Хмельницький національний університет

THROUGH PRACTICAL TRAINING PROGRAM

НАСКРІЗНА ПРОГРАМА ПРАКТИЧНОЇ ПІДГОТОВКИ

Методичні настанови
для здобувачів першого (бакалаврського) рівня вищої освіти
спеціальності 121 «Інженерія програмного забезпечення»

Затверджено на засіданні кафедри
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Укладачі: Радельчук Г. І., канд. техн. наук, доц.;
Бедратюк Л. П., д-р фіз.-мат. наук, проф.;
Форкун Ю. В., канд. техн. наук, доц.;
Яшина О. М., канд. техн. наук, доц.;
Онишко О. Г., канд. пед. наук, доц.;
Бедратюк Г. І., ст. викл.

Відповідальний
за випуск: Бедратюк Л. П., д-р фіз.-мат. наук, проф.

ВСТУП

На сучасному етапі розвитку інформаційних технологій пред'являються підвищені вимоги до підготовки інженерів-програмістів у закладах вищої освіти. Майбутні фахівці повинні не тільки володіти загальнопрофесійними і спеціальними знаннями, набути загальних та професійних компетентностей, а й уміти, на основі вивчення та оцінки поточної і перспективної ситуацій, формувати цілі та завдання виробництва, знаходити шляхи їх ефективного вирішення, а також набути первинних навичок командної роботи.

Важливе значення для закріплення та поглиблення теоретичних знань і набуття практичного досвіду професійної діяльності має проходження здобувачами вищої освіти різних видів практичної підготовки. Практика відіграє особливу роль у формуванні професійної компетентності здобувача, який спеціалізується у галузі інформаційно-комп'ютерних технологій та/або у споріднених з нею галузях.

Наскрізна програма практичної підготовки передбачає безперервність та послідовність її проведення, отримання, розвиток та удосконалення здобувачами достатнього обсягу компетентності відповідно до освітньо-професійної програми підготовки бакалавра за спеціальністю 121 «Інженерія програмного забезпечення». В період практики у них закладаються основи досвіду професійної діяльності, практичних умінь та навичок, професійних якостей особистості здобувача тощо. Від ступеня успішності на цьому етапі у значній мірі залежить професійне становлення майбутнього фахівця.

Забезпечуючи зв'язок закладу вищої освіти із сучасним виробництвом, практика також дозволяє оцінити рівень готовності майбутніх фахівців до розв'язання завдань у галузі інженерії програмного забезпечення (ІПЗ).

Програма і методичні настанови розроблені з метою організації наскрізної практичної підготовки здобувачів освітнього ступеня «бакалавр» спеціальності 121 «Інженерія програмного забезпечення» на підставі стандарту вищої освіти та освітньо-професійної програми спеціальності, навчального плану і відповідно до Положення про практичну підготовку здобувачів вищої освіти у Хмельницькому національному університеті та Кодексу законів про працю України.

У виданні представлені наскрізна програма практичної підготовки та методичні настанови щодо організації, змісту її окремих складових та вимоги до виконання здобувачами вищої освіти.

Укладачі сподіваються, що наведені настанови допоможуть продуктивній роботі здобувачів та дозволять уникнути зайвих витрат часу під час проходження окремих видів практики.

INTRODUCTION

At the current stage of information technology development, there are heightened demands on the training of software engineers in higher education institutions. Future specialists should not only possess general professional and specific knowledge and acquire general and professional competencies, but also be able to set goals and objectives based on the evaluation of the current and prospective situations. They should also find effective solutions to these challenges and acquire primary teamwork skills.

Undergoing various types of practical training is of paramount importance for consolidating and deepening theoretical knowledge and gaining practical experience in professional activities. Practical experience plays a pivotal role in shaping the professional competence of students specializing in information and computer technology and/or related fields.

The integrated program for practical training ensures continuity and consistency of its implementation, allowing students to gain, develop, and refine competencies in accordance with the educational and professional training program for a bachelor in specialty 121 "Software Engineering". During their practical training, the foundation for their professional experience, practical skills and abilities, and professional personal qualities are laid. The success at this stage largely determines the professional formation of the future specialist.

By linking higher education institutions with modern production, practical training also evaluates the readiness level of future professionals to tackle tasks in the field of software engineering (SE).

The program and methodological guidelines were developed to organize the comprehensive practical training of students pursuing a bachelor's degree in specialty 121 "Software Engineering", based on the higher education standard, the educational and professional program of the specialty, the curriculum, and in accordance with the Regulations on practical training of students at the Khmelnytsky National University and the Labor Code of Ukraine.

This publication presents the integrated program for practical training and methodological guidelines concerning its organization, content, requirements for performance by students.

The compilers hope that the provided guidelines will facilitate productive work of the students and will help avoid unnecessary time expenditure during different types of practical training.

1 PURPOSE AND TASKS OF PRACTICAL TRAINING

The purpose of practical training for students in "Software Engineering" is to consolidate and deepen theoretical knowledge acquired by students during the study of a certain cycle of specialized disciplines; to expand, improve, and deepen professional competences and learning outcomes using the material and technical equipment of the practice base; to form practical skills in solving tasks in the field of future professional activity; to develop students' ability to make independent decisions during specific work in real market and production conditions, to work in a team; to cultivate the need to systematically update their knowledge and apply it creatively in practical activities.

The tasks of practical training for students depend on the type of practice. During practical training, students should consolidate, expand, and refine competences specified in the educational program of the specialty, in particular: to apply knowledge in practical situations; identify, classify, and formulate requirements for software (SW); participate in SW design, including modeling (formal description) of its structure, behavior, and operational processes; develop architectures, modules, and components of software systems; formulate and ensure quality requirements for SW in accordance with customer requirements, technical specifications, and standards; adhere to specifications, standards, rules, and recommendations in the professional field when implementing lifecycle processes (LC); possess knowledge about information data models and create SW for storage, retrieval, and data processing; evaluate and take into account economic, social, technological, and environmental factors affecting the professional field; accumulate, process, and systematize professional knowledge on SW creation and support and recognize the importance of lifelong learning; implement phases and iterations of the LC of software systems and information technologies based on appropriate models and approaches to SW development; carry out the system integration process, apply standards and change management procedures to support integrity, overall functionality, and SW reliability; justify the choice and master tools for developing and supporting SW; ability for algorithmic and logical thinking; ability to work in parallel on the stages of the SW LC and effective interaction between the executors of the stages.

Accordingly, as a result of practical training, students should improve their integrated competence – the ability to solve complex specialized tasks or practical problems of software engineering, characterized by complexity and uncertainty of conditions, using theories and methods of information technologies.

A student who successfully completed the practical training program must achieve and perfect the following learning outcomes: analyze, purposefully search for, and select the necessary information and reference resources and knowledge needed to solve professional tasks, taking into account modern scientific and technical

achievements; be familiar with the code of professional ethics, understand the social significance and cultural aspects of software engineering, and adhere to them in professional activities; know and apply professional standards and other regulatory documents in the field of software engineering; have the ability to choose and use the appropriate methodology for software creation; know and apply in practice the fundamental concepts, paradigms, and basic principles of the functioning of language, instrumental, and computational tools of software engineering; know and be able to use methods and tools for collecting, formulating, and analyzing software requirements; conduct a pre-project survey of the subject area and a system analysis of the design object; choose input data for design using formal methods of requirement description and modeling; know and apply methods for developing algorithms, designing software, and structures of data and knowledge; possess skills in team development, coordination, formatting, and releasing all types of software documentation; be skilled in using methods of component software development; know and apply information technology methods for data processing, storage, and transfer; know and apply methods of software verification and validation; be aware of approaches to software quality assessment and assurance; understand, analyze, select, and expertly apply means of information security (including cybersecurity) and data integrity in accordance with the tasks being solved and the software systems being created; know and apply methods and tools for project management; be skilled in documenting and presenting software development results; conduct calculations on the economic efficiency of software systems; work effectively with executors of different stages of the software lifecycle, coordinating simultaneous work on stages; know and apply methodologies, tools, and strategies for resource, time, and communication management to ensure efficient parallel work on different stages of the software lifecycle; continuously develop professionally, process sources in both Ukrainian and English in the subject area, understand the need for lifelong learning to deepen and acquire new professional knowledge in the field of software engineering, adapt to working in a specific profession, promote an active and healthy lifestyle as an effective component of professional development; see oneself as a member of civil society and the scientific community, recognize the rule of law, especially in professional activities, understand and use one's own rights and freedoms, and respect the rights and freedoms of others.

2 TYPES AND CONTENT OF PRACTICES

2.1 Types of Practice

The practical training of students specializing in "Software Engineering" is a continuation of the educational process in production conditions. The educational program and curriculum provide for two types of practices: project and technological and professional.

Project and Technological Practice is conducted in the last semester of the penultimate year of study and lasts three weeks.

The goal of this practice is to consolidate and deepen the software learning outcomes acquired by students during the study of a certain cycle of theoretical disciplines, to gain the ability to make independent decisions during specific work in real professional conditions, to deepen general and professional competences and practical skills, and to gather materials for the execution of coursework projects and works, as well as applied and scientific research. In line with this goal, the main tasks of the practice are:

– A general introduction of the intern to the operations of the practice base;

– Familiarization with the available hardware and software of the practice base and its adequacy for the class of problems being solved;

– Reinforcing theoretical knowledge and expanding professional knowledge acquired during the study of specialized disciplines by the students;

– Gaining experience in independent collection, systematization, and generalization of materials necessary for task execution;

– Getting acquainted with the latest methods and tools for computer research and software design, with methods and means for collecting, processing, and storing information, forming databases, etc.;

– Mastering modern tools for designing and developing software systems and information technologies;

– Studying and using automation tools for software design and implementation applied at the intern's workplace;

– Developing the ability of students to implement the main processes, phases, and iterations of the Software Lifecycle;

– Absorbing the latest methodologies and tools for software design, using modeling methods and tools; refining skills and practical techniques from programming and software design disciplines;

– An initial introduction to the range of tasks a programmer has to address in professional activities.

During the practice, students acquire skills for independent work in solving specific problems in the field of Software Engineering. Based on these, they will be able to address design and development tasks for various software purposes (creating software requirements, describing its structure, subdividing into modules, using object-oriented analysis methods, describing system classes and components and their interconnections, requirements for the operating environment, and a justified choice of technologies and development tools, etc.).

Professional Practice of students is conducted in the last semester of the final year and lasts three weeks.

The goal of this practice is to summarize and refine the acquired competences and achieved software learning outcomes by allowing students to emulate the roles of software development professionals, master professional

experience, and test the students' readiness for independent work, as well as gather materials for the qualification work (QW).

In line with this goal, the main tasks of the professional practice are:

– Familiarization with the production conditions of designing and developing information technologies and software systems at the practice bases;

– Acquisition and development of practical skills of independent activity and teamwork during specific tasks in real production conditions when designing, developing, and implementing software (including by personal participation in the software projects of the practice base);

– Learning the latest design methodologies for algorithmic and software using modern tools and technologies;

– Mastering contemporary tools for designing and developing information technologies and software systems;

– Studying the organization of work in the departments of practice bases and the practical application of economic-organizational methods and advanced technologies in software development;

– Mastering modern methods, forms of organization, and tools of work in the field of the future profession;

– Developing skills in analytical, graphical, and literary presentation of the text, and formatting software documentation;

– Application of the acquired knowledge and skills by the students in solving specific technical, engineering, and production tasks in the field of information technologies and Software Engineering.

2.2. Content and Calendar Schedule of the Project and Technological Practice

The structure of the project and technological practice program implies familiarizing the student with the specifics of their specialty in real (or simulated) production conditions, the structure and hardware-software support of the practice base, performing project and technological operations from the specialty, improving general computer training, and so on. The content (program) of the practice should ensure the achievement of its goals and the execution of tasks. Students implement the content of the practice according to the tasks of the department, the basis of which are individual project tasks for practice. To organize the implementation of the practice program, a tentative distribution of time for the execution of various sections of the practice program or types of work (Table 1) is proposed.

The calendar schedule of the practice must be reflected in the practice diary. To activate the creative thinking of the students and enhance their ability to independently analyze and summarize the results of work, students are given individual project tasks, the content of which is established by the head of the practice from the department. The results obtained by students during the execution of such tasks can subsequently be used in the implementation of course projects, preparation of reports for scientific-practical conferences, etc.

Table 1 – Program of the project and technological practice

The name of the section of the programme or type of work	Number hours
1 Introductory lesson (familiarisation and study of the structure of the practice object; study of safety and occupational health and safety)	4
2 Practical classes and consultations of the manager during practice	8
3 Study of the technical and technological support of the object of practice (determining the characteristics of electronic computing systems, peripheral devices, the presence of local and/or global networks, telecommunications equipment, and so forth)	6
4 Studying the system software of the object of practice	6
5 Study of the applied software of the object of practice	6
6 Study of information and software (software) necessary to perform individual tasks; installation of the necessary software (design and development tools, CASE tools, DBMS, and so forth)	10
7 Performance of individual tasks	75
8 Systematisation of materials, design of reports, presentations, preparation for the defence of practice results	35
Total:	150

Note. The names of the program sections and the number of hours can be adjusted depending on the specifics of the conduct of project and technological practice at the enterprise.

Guided Directions and Themes of Individual Tasks

The following directions and a tentative list of themes for individual project tasks that the student should develop are recommended:

1. High-level programming language Python and its libraries OpenCV and NumPy. Basics of working with the OpenCV library.

2. Video processing technologies: road line marking.

3. Neural networks: object detection in images.

4. Machine learning: predicting and recognizing objects in photos and videos.

5. Computer vision: recognizing a person in a photo using the Dlib library.

6. Designing software aimed at engineering calculations, statistical data processing, mathematical modeling of processes, automation of work processes, etc.

7. Designing websites of different types and purposes.

8. Designing a 3D data visualizer.

Individual tasks may also reflect issues that correspond to the interests of students' work in the student scientific and technical society, departmental scientific research works, etc. (provided that this work corresponds to the educational program of the specialty). The student also has the right to propose their own theme of an individual project task with justification for its feasibility and with the agreement of the head of practice from the department (provided that this topic corresponds to the educational program of the specialty and the practice program).

2.3 Content and Calendar Schedule of the Professional Practice

The content of the professional practice is determined by its program, approved by the department. A separate component of the practice's content is the collection, processing, and analysis of factual material and statistical data according to the QW topic. To organize the execution of the practice program, a tentative distribution of time for performing various sections of the program or types of tasks is suggested (Table 2).

Table 2 – Professional Practice Program and Time Allocation.

The name of the section of the programme or type of work	Number hours
1 Introductory lesson (familiarisation and study of the structure of the practice object; study of safety and occupational health and safety)	4
2 Practical classes and consultations of the manager during practice	8
3 Study of the technical and technological support of the object of practice (determining the characteristics of electronic computing systems, peripheral devices, the presence of local and/or global networks, telecommunications equipment, and so forth)	6
4 Studying the system software of the object of practice	6
5 Study of the applied software of the object of practice	6
6 Study of information and software (software) necessary to perform individual tasks; installation of the necessary software (design and development tools, CASE tools, DBMS, and so forth)	10
7 Performance of individual tasks	75
8 Systematisation of materials, design of reports, presentations, preparation for the defence of practice results	35
Total:	150

Contents of the Professional Practice Program and Types of Work

1. *Introductory Session.* General introduction to the practice base, its structure, purpose, and position of each subdivision in the production process, their interrelationship, as well as logistics of managing technological processes and operational activities of the practice base. Familiarization with internal regulations, safety and labor protection briefing.

2. *Sessions during Practice.* Planning and conducting sessions during the practice is carried out jointly by supervisors from the university and the practice base. The sessions held during the practice will contribute to deepening the professional competence of the interns, especially regarding the latest technologies in software development, modern tools, etc., using the technical and technological capabilities of the practice base. For such sessions, it is advisable to involve qualified employees of the practice base. Excursions may be conducted during the practice to give students a better understanding of the practice base, its structure, the interaction of individual subdivisions, the existing management system, etc.

3–5. ***Study of the Technical, Technological, and Software Infrastructure of the Practice Base.*** The student must study the features of the technical, technological, and software infrastructure of the practice base; the specifics of the subdivision where the practice takes place; its structure, functions, and operational activities; software development processes; employees' duties, etc.

6. ***Introduction to Software Project Management Processes.*** The student should familiarize themselves with the Software Life Cycle (SLC) models used at the practice base, version control organization, software quality management system, team software development organization, planning tasks, etc.

7. ***Performance of Individual Tasks.*** At this stage, the student must: research the subject area where the software product is planned to be used according to the QW topic; collect and analyze factual material for the QW execution; set design tasks and develop technical specifications; preliminary software design, etc.

8. ***Systematization of Materials, Documentation Report Preparation, Presentation, and Preparation for Defense of Practice Results.*** At this stage, the student must systematize the materials obtained and developed during the professional practice, prepare a report and presentation, and pass an assessment.

The calendar schedule for the professional practice must be reflected in the practice diary.

3 PRACTICE BASES

Practice for students is conducted at appropriate facilities that provide the necessary conditions to fulfill the program of a certain type of practice. Educational and production laboratories of the university (which simulate the nature of work in IT companies) or IT enterprises with which the university has relevant agreements can serve as bases for project and technological practice. Bases for professional practice are modern IT companies, enterprises (organizations, institutions) from various economic sectors, provided they correspond to the objectives and tasks of the educational program "Software Engineering" and also ensure qualified practice supervision. With the practice base enterprises, the university concludes bilateral agreements to conduct the practice using an established (typical) form. The duration of the agreement is agreed upon by the contracting parties and can be defined for the period of a specific type of practice or for a term up to five years. Students can independently, with the agreement of the department, select a base and propose it for practice, submitting an appropriate "Approval Letter" from the enterprise (Appendix A). Practice bases must meet the following requirements:

− ensuring qualified supervision of the practice for students of the first (bachelor) level;

− the possibility of providing students with workplaces during the practice;

− the presence of production and structural units corresponding to the specialty "Software Engineering";

− giving students the opportunity to gather material for course and qualification works and applied research;

− granting students the right to use the library, laboratories, technical and other documentation necessary for the practice program;

− the possibility of further employment of graduates.

The selection of practice bases should be preceded by the department's continuous work in studying the production and economic capabilities of enterprises in terms of their suitability for conducting student practices in the specialty. At the same time, the prospects of modern directions in IT industry development, economic, social, and environmental development of society should be taken into account. The update of the practice bases should be based on the analysis of the results of the practice each year and contribute to the improvement of the quality and efficiency of practical training of students.

Note: Students can be employed in vacant positions or undergo practice as trainee engineers. In the case of practice trainees working in full-time positions, their work is paid by the enterprise on equal terms with permanent employees.

4 ORGANIZATION OF THE PRACTICE

4.1 General Guidelines

For pedagogical guidance on practical training, instructors from the IPZ department are appointed, as well as supervisors from the practice base, chosen from among qualified and experienced specialists. Regardless of the type of practice, no later than one month before it starts, the rector of the university, upon the recommendation of the graduating department, issues an order for the conduct of the practice. The practice supervisor from the department informs the students at organizational meetings before it begins.

At the organizational meetings, preliminary instructions are also provided to explain the purpose, content, and order of the practice. Each student is given a formatted task for practice, signed by the practice supervisor and approved by the department head, a practice diary (which the student keeps throughout the practice period), and individual practice tasks are also issued.

Individual tasks are developed by the practice supervisors from the department and are issued to each student. The content of the task must consider the specific conditions of the practice (including the capabilities of the practice base), meet the needs of production and simultaneously comply with the objectives and tasks of the educational program and the program of a specific type of practice.

The preliminary briefing aims to:
– inform students about the terms, purpose, and tasks of the practice;
– inform students about the practice venues;
– inform about the practice supervisors from the department;
– inform students about the specifics of organizing and undergoing practice at a specific enterprise (or in the university's laboratories);
– inform about the time and place of gathering students at the practice base;
– determine norms, rules, and channels for urgent communication with practice supervisors from the department;
– inform requirements for keeping practice diaries and writing reports;
– discuss the observance by students of safety and labor protection rules during the practice;
– discuss the working regime of the enterprise/laboratory, rules of internal order, educational, production, and ethical and moral discipline of students during the practice.

Note: Students who have not undergone a preliminary briefing on labor protection and safety techniques are not allowed to participate in the practice.

4.2 Duties of Participants in the Practical Training of Students

The practice supervisor from the university (department) is obliged to:
− ensure the organisation of events before sending students to practice (in particular, determining and approving the places of practice for all students who are sent to practice);
− formulate and approve the project task for groups of students for the practice period, draw up a practice calendar schedule, and coordinate it with responsible persons at the practice bases;
− conduct organisational meetings with students and preliminary instructions on practice before the start of practice;
− issue the necessary documentation to students (direction or certificate of assignment, programs, practice diaries, and so forth);
− provide students with the necessary methodological materials for practice and the implementation of project tasks;
− issue individual practice tasks to consolidate theoretical knowledge and practical skills;
− provide students with consultations on theoretical and practical issues related to the process of implementing the practice program;
− systematically hold meetings with students and practice managers from the enterprise;
− study the current achievements of practice bases in the field of modern SE technologies for their application in the educational process;
− acquaint students with the system of reporting on practice;
− check the results of students' project tasks;

− check diaries for the presence of necessary information, characteristics, signatures, and stamps;

− check and preliminarily evaluate practice reports;

− participate in the work of the commission for the defence of practice results.

Duties of the Practice Supervisor from the Enterprise:

− familiarise oneself with the practice program;

− acquaint students with the enterprise and distribute them to workplaces;

− ensure that all students undergo occupational health and safety instructions at the enterprise;

− acquaint students with the rules of internal order and the specifics of work at the corresponding workplaces;

− form and coordinate with the practice supervisor from the department the practice calendar schedule and project tasks for all students;

− regularly control the attendance record of students;

− ensure the implementation of the practice calendar schedule;

− check the results of students' project tasks;

− provide students with access to the necessary equipment, scientific and technical library, and regulatory and other documentation used in practical work;

− create conditions for acquainting higher education students with new equipment, the latest technologies, and modern methods of work organisation;

− assist students in selecting factual material necessary for the further course or diploma design;

− prepare feedback and evaluate the student's work.

Duties of the Student:

− appear for instructional meetings before the start of practice and receive the necessary documentation for practice;

− arrive at the practice base within the specified term;

− undergo occupational health and safety, and internal order instructions at the corresponding practice base before starting the practice, and strictly comply with its requirements during practice;

− develop a practice schedule with the practice supervisor from the organisation;

− competently perform duties at the workplace to fulfil the practice program;

− analyse the enterprise's activity, identify shortcomings, formulate proposals for ways to eliminate them;

− systematically keep a practice diary;

− participate in the community life of the practice base team;

− timely form reporting documentation on practice according to requirements.

The organisation, overall control over the practice, and compliance with its schedule are carried out by the practice supervisor from the university.

The Department of Software Engineering ensures general educational and methodological guidance of practice and control over the implementation of its program.

4.3 Occupational Health and Safety

To avoid injuries and accidents during practice, students must know and strictly follow occupational health and safety rules at the enterprise or in the educational and production laboratory (practice base). In connection with this, the following recommendations must be followed when undergoing practice of any kind.

Before leaving for practice, the department conducts organisational meetings and instructs on occupational health and safety for the practice period. At the practice site, students must also undergo introductory instruction on occupational health and safety, and direct instruction at workplaces, the main tasks of which are to acquaint with the following:

− internal order rules and the basics of labour discipline;

− instructions, rules, and norms of safety and industrial sanitation, electrical and fire safety concerning the production conditions of the enterprise's subdivisions (or educational and production laboratory);

− sanitary and hygienic measures carried out at the enterprise (in the premises of the department's laboratories, and so forth).

Students who have not undergone introductory instruction and instruction at the workplace are not allowed to practice.

The practice supervisor from the university controls the conduct of the introductory instruction at workplaces according to established rules.

When undergoing the practice, the student is obliged to strictly adhere to the rules of internal order, instructions, rules, and norms of safety and industrial sanitation of the corresponding practice base.

The student is obliged to immediately notify the administration of the subdivision (department), laboratory, and so forth, as well as the practice supervisor from the university, about an accident that occurred with him or a workmate.

The practice supervisor participates in the investigation of the causes of the accident that occurred with the student.

The supervisor reports the investigation results to the rector of the university, the dean of the faculty, and the head of the department.

It is strictly forbidden to use students for work that does not correspond to the purpose and tasks of the practice.

5 FORMS AND METHODS OF CONTROL

5.1 Ongoing and Final Control

The types and forms of ongoing and final control are determined by the curriculum and the working programs of practices.

The work of the student-practitioners during their practice is supervised by: the person responsible for organizing the practice at the department; practice supervisors from the department; practice supervisors from the practice base.

Control forms: self-control; checking students' diaries and other documentation; final control-credit. Self-control is exercised by the student in the form of systematically keeping a practice diary, adhering to an individual schedule, and fulfilling an individual assignment.

A weekly form of control is the verification of students' diaries by practice supervisors and familiarization with all processed materials. Particular attention is also paid to compliance with safety rules, discipline requirements, and the internal regulations of the practice base.

The final reporting aims to summarize the results obtained by students during the practice. Practice results are summed up during the student's defense of the practice report in front of a commission.

The general form of a student's report on the practice is the submission of a report, signed and evaluated by the supervisor from the practice base, in electronic and printed form. The electronic version of the report is submitted for review to the practice supervisor from the department. After refinement and final approval with the practice supervisor from the department, the printed report, together with other documents provided by the practice program, is submitted for defense. The defense of the practice takes place in front of a commission formed by the head of the department consisting of 2–3 department teachers and the participation of the practice supervisor from the department. The supervisor from the practice base may also be added to the commission.

5.2 Procedure for Maintaining and Designing a Practice Diary

The diary is the main document of a student during practice, containing a description of all materials according to the content (program) of the practice.

The practice diary is a document of established (standard) form, in which the student daily records the main stages of practice (of any kind), highlights the content of the work performed, and individual tasks.

Main structural elements of the diary:

− Title page;

− Practice calendar schedule;

− Characteristics of the student by practice supervisors from the department and (if available) from the enterprise (practice base);

− Student's working notes during practice.

An example of forming a calendar schedule for practice is given in Table B.1 (Appendix B).

It is also recommended to make working notes in the diary (on the pages of the *'Working notes during practice'* section) during practice. Entries should be concise, clear, literate, and specific (e.g., 1) date. *Registration for practice. Review of the enterprise/laboratory*; 2) date. *Familiarisation with occupational health and safety rules*, and so forth).

In the working notes, it is also worth reflecting on answers to such questions:

− How were the assigned tasks performed?

− What new was implemented by the student in the work process?

− What inconsistencies were found in the activities at the student's workplace and suggestions for their elimination?

− Personal achievements during practice, and so forth.

At least once a week, the student must present the diary to the practice supervisors for review and control.

After completing the practice, the supervisor:

− From the practice base (if available) characterises the student's work, discipline, personal and professional qualities and evaluates the activities during practice in their feedback;

− From the department reflects the theoretical level of the work performed by the student (individual task) and its practical significance and evaluates the student's work during practice in their feedback.

The completed diary (with all signatures and stamps) and the practice report are used to defend the practice results at the department. Without a filled diary, the student is not admitted to the defence, and the practice results are not credited.

6 GENERAL REQUIREMENTS FOR PRACTICE REPORTS

6.1 Requirements for the Structure and Content of the Practice Report

Based on the work done during the practice, the student compiles a report that must be signed by the practice supervisors.

The signature of the supervisor from the practice base is certified with a stamp (if available).

The practice report should contain information about the results achieved by the student in all sections of the practice program and individual assignment. The structure of the practice report is determined by its program and should consist of the following elements:

− Title page;

− Project task;

− Content;

− Introduction;

− Main part;

− Conclusions;

− List of reference sources;

− Appendices (if necessary).

The total volume of the report on project and technological practice is 25–30 pages of printed text (excluding appendices).

The total volume of the report on professional practice is 30–40 pages of printed text (excluding appendices).

The volume of appendices is not regulated.

The title page is the first page of the report. It contains the main data, which is presented in the following sequence: name of the university, faculty, and department; title of the document (in capital letters); document code; signatures of the document developer and responsible persons; year of compilation.

Formation of a code for the report on project and technological practice::

PTPSE.200135.01.06.00

Formation of a code for the report on professional practice:

PTPSE.200135.01.06.00

The first six digits in the code are the individual study plan number of the student (grade book number); the following digits are the group number and the student's number in the list.

The form of the title page of the report on practice is given in Appendix C.

The task for the project and technological practice should contain a list of tasks that need to be solved by the intern during the practice. This sheet must be signed by the student and the practice supervisor from the department.

The task for the project and technological practice is prepared according to the sample provided in Appendix D.

The individual task for professional practice is prepared according to the sample provided in Appendix E. This sheet must also be signed by the student and the practice supervisor from the department.

In the structural section "*Introduction*", the purpose is disclosed and the tasks of the practice are defined. The "Introduction" also highlights the main trends in the development and state of the subject area on the topic of an individual (project) task; it outlines the problem targeted by this task and the ways to solve it. Justification of the relevance and the necessity of solving the task, the field of application, the purpose of the development, etc., should also be provided. Moreover, in the report on professional practice, if necessary, the purpose and tasks of the diploma project should also be clarified.

The estimated volume of the "Introduction" is one to two pages of text.

In the structural section "*Conclusions*", the results of the practice and the completion of tasks are summarized, and conclusions regarding the achievement of the goal and the execution of the practice program are drawn.

The estimated volume of the "Conclusions" is one to two pages of text.

The "*List of reference sources*" contains a list of used literary and other sources (5–15, depending on the type of practice) in alphabetical order (or in the order of references to them in the report text). In this structural element, it is prohibited to indicate pages of Wikipedia, Studopedia, essay websites, and other similar resources.

In the *Appendices* (if necessary), additional data, illustrations, models, tables, etc., which due to their large volume or form of presentation, are not advisable to be included in the main part of the practice report, are placed.

The main part of the report should contain the results of the practice obtained by the student according to the program and the execution of the individual (project) task.

Recommended structure for the main part of the report on project and technological practice (***approximately – two sections***)**:**

1 General characteristics of the practice base

    1.1 Extract from the university rector's order on undergoing the practice

    1.2 Technical and technological equipment of the practice base

    1.3 System software of the practice base

    1.4 Application software of the practice base

    1.5 Safety techniques and labor protection at the practice base

2 Individual project task

2.1 Description of information and software required for the execution of the individual task

    2.2 Justification for the choice of development technology

    2.3 Justification for the choice of programming language

    2.4 Justification for the choice of DBMS

    2.5 General description and structure of the development

    2.6 ...

Note: The structure of the main part can change by agreement with the practice supervisor and depending on the type of practice base, nature, and content of the project tasks.

The first section of the report should contain the results of a comprehensive study of the practice base (educational-production laboratory of the university or enterprise/institution), including its structure, technical-economic characteristics, a description of technical, technological, and software equipment, workplace organization, etc. (according to the content of the practice program). Issues such as the use of computing equipment at the practice base should be elaborated: classification and brief characteristics of electronic computers, workstations, servers, etc.; purpose of PCs, their usage, availability of the Internet network, communication tools; features of system and application software, etc. In the subsection on safety techniques and labor protection, practical issues of safety and harmlessness of work at a specific workplace, prevention of injuries, fires, and electrical injuries, etc., as well as ways to achieve these goals should be considered. The description and presentation of the studied indicators should be concise, clear, and accompanied (if necessary) by numerical data, tables, illustrations, etc.

The estimated volume of Section 1 is 35–40 % of the total report volume.

*Note***:** The extract from the rector's order about undergoing the project and technological practice is provided by the practice organizer from the department.

In ***the second section***, the work carried out by the student-intern during the practice and the completion of the individual project task should be described.

The structure of this section is determined based on the topic of the individual project task for the project and technological practice and with the approval of the practice supervisor from the department. In the first subsection, it is necessary to generally characterize the information and software required for the execution of the individual task (design and development tools, CASE tools, DBMS, programming languages, standard libraries, etc.). In the subsequent subsections, it is necessary to justify the choice of technology and development tools, describe the design and software solutions, and the results obtained by the student-intern during the execution of the individual task.

The section text should be illustrated with diagrams, tables, figures, etc.

The estimated volume of Section 2 is 45–55 % of the total report volume.

Recommended structure for the main part of the professional practice report (approximately three sections):

1 General Characteristics of the Practice Base
1.1 Extract from the rector's order regarding undergoing the practice
1.2 Organizational structure of the practice base
1.3 Material, technological, and software provisioning
1.4 Safety regulations and fire safety rules in the company
1.5 Operational activities of the practice base and its connection to the topic of diploma design
2 Description of work done during the practice period
3 Individual task
3.1 Content analysis of the subject area, its structural and functional features
3.2 Analysis of the existing software and technical provisioning of the subject area
3.3 Defining software requirements
3.4 Technical task for software development
3.5 …

***Note*:** The structure of the main part of the professional practice report is indicative and can be adjusted in agreement with the practice supervisor from the department, depending on the nature of the operational activities of the practice base and the specifics of the individual task.

The first section of the report should contain the results of a comprehensive study of the practice base (enterprise, unit, department, laboratory, etc.), including its organizational structure, technical-economic characteristics, organization of operational activities, and its connection to the topic of the diploma project, a logistic description of the management structure of technological processes, material and technological provisioning, equipment, and workplace organization, etc. (according to the practice program content). It is also necessary to provide information about the specifics of the IT sector of the company/ enterprise (directions of IT development, software used, software development life

cycle models, etc.). The description and presentation of studied indicators should be concise, clear, accompanied (if necessary) by numerical data, charts, tables, figures, etc. In the subsection on safety techniques and labor protection, it is worth considering practical issues of safety and harmlessness of work at the enterprise, prevention of injuries, professional diseases, accidents, fires, electric shocks, etc.

The approximate volume of Section 1 is 30–40 % of the total report volume.

Note: The extract from the rector's order about undergoing professional practice is provided by the practice organizer from the department.

In the second section, the tasks performed by the trainee during the internship should be described. For example:

– studying the existing technical, technological, and software environment of the training base;

– learning a new programming language, a new technology and/or a software development tool, etc.;

– familiarizing oneself with the software life cycle models used at the enterprise, software development processes, the level of standardization during software development; software version control organization, software quality management system, software project management and team development, etc.;

– studying the methods and tools the enterprise uses in areas directly related to the topic of the individual assignment and the theme of the qualification work;

– collecting factual material related to software analysis and design according to the qualification work topic;

– participation in real software projects, etc.

The approximate volume of section 2 is 10–20 % of the total report volume.

The third section should describe the execution of the individual task. The structure of this section is formed depending on the topic of the individual task and in agreement with the internship supervisor from the department. Since the individual task should be related to the topic of the qualification work, this section usually includes questions about the analysis of the subject area (SA) by the topic of the qualification work, describing the characteristics of analogs, developing software requirements, drafting technical tasks, and preliminary software design.

In the subsection "*3.1 Content analysis of the subject area, its structural and functional features*", an overview and description of the SA for which software development is planned according to the qualification work topic should be carried out. The study of the SA is conducted to identify problems and unresolved issues from the perspective of implementing IT, automating production processes, processing, and transmitting information, etc. Based on the results of the SA analysis, a problem is described that will be solved using the software to be developed during the thesis project. It is advisable to accompany the SA analysis (if necessary) with its model representations. Modeling methodologies and types of models for clarifying the SA description should be chosen individually, depending on the qualification work topic and the chosen programming paradigm.

This subsection also identifies the end-users of the software and their information needs. To determine the information needs of users, primary documents are analyzed, and a list of their attributes for storage in operational information tables is provided. The process of transforming a set of input information into output is described, and security aspects (identification and authentication of users) are analyzed, etc.

In the subsection "*3.2 Analysis of the current software and hardware of the subject area*", it is necessary to ascertain and summarize modern scientific and practical achievements in the implementation of promising information technologies in order to use concepts that will form the basis for the development of design decisions. In this regard, it is worth analyzing the software that is already being used in the subject area on the topic of the qualifying research work (including based on practice, if available). The goal of the review is to study the experience of leading software development companies and to use their solutions when conducting qualifying research. This will ensure that the software being developed in the project meets the current needs of the software market.

During the analysis for each analog, it is necessary to reveal: the purpose of the software; the developer company; interface windows; advantages and disadvantages, etc. It is advisable to summarize the disadvantages and advantages of analogs in a comparative table. Knowing these features for a certain set of similar software, one should logically choose the ones closest to those that need to be implemented in the developed software.

In the subsection "*3.3 Analysis of software requirements*", based on the analysis of the subject area, the requirements for the developed software should be defined and described, the consideration of which should be accompanied by the construction of a series of models. The main tool for software requirements engineering within the object-oriented paradigm is the Unified Modeling Language (UML). Use case diagrams (UC) are primarily developed. The UC diagram reflects the execution of specific user tasks using software. When creating such a model, it is advisable to first compile brief descriptions of the software users (actors) and the necessary UC services for them. Each UC should be accompanied by its specification (description).

UML activity or state diagrams can be used to formalize the presentation of the UC scenario. The main, alternative, and prohibited paths of UC execution, interactions of actors with the system, and the information they exchange should be described.

Thus, as a result of modeling, a hierarchy of diagrams can be created that reflects various aspects of the developed software (structural, functional, behavioral, informational, etc.).

When analyzing user interface requirements, it is necessary to determine the requirements for its appearance, the form of interaction with users, requirements for access to the internal functionality of the software, etc.

It is recommended to present only the main requirements for software in this subsection, necessary for understanding the problem statement. A detailed presentation of software requirements should be provided in the document "**Technical Task**", which is placed in subsection 3.4.

The estimated volume of section 3 is 40–45 % of the total report volume.

6.2 Requirements for the Formatting of the Practice Report

The format of the professional practice report should comply with current standards and regulations of the university. General requirements for the report include a logical sequence of material presentation, clarity, and specificity of internship results, justified conclusions, and so on. The report should not be overloaded with barely informative content or lengthy descriptions of commonly known facts and methods. The report's text should be clear, concise, and well-edited. The text should adhere to the norms of Ukrainian spelling and lexicon, using a business language style. Established terms, notations, and definitions set by current standards should be applied. If absent, those generally accepted in scientific and technical literature should be used. It is also undesirable to use foreign words and terms when there are equivalent words and terms in the Ukrainian language. The project and technological ptactice report should be presented on A4 sheets (210 mm × 297 mm). Pages are numbered consecutively, starting with number 1 on the title sheet; page numbers are placed in the upper right corner of the header. The title page and the project assignment sheet do not have a page number. Recommended page margins are: top and bottom – 20 mm, left – 20–25 mm, right – 10 mm. The professional practice report is formatted on A4 sheets (210 mm × 297 mm) using form-frames; main titles should comply with DSTU GOST 2.104:2006 standards (Form 2 for "Content", Form 2a for subsequent sheets). The title page, individual task sheet, and appendices should be on A4 sheets (without a frame). For forms, the distance from the frame to the text's edges at the beginning and end of lines should be no less than 3 mm (5 mm is recommended). The distance from the top or bottom line of the text to the top or bottom frame should be no less than 10 mm (10 mm is recommended). The distances from the form frame to the edges of the sheet should be as follows: from the left edge – no less than 20 mm, from the right, top, and bottom – 5 mm. For the title page, individual assignment sheet, and appendices, the recommended page margins are: top and bottom – 20 mm, left – no less than 20 mm, right – 10 mm.

Examples of the main inscriptions are shown in Figure 4.1.

The page numbering of the report on professional practice is continuous, starting with number 1 on the title page. The page number is not indicated on the title page or the individual task sheet. On subsequent sheets (with frames), the page number (starting with number 3) is placed within the frames on the right. On the pages of appendices (if any), the numbering continues, and the page number is placed in the upper right header.

Ch.	Site	Doc. No		Date	PPSE.200135.01.06.00				
Executor	Ivanenko I. I.						Lit.	Site	Sites
Supervisor	Radelchuk H. I.				Report on professional practice			3	35
Reviewer									
St.Controller							KhNU, SE-25-1		
Dept. Head	Bedratyuk L.P.								

a) form 2

Ch.	Site	Doc. No	Sign.	Date	PPSE.200135.01.06.00	Sites
						4

b) form 2a

Figure 4.1 – Examples of Main Inscriptions

For the design of reports from **all types of practices**, the following basic requirements should also be observed:

Main font – Times New Roman; style – regular (except for the names of structural elements and section headings); font size – 14pt; font colour – black; line spacing – 1.5 (one and a half intervals); alignment of the main text – justified; paragraph indent – 1.25 cm.

The text of the document, depending on its understanding by content, is divided into sections, subsections, items, and sub-items, numbered with Arabic numerals: sections – within the entire document, subsections – within each section, items – within the subsection, sub-items – within the item. Each section should start on a new page.

The section number is written without a dot at the end.

The subsection number should consist of the section number, a dot separator, and the subsection number; a dot is not placed at the end of the number (e.g., 2.1 – the first subsection of the second section).

Structural elements *'Content'*, *'Introduction'*, *'Conclusions'* and *'List of Reference Sources'* are not numbered.

Headings of structural elements and sections should be printed with a paragraph indent in **CAPITAL LETTERS** in a bold font without a dot at the end. They can be placed in the middle of the line (in this case – without a paragraph indent).

Headings of subsections, items, and sub-items should be printed with a paragraph indent with a capital letter without a dot at the end. Words cannot be broken with a hyphen in any headings.

The distance between the heading and the subsequent or preceding text must be no less than a **double line spacing** (or two single ones).

The distance between the lines of the heading, and between two headings, is taken **as in the text**.

The subsection/item/sub-item title should not be placed in the lower part of the page if less than two lines of text are placed after the title. If this occurs, it is

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permissible (within individual pages) to change the line spacing, but no more than 0.02 (recommended multiplier values from 1.48 to 1.52).

Also, avoid placing only one word in the last line of a paragraph; if this occurs, rephrase the text of the paragraph or set a denser interval between characters (but no more than 0.2 pt).

Detailed requirements for the design of text documents (including requirements for the design of lists, figures, tables, formulas, appendices, and so forth) are set out in DSTU 3008:2015 [9] and SOU 207.01:2017 [11]. Rules and examples of bibliographic descriptions and references are given in DSTU 8302:2015 [10] and SOU 207.02:2017 [12].

*Note***:** Practice reports may be subjected to plagiarism checks in the Anti-Plagiarism system. In this case, students also receive a plagiarism check report (and thus also add it to the reporting documentation). If plagiarism exceeding the established norms is detected, the student must correct the violations and resubmit the report for plagiarism check.

7 SUMMARISING THE PRACTICE AND EVALUATING ITS RESULTS

7.1 Defence of Practice Results

After the completion of the practice term of any type, students report on the implementation of its programme and individual tasks, submitting the following documentation (enclosed and stitched in a folder) to the department:

− Practice diary (filled out and formatted) with all necessary signatures and stamps;

− Formatted and signed written practice report by the supervisors;

− A certificate of plagiarism checks of the report (if such a check was conducted).

The student defends the practice report before a commission appointed by the department head. The commission includes the practice supervisor from the department, other department faculty, and (if possible) the supervisor from the practice base.

Higher education students defend the practice report at the software engineering department no *later than one week* after its completion.

When evaluating the student's work results, the commission considers the content of the practice report, the quality of the report documentation, the student's defence of the practice results, and feedback and evaluations from practice supervisors.

If the student did not complete the practice programme for valid reasons, the dean's office sets an individual schedule for completion.

A student who received a negative grade for *the project and technological practice* or did not complete its programme without valid reasons is

allowed to retake it in the next academic year with changes to his individual study plan. A student who received a negative grade for the practice results again is expelled from the university.

A student who received a negative grade for *professional practice*, did not appear for its defence within the specified terms or did not complete its programme without valid reasons is expelled from the university. The practice exam result is entered into the grade-examination sheet and the individual study plan of the student on two grading scales (institutional and ECTS) with the signatures of the commission members. In case of *disagreement* with the commission's decision regarding the received grade for the practice defence results, the student may appeal to the dean of the faculty with a motivated statement regarding the commission's disregard of important circumstances during the evaluation. The practice results are summed up at the department meeting and discussed at the scientific council meeting of the Faculty of Information Technology. The practice report documentation is handed over to the department after its defence.

7.2 Evaluation Criteria

According to the 'Regulations on Control and Evaluation of Educational Achievements of Students at Khmelnytskyi National University', the practice results are evaluated according to the national four-point scale and the ECTS scale. The practice results evaluation system is based on the following parameters: evaluation of the practice report content; evaluation of the quality of report documentation; evaluation of the practice defence results; recommended evaluations from practice supervisors.

Criteria for evaluating the content of the practice report include: compliance with the practice program; relevance and practical significance of the task topic; compliance with the individual task; objective coverage of the issue with creative use of modern sources; completeness of subject area research; clarity of task setting; justification of methods and means for solving the set tasks, presence of new ideas and solutions; clarity and quality of illustrative material; degree of student's independence; presence/absence of duplication, descriptive material, stereotypical solutions that do not affect the essence of the obtained results.

Criteria for evaluating the quality of report documentation:
− Compliance with established requirements and current standards for practice report documentation;
− Organic connection of the report's text material with graphics;
− General and professional literacy, conciseness, and logical sequence of material presentation.

Criteria for evaluating the quality of the defence of practice results:
− Quality and completeness of the student's report (and accompanying presentation): compliance with the practice program; mastery of the material, consistency, logic, and literacy of its presentation; ability to justify decisions, make conclusions, and so forth;

− Correctness and completeness of answers to questions: the ability to formulate a reasoned answer, respond to non-standard questions, justify one's position in problematic situations, and so forth.

The student receives an *'excellent'* grade if he/she has fully completed the practice program, complying with all requirements, and during the defence of practice results, demonstrated a competent, logical presentation of the report, correct and complete answers to questions; deep mastery of the educational material content; ability to connect theory with practice, justify judgments, make conclusions; possession of diverse skills, techniques, and competence. The practice report meets the requirements for its content and formatting and reveals all provisions of the practice program. In the practice diary, the content of the work throughout the entire practice period is recorded, with characteristics-feedback from supervisors, signatures, and stamps. Characteristics-feedback from practice supervisors is positive, and evaluations are 'excellent'.

The grade *'good'* is awarded to the student who has fully completed the practice program, complying with all requirements, and during the defence of practice results, demonstrates a solid knowledge of the material, presents it competently and substantially, does not allow significant inaccuracies in answers to questions, correctly applies theoretical provisions in solving practical tasks, and possesses the necessary skills and techniques for their execution. The practice report sufficiently meets the requirements for its content and formatting and reveals the key provisions of the practice program. In the student practitioner's diary, the content of the work throughout the entire practice period is recorded; there are characteristics-feedback from supervisors, signatures, and stamps. The feedback from practice supervisors is positive, and the evaluations are 'excellent' and/or 'good'.

The grade *'satisfactory'* is deserved by the student who has mainly completed the practice programme but has made inaccuracies in execution; during the defence of practice results, showed knowledge of the basic material in the minimum volume necessary for professional activity; mainly copes with the execution of practical tasks but allows violations of logical sequence in the presentation of material, mistakes in answers to questions, and experiences difficulties in answering modified questions. The practice report reveals most of the provisions of the practice programme and mainly meets the requirements for its formatting. In the student practitioner's diary, the content of the work throughout the entire practice period is mainly recorded; there are characteristics-feedback from supervisors, signatures, and stamps. The characteristics-feedback from practice supervisors are mainly positive, and the evaluations are 'satisfactory' and/or 'good'.

The student receives an "*unsatisfactory*" grade if they have completed their individual task insufficiently; possesses fragmented, disorganized knowledge, and makes mistakes in defining concepts; presents material chaotically and insecurely, cannot answer questions from the commission members; receives negative feedback from practice supervisors; documentation about the practice experience is either missing or is not in accordance with current requirements.

LIST OF USED SOURCES

1. Стандарт вищої освіти України за спеціальністю 121 «Інженерія програмного забезпечення» для першого (бакалаврського) рівня вищої освіти. Київ : МОН України, 2018. 24 с.

2. Освітньо-професійна програма підготовки бакалавра зі спеціальності «Інженерія програмного забезпечення». URL: https://khmnu.edu.ua/121-ipz-b-op/ (дата звернення: 01.08.2023).

3. Положення про організацію освітнього процесу у Хмельницькому національному університеті. URL: https://khmnu.edu.ua/wp-content/uploads/-normatyvni-dokumenty/polozhennya/pro-organizacziyu-osvitnogo-proczesu.pdf (дата звернення: 10.07.2023).

4. Положення про практичну підготовку здобувачів вищої освіти Хмельницького національного університету. URL: https://khmnu.edu.ua/wp-content/uploads/normatyvni-dokumenty/polozhennya/pro-praktychnu-pidgotovku.pdf (дата звернення: 11.07.2023).

5. Положення про контроль і оцінювання результатів навчання здобувачів вищої освіти у Хмельницькому національному університеті. URL: https://khmnu.edu.ua/wp-content/uploads/normatyvni-dokumenty/polozhennya/pro-kontrol-i-oczinyuvannya-rezultativ-navchannya.pdf (дата звернення: 15.07.2023).

6. Положення про систему забезпечення академічної доброчесності у Хмельницькому національному університеті. URL: https://khmnu.edu.ua/wp-content/uploads/normatyvni-dokumenty/polozhennya/pro-systemu-zabezpechennya-akademichnoyi-dobrochesnosti.pdf (дата звернення: 25.07.2023).

7. Кодекс законів про працю України № 322-VIII. Редакція від 30.07.2023. URL: https://zakon.rada.gov.ua/laws/main/322-08#Text (дата звернення: 05.08.2023).

8. ДСТУ ГОСТ 2.104:2006. Єдина система конструкторської документації. Основні написи. [Чинний від 2007–07–01]. Вид. офіц. Київ : Держспоживстандарт України. 2007. 23 с.

9. ДСТУ 3008:2015. Звіти у сфері науки і техніки. Структура та правила оформлювання. [На заміну ДСТУ 3008-95; чинний від 2017–07–01]. Вид. офіц. Київ : ДП «УкрНДНЦ», 2016. 26 с. (Інформація та документація).

10. ДСТУ 8302:2015. Бібліографічне посилання. Загальні положення та правила складання. [Уведено вперше; чинний від 2016–07–01]. Вид. офіц. Київ : ДП «УкрНДНЦ», 2016. 17 с. (Інформація та документація).

11. СОУ 207.01:2017. Текстові документи. Загальні вимоги / Ю. М. Бойко, Г. В. Красильнікова, Л. І. Першина, Т. Ф. Косянчук [2-ге вид., випр.]. Хмельницький : ХНУ, 2018. 45 с.

12. Бойко Ю. М., Першина Л. І. СОУ 207.02:2017. Бібліографічний запис. Загальні вимоги та правила складання. Хмельницький : ХНУ, 2017. 37 с.

APPENDICES

SAMPLE APPROVAL LETTER FORM

Декану
факультету інформаційних технологій

_____

Просимо Вас направити на _ФОП Підфігурний Микола Васильович_
<div align="center">Назва бази практики</div>

(м. Хмельницький) здобувача групи _____ _Зайцева Петра Васильовича_
<div align="center">група   ПІБ здобувача</div>

для проходження _професійної_ (_проєктно-технологічної_) _практики_
<div align="center">Вказати вид практики</div>

з «___» _____ 20__ року.

Гарантуємо фахове і кваліфіковане керівництво практикою.
Необхідними апаратно-програмними засобами та матеріалами для виконання програми практики здобувач буде забезпечений.

Директор   _____   Підфігурний М. В.

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EXAMPLE CALENDAR SCHEDULE OF PRACTICE

Table B.1 – Calendar schedule of practice

No. z/p	Titles of works	Weeks of Practice Duration					Notes about implementation
		1	2	3	4	5	
1	*Training in safety and occupational health and safety techniques*	+					*done*
2	*Acquaintance with the base of practice (enterprise, institution, laboratory, etc.), organizational management structure*	+					*done*
3	....		+				
K	*In fulfillment of an individual task*	+	+	+			*done*
$K+1$			+				
N	*Preparation and execution of reporting documentation*			+			*done*

Heads of practice:
from a higher educational institution

_____   _____
Signature   Name , SURNAME

from an enterprise, organization,
institution

_____   _____
Signature   Name , SURNAME

THE FORM OF THE PRACTICE REPORT TITLE PAGE

Khmelnytskyi national university
Faculty informative technologies
Department of Software Engineering

REPORT

On_____
<div align="center">Type of practice</div>

Practice Bases _____
<div align="center">Name enterprise (institution, institution)</div>

_____
<div align="center">Code</div>

Branch of knowledge   *12 "Informational technologies"*_____
Specialty   *121 "Software Engineering"*_____
Educational program   "*Software Engineering*"_____
Students of __ course, group _____   _____   _____
<div align="center">Signature   Name, SURNAME</div>

Head practice from department   Head from base practice
_____   _____
<div align="center">First name, last name, position   First name, last name, position</div>

_____   _____
<div align="center">Signature, date   Signature, date</div>

Stamp

Number points _____
Grade scale:
institutional _____/ECTS____

Committee   _____   _____
members: <div align="center">Signature, date   Name, SURNAME</div>

_____   _____
<div align="center">Signature, date   Name, SURNAME</div>

_____   _____
<div align="center">Signature, date   Name, SURNAME</div>

Khmelnytskyi 20_

TASK TEMPLATE FOR PROJECT AND TECHNOLOGICAL PRACTICE

TASK FOR PROJECT AND TECHNOLOGICAL PRACTICE

_____
Surname, first name, patronymic of the student

1 Project assignment topic: _____
_____
_____

2 Deadlines for Submission of Completed Report by the Student "___" ____ 20__

3 List of Issues for Study and Development: _____
_____
_____
_____
_____
_____
_____

4 Date of assignment issuance: "___" _____ 20__

Supervisor of Practice from the Department _____
                                           Surname, first name, patronymic, signature

Task Accepted by   ____ _____
                        Surname, first name, patronymic of the student, signature

EXAMPLE OF AN INDIVIDUAL TASK ON PROFESSIONAL PRACTICE

**INDIVIDUAL TASK
ON PROFESSIONAL PRACTICE**
of the IPZ-20-1 group
Programme Subject Area 121 "*Software engineering*"
Kukharchuk Mykhailo Leontiiovych
Surname, first name, patronymic

Practice base TECHNOCON ENGINEERING LLC
Term of practice from _____ to _____.
Topic of an individual task A decentralised payment system with its own digital currency based on the Ethereum blockchain platform. Analysis of the subject area and formulation of design tasks

The task PhD, Assoc. Prof. Radelchuk H. I.
was issued by: Position, surname, initials of the supervisor
from the department Signature, date

The task
Was received by: Signature, date

CONTENT