goal of the master thesis)	7 – 8
3. Design plan 3.1. Building a model of innovation (building a model of the future information system or a model of its module or a model of some other innovative impact on information technologies that support the business process; building a usage diagram, an interface model, a logical database model, etc., if you need) 3.2. Development of the research results implementation plan (the implementation of the innovations proposed in the master thesis involves the practical implementation of the model developed by the student of higher education. The implementation plan may include the following stages: – reasonable choice of software and hardware components of the	7 – 8

system, programming languages and technologies; - construction of an algorithm or class diagram of the software complex (in the case of development of the appropriate software by the student); – implementation and filling of the database (if necessary); – implementation of the interface with users and other system components; – proving the reliability of the innovative product; - making changes to the management of the enterprise in which the innovation will be implemented; – etc.)	
Conclusions	1
references	2
Appendices	

The recommended length of the report is up to 30 pages. It is advisable to present the material of the report concisely, focusing on models and stages of work. It is advisable to present data in a condensed form using tables and charts.

6. Summary of pre-graduate practice

The report must be drawn up and completed at the enterprise (organisation), checked by the supervisor from the practice base and, together with the practice diary, submitted to the Information Systems Department by the set deadline. After submitting the specified materials, the supervisor of the university decides on the admission of the higher education student to defend the practice results. It is necessary to check the report for plagiarism using the StrikePlagiarism.com system, if the check is passed, the applicant may be admitted to the defence.

During the defence of the practice results, it is necessary: to show knowledge of the subject area of the research topic, methodologies for the development of information systems and software; to demonstrate the results of practice.

Higher education students who did not complete the practice programme and received a negative feedback on the work and an unsatisfactory grade during the defence will be dismissed from the university. Practice materials submitted to the department will not be returned to students. Higher education students defence the results of practice (with differentiated assessment) in the commission appointed by the head of the department. The commission consists of those responsible for conducting practice from the department of information systems as well as the guarantor of the programme.

The results of practice are discussed at department meetings: practice supervisors report on the students' results of practice by students, provide suggestions for improving the organization of the practice, diversifying the means of conducting it, using modern methods, best practices, and cooperation with practice bases.

7. Criteria for evaluating the results of pre-graduate practice

The results of the pre-graduate practice are evaluated according to the 100-point evaluation system adopted at the university.

The final number of points received by the student of higher education based on the results of the practice takes into account:

- supervisor's feedback from the practice base;
- feedback of supervisor from the university;
- presentation of the results of the practice by the student of higher education during the defence process;
- student's answers to questions.

Evaluation criteria of the practice report.

90-100 points if the report shows a deep understanding of the theoretical material, basic skills have been developed and mastered at a high level; presentation of the material is logically consistent, evidential, conclusions and generalizations are accurate; supervisors' feedback about the student's practice are high and positive; the reporting documentation on the completion of the practice is drawn up in accordance with the established requirements at the appropriate level.

74-89 points if the report meets the above-mentioned criteria, but the material is not sufficiently systematized, individual skills are formed at an insufficiently high level, there are some inaccuracies in the conclusions and generalizations, the answers to the questions of the commission members are generally correct; the supervisors' feedback regarding the student's practice are positive, with minor comments regarding the content and design of the pre-graduate practice materials.

60-73 points if the report demonstrates a general understanding of the main tasks of the practice programme; there are significant deficiencies in theoretical knowledge; the basic skills and abilities in the student's work are insufficiently formed, conclusions and generalizations are weakly argued; Supervisors' feedback on the practice are generally positive with significant comments, there are significant shortcomings in the documentation of internships.

1 – 59 points if a student does not have theoretical knowledge enough; did not complete all pre-graduate practice tasks; cannot answer the questions of commission members; supervisors' feedback about practice are negative; there is documentation of the internship, but it is not formalized in accordance with the requirements.

A student should be considered certified if the grade obtained as a result of the defence equals or exceeds 60 points.

8. Recommended literature

1. ДСТУ 3582:2013. Бібліографічний опис. Скорочення слів і словосполучень українською мовою. Загальні вимоги та правила. – Київ : Мінекономрозвитку України, 2014. – 15 с.

2. ДСТУ 8302:2015. Інформація та документація. Бібліографічне посилання. Загальні положення та правила складання. – Київ : ДП "УкрНДНЦ", 2016. – 17 с.

3. ДСТУ 3008-15. Інформація та документація. Звіти у сфері науки і техніки. Структура та правила оформлювання. – Київ : ДП "УкрНДНЦ", 2016. – 31 с.

4. ДСТУ 1.5:2015. Національна стандартизація. Правила розроблення, викладання та оформлення нормативних документів. – Київ : ДП "УкрНДНЦ", 2015. – 65 с.

5. Методичні рекомендації до оформлення звітів, курсових проєктів та дипломних робіт (проєктів) для студентів спеціальностей 126 "Інженерія програмного забезпечення", 122 "Комп'ютерні науки", 126 "Інформаційні системи і технології" / уклад. І. О. Ушакова, Г. О. Плеханова, О. М. Беседовський. – Харків : ХНЕУ ім. С. Кузнеця, 2021. – 46 с.

Appendix A

Feedback of supervisor from the university about the pre-graduate practice

The feedback from the practice supervisor from the university must include the following:

– the compliance of the assigned tasks with the set deadlines of the calendar schedule is indicated;

– the degree of completeness of solving the issues considered in the work is emphasized;

– attention is drawn to the scope and quality of the work performed by the student;

– attention is paid to the timeliness and correctness of keeping a practice diary;

– the obligation to attend consultations conducted by the supervisor is indicated;

– reviews of specialists from the practice base, which are provided to the supervisor during a visit to the practice base, are taken into account.

Appendix B

Feedback of supervisor from the practice base about the pre-graduate practice

The following must be stated in the feedback of the practice manager from the enterprise:

– completeness of the student's completion of the pre-graduate practice programme;

– the quality of the student's writing of the internship report, its compliance with established requirements and the realities of the practice base;

– the level of preparation of the higher education student for professional activity in terms of theoretical knowledge and practical skills;

– the student's attitude to work, his organization and discipline;

– the practical significance of the student's suggestions, set out in the report, regarding the improvement of certain aspects of the tasks being solved, etc.;

– the ability to work in a team, the level of communication, public attitude and other personal traits that appeared during practice.