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SIMON KUZNETS KHARKIV NATIONAL UNIVERSITY OF ECONOMICS

Department of Information Systems

AGREED
Vice-rector for educational and methodical work

_____Karina NEMASHKALO

Methodological recommendations for training on the basics of IT project management

Field of knowledge	**12 "Information technologies"**
Specialty	**121 "Software engineering"**
Study cycle	**first (bachelor)**
Study programme	**"Software engineering"**

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Methodological recommendations for training on the basics of IT project managementfor applicants of specialty 121 "Software engineering" of the first (bachelor's) level [Electronic resource] / comp. I.O. Ushakova, O.B. Ploha, L.V. Znahur, Yu.Ye. Chyrva. – Kharkiv: KHNUE named after S. Kuznets, 2024. - 19 p.

The general provisions, purpose and tasks are presented. The process of organizing and evaluating training results is described. The structure of the report based on the results of outcomes and protection is provided.

Recommended for applicants of the educational and professional program "Software Engineering" specialty 121 "Software Engineering" of the first (bachelor) level.

Introduction

In connection with the development of computer information systems and technologies and the growth of their role in the activities of enterprises and organizations in various fields, the problem of effective management of software development projects (IT projects) is becoming increasingly acute.

The relevance and necessity of conducting the training is determined both by the processes of Ukraine's integration into the world community and by the need for further development of the information society. There is an acute shortage of formalization, preparation and project management skills among professional personnel. The practical orientation of the training on the basics of IT project management is determined by the urgent need to master the global experience of development, analysis, implementation and project management in the field of software development.

The training allows students of higher education to deepen their theoretical knowledgeand practical skills in the Agile methodology of IT project management, in particular Scrum, in the role of members of project teams in the conditions of active development of the industry in Ukraine.

Students of higher education will receive the required amount of practical knowledge and skills, in accordance with the training program.

Content

1. PURPOSE, TASKS OF THE TRAINING, COMPETENCES THAT ARE BEING FORMED

The training on the basics of IT project management is part of the educational process and is organized for students of the third year of full-time study in the specialty 121 "Software engineering" of the first (bachelor's) level in the sixth semester.

The purpose of the training is the formation of the system of competences in IT project management and the use of applied tools for the organization of team work, planning, control of execution and visualization of project results in students of higher education.

*Training tasks*is:

1. Learning the basic principles of project management in the field of IT.
2. In-depth study of Agile IT project management methodologies.
3. Consideration of examples of implementation of IT projects and analysis of their results.
4. Organization and support of the processes of planning, evaluation and control of the implementation of IT projects using modern tools.
5. Development of soft-skills, teamwork skills, communication and leadership skills necessary for successful management of IT projects.

*Training tasks*is:

assimilation of knowledge about theoretical aspects of project management in the field of information technologies based on Agile frameworks;

learning about the basic principles of IT project management;

mastering practical skills regarding the distribution of roles, duties and responsibilities in the process of implementing an IT project;

obtaining practical skills for organizing work with the customer at the pre-project stage;

acquiring practical skills in building a general plan, estimating the cost and timing of IT project tasks;

obtaining practical skills in developing project documentation;

obtaining practical skills in project control;

acquiring practical skills for the presentation of project results.

Competencies and learning outcomes are listed in table. 1.

Table 1

Planned competencies and learning outcomes

Special competences	General competences	Learning outcomes
SC11, SC12	–	LO 3
SC2, SC3	–	LO 12
SC2, SC3, SC4	–	LO 14
SC12	GK 3, GK 7, GK 8, GK 10	LO 16
SC11	GK 3, GK 7, GK K10	LO 22
–	GK 3	LO 23

Note.

Passing training contributes to the formation of:

General competencies:

GK 03. Ability to communicate in the national language both orally and in writing.

GK 07. Ability to work in a team.

GK 08. The ability to act on the basis of ethical considerations.

GK 10. The ability to act socially responsibly and consciously.

Special competencies:

SC02. Ability to participate in software design, including modeling (formal description) of its structure, behavior and functioning processes.

SC03. Ability to develop architectures, modules and components of software systems.

SC04. Ability to formulate and ensure software quality requirements in accordance with customer requirements, specifications and standards.

SC11. The ability to implement phases and iterations of the life cycle of software systems and information technologies based on appropriate software development models and approaches.

SC12. Ability to carry out the system integration process, apply change management standards and procedures to maintain the integrity, overall functionality and reliability of the software.

Program learning outcomes:

LO 03. Know the main processes, phases and iterations of the software life cycle.

LO 12. Apply effective software design approaches in practice.

LO 14. Apply in practice instrumental software tools for domain analysis, design, testing, visualization, measurement and software documentation.

LO 16. Have skills in team development, approval, design and release of all types of software documentation.

LO 22. Know and be able to apply project management methods and tools.

LO 23. Be able to document and present the results of software development.

2. CONTENT OF THE TRAINING

An important component of the professional activity of a person with a modern technical education is working with people. So, among a number of professional skills, special attention is paid to such social and psychological skills as organizational, methodical and communicative, including the ability to assess the business qualities of employees, to communicate, to choose appropriate work methods, to encourage joint work, to effectively influence to achieve results, to stimulate activity, initiative, interest, etc.

The ability to listen to the opinion of another, to reach a compromise, despite differences in views and beliefs, the ability to negotiate are necessary for teamwork, which is the basis for creating a project in the field of information technologies. All these personal competencies can be formed in the future specialist only by gaining experience, which, unfortunately, cannot be acquired in the process of traditional training. In this regard, a young specialist in the field of computer sciences and information technologies upon graduation from a higher educational institution does not have the experience of applying the acquired knowledge and skills in practice, but is also psychologically unprepared for radically new activities.

The only way to solve the problem of adaptation is the implementation of training, which combines two important components of the specialist's future success - the acquisition of practical experience by solving and modeling work on an IT project.

So, training is a teaching method used to develop certain skills and competencies of participants. The training is conducted in the form of teamwork,

which ensures active participation and creative interaction of the participants among themselves and with the teacher (coach).

It is during the training that you can learn to build interpersonal relationships, implement your plans and needs in them, choose ways to interact in joint activities with other people, express yourself and master social roles when solving economic problems. Undoubtedly, for the acquisition of both professional and personal competencesthe acquirerit is necessary to prepare for training. Such training should include the following procedures: perform self-study on training preparation; generalize the theoretical knowledge and practical skills on the subject of the training, which were obtained during the mini-lectures; develop personal competencies during the training; to accept changes, both subjective and psychological, that occurred during the training.

Each part of the training on the basics of IT project management has its own content, which is organized according to certain rules: presentation of new information and its justification in accordance with the goals of the training; analysis of the components of the provided information, identification of the problem, description of its impact on current or future activity; searching for ways to solve problems, improve or modernize activities; analysis of proposed solutions and development of proposals for their implementation; analysis of the subjective impressions of the participants and their vision of the effectiveness of the obtained results. Compliance with the specified rules is ensured by a clear organization of the training process, which consists in the distribution of certain training procedures and operations in time.

Essential characteristics of the task:each group simulates the work of the IT team involved in the development of the site (landing).

The tasks that each team receives are listed in the table. 2.

The content structure of the training on the basics of IT project management includes three parts: introductory, main and final.

Introduction training is aimed at determining the main goal, task, results of the training, providing basic information about IT project management and involving training participants in joint work to achieve educational goals.

The introductory part of the training on the basics of IT project management covers the following.

Goals and tasks: the teacher (trainer) explains the goals, tasks, and expectations of the training participants.

Table 2

Themes for creating a landing page

Option 1 Development of a landing page for a restaurant business
Option 2 Development of a landing page for an entertainment center
Option 3 Development of a landing page for a children's goods store
Option 4 Development of a landing page for a company engaged infreight transportation
Option 5 Landing development for a food delivery company
Option 6 Landing developmentfor a medical laboratory
Option 7 Landing developmentfor a chain of coffee shops
Option 8 Landing developmentfor an event agency
Option 9 Landing developmentfor a private clinic
Option 10 Landing developmentfor a fitness club
Option 11 Landing developmentforfor a barbershop
Option 12 Development of a landing page for a photo studio
Option 13 Landing developmentfor a flower studio, a bouquet bar
Option 14 Landing developmentfor a car rental company
Option 15 Landing developmentfor a charity

Training organization: it is necessary to explain the structure and content of the training, the deadlines and results of the training, the system for evaluating the results of the team work of the applicants.

Basic provisions for project management: in this part, the teacher (trainer) defines the basic provisions for project management according to the PMBOK.

Key Terms: Key terms used in IT project management such as "project life cycle", "project risks", "business requirements", "project roles and responsibilities", etc. need to be explained.

IT project management methodologies: you need to consider the main project management methodologies and frameworks, such as Waterfall, Scrum, Kanban.

Successful projects: examples of successful IT projects should be considered.

Roles and Responsibilities in the Project: You need to define the roles and responsibilities in the project, such as Product Owner, Scrum Master, and Team, and explain how they interact with each other.

The main part focused on solving team training tasks.

At this stage, it is necessary to form teams, provide each team with a variant of the topic (requirements) for the development of IT projects, make an analysis of business problems and requirements, clarify the setting of tasks and carry out their discussion with the teams to reveal a common understanding of the essence of the problems and the results of their solution. The main part of the training involves the practical use of IT project management methodologies and frameworks, namely: drawing up a the technological card., allocating tasks and resources; estimation of time and costs for project implementation; project risk management; monitoring and control of project implementation, creating reports, conducting performance analysis, determining deviations from the schedule and budget, building effective communication between project participants, motivating and supporting team members, resolving conflicts.

At the beginning of the work, each team (small group) must distribute duties and responsibilities for the implementation of project tasks according to the Scrum framework.

To implement the project, the team must complete the following tasks:

1) build a mockup of the landing page, define the main user-story;
2) develop the Product Backlog document;
3) determine sprint goals (Sprint);
4) implement the Sprint Planning procedure and carry out Estimation of Sprint Backlog tasks;
5) develop the Sprint Backlog document;
6) plan the project by sprints based on Trello (use a new board for each sprint);
7) to hold daily meetings. At the daily meeting, each executor will determine the progress of sprint tasks;
8) control project implementation using Burndown Chart visualization;
9) implement sprint review and sprint retrospective;
10) make a presentation of the sprint results.

The final part training on the basics of IT project management is aimed at consolidating the received information. The final part of the training includes a presentation of the results of the work of each team (small group), their discussion, assessment and recommendations. At this stage, participants should share their impressions of the training and identify the knowledge and skills they have acquired.

During the training, the participants need to use knowledge from different directions, different disciplines. This training allows you to try yourself as a member of the IT team. Participants must join their efforts, learn to work as a team and make real, considered, weighted decisions and implement them in the project. Self-study is a very important point during the trainingacquirers. The purpose of the SR is to independently work out individual blocks of the training program, to deepen and consolidate knowledgeacquirer, obtained by the content module of the the course. The content of self-study in this training should be creative in nature, because independence and creative abilitiesacquirersit is necessary to develop not only during the training, but also in the pre-training period. In preparation for the training (in a week), the academic groupacquirersreceives a task, the meaning of which is that each participant of the training group must compose and solve three tasks (stereotype, diagnostic and heuristic) based on the material of the meaningful module, according to which the training is conducted. In addition, when completing the taskgetteris faced with the need to repeat the theoretical material, since the problems must not only be proposed, but also solved.

3. ORGANIZATION OF TRAINING

The main requirements for the organization of IT project management training should include:

Comprehensiveness: Training should cover all aspects of project management, including organization, planning, control, execution, monitoring, communication, risk, quality and others.

Relevance: the training should focus on modern practices, frameworks and IT project management standards, such as MSF, Scrum, Kanban and others.

Practical orientation: the training should include practical exercises and tasks related to the development of a team IT project, which allow participants to apply theoretical knowledge in practice.

Interactivity: training should be interactive and allow participants to interact with each other and with the trainer.

Teamwork: the training should be organized on the basis of teamwork of the acquirers, where the acquirers define their roles, functions, tasks according to the chosen framework or project management methodology.

Personalization: the training should take into account the individual needs and level of knowledge of the participants.

Support and consultation: during the training, participants should have the opportunity to contact the teacher (trainer) for advice and get answers to questions.

Training must meet the requirements of education quality standards.

The results of the training on the basics of IT project management should include:

1. Understanding the basic terms and concepts of project management, such as sprint, backlog, user-story, review, retrospectiva, WBS, Gantt chart, critical path, stakeholders, project scope and others.

2. Ability to plan processes, in particular, definition of tasks, stages, deadlines, budget, resources, risks and control of IT project execution.

3. Skills of organization, communication and cooperation with the project team, trainer, customer.

4. Ability to identify and manage risks, in particular, to identify potential problems, analyze them and develop minimization and control plans.

5. Project control skills, in particular, tracking progress, evaluating compliance with schedule and budget, identifying problems.

6. Knowledge of tools and technologies necessary for successful implementation of the project.

7. Decision-making skills regarding planning processes, in particular, based on self-organization, teamwork and brainstorming.

8. Soft skills, in particular, support of an effective communication process and resolution of conflicts in the team.

The structure of the training report is given in Appendix A.

4. EVALUATION OF TRAINING RESULTS

The results of passing and defending the training are evaluated according to the 100-point system for evaluating the results of outcomes adopted at the university (Table 3).

Table 3

The scale for evaluating the results of passing and defending practice

Rating (on a four-point scale)	Rating (on a one-point scale)
Differentiated scale	
Perfectly	90 - 100
Fine	74-89
Satisfactorily	60-73
Unsatisfactorily	1 – 59

Evaluation criteria

The final control of the training is carried out in the form of presentations of the results of the team (small group) and preparation of a report based on the results of the training. A necessary condition is the participation of each participant both in the presentation and in the preparation of the report. The work of applicants is evaluated according to the following criteria:

1. The applicant's level of knowledge regarding the theoretical material.
2. The acquirer's ability to apply knowledge in real situations and tasks.
3. The degree of participation of the applicant in teamwork, including communication, interaction, contribution to joint work.
4. Evaluation of the self-study of the acquirer.
5. The acquirer's ability to find non-standard solutions, propose new ideas, develop and improve projects.
6. The applicant's ability to plan his time, independently perform tasks and manage the project, organize his work.

Such control covers the practical part of the training and consists of the following elements:

1. The results of the presentation at the first stage (according to the results of the voting of all training participants and the teacher).

2. The results of the presentation at the second stage (based on the results of voting by all training participants and the teacher).

3. Results of the final presentation and report.

Voting of training participants at each stage should be carried out with the following requirements:

- teams (small groups) vote only for the projects of other participants (votes cannot be cast for their own project);
- each participant must rank their preferences at each stage (the same number of points cannot be awarded to several groups);
- when determining your preferences, you need to explain why this or that team received the highest (lowest) score.

According to the voting results of the training participants and based on their points, the teacher summarizes the results (points) and reports them to all teams (Appendix B).

The obtained score based on the results of the entire training should be distributed among the team members according to their contribution to the work.

Evaluations of the training results are included in the information of the record of current and final performance, individual study plan of the applicant (or score book). The rating for the training is taken into account when determining the rating position seekers.

RECOMMENDED BOOKS

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. 4. A Guide to the Project Management Body of Knowledge (PMBOK Guide). – 6th ed. [Electronic resource]. – Access mode : https://www.pmi.org/pmbok-guide-standards/foundational/PMBOK.

6. A guide to the Scrum Body of Knowledge (SBOK Guide), 2016 Edition [Electronic resource]. – Access mode : https://www.chardaeconsulting.com/wp-content/uploads/2019/01/SCRUMstudy-SBOK-Guide-3rd-edition.pdf.

7. Методичні рекомендації до оформлення звітів, курсових проєктів та дипломних робіт (проєктів) для студентів спеціальностей 121 "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.

APPENDICES

Appendix A

STRUCTURE OF THE TRAINING REPORT

1. INTRODUCTION

The purpose of the work: Learn the main elements of the Scrum methodology; apply the Scrum methodology to organize teamwork in the landing page development project

Task:

organize the management of the project team based on the Scrum methodology (by dividing the tasks into two sprints) using the Trello tool;

develop a landing page that should contain: a unique sales offer (USP), a demonstration of the advantages of the product / service or the results of use, the benefits of ordering a product or service on the site, evidence (statistics, reviews), a call to targeted action.

2. SPRINT-1

1) team composition and roles,
2) formed Product Backlog,
3) formed Sprint Backlog-1,
4) board in Trello at the beginning of Sprint-1,
5) a board in Trello after the end of Sprint-1,
6) cards of the main tasks with prescribed details.

3. SPRINT-2

1) formed Sprint Backlog-2,
2) a board in Trello at the beginning of Sprint-2,
3) a board in Trello after the end of Sprint-2,
4) cards of the main tasks with prescribed details and acceptance criteria.

4. RESULTS

1) a link to the Trello board,
2) link to the table with the decomposition of User Stories,
3) a link to the Lending Page mockup,
3) a link to the Lending Page.

5. CONCLUSIONS

Present the results of the Sprint Retrospective Meeting according to the Start-Stop-Continue scheme, namely provide the recommendations received by the team during the Scrum Retrospective in the following structure:

1) Start doing;
2) Stop doing;
3) Continue doing.

APPLICATIONS

1. Content plan, which contains the name and content of the element of the landing page.
2. Table with decomposition of User Stories.
3. Mockup(s).
4. Bug Report (optional).

Appendix B

Evaluation form
1sprint training
Name of team evaluating _____

Team, which is evaluated		Rating (from 1 to 10)	Topic	Notes
Number	Name			
1				Advantages: Disadvantages:
2				Advantages: Disadvantages:
3				Advantages: Disadvantages:
4				Advantages: Disadvantages
5				Advantages: Disadvantages
6				Advantages: Disadvantages
7				Advantages: Disadvantages
8				Advantages: Disadvantages
9				Advantages: Disadvantages
10				Advantages: Disadvantages

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