Methodologies and Technologies of Software Development. Coursework
Working program of the academic discipline (Syllabus)

Requisites of the Course	
Level of higher education	*First (bachelor's)*
Field of Study	*12 Information technologies*
Specialty	*121 Software Engineering*
Education Program	*Computer Systems Software Engineering*
Type of Course	*Normative*
Mode of Studies	*Full-time*
Year of studies, semester	*2nd year, spring semester*
ECTS workload	*1 credit (30 hours)*
Testing and assessment	*Final test*
Course Schedule	*https://roz.kpi.ua/*
Language of Instruction	*English*
Course Instructors	Prof., Dr.Sc., Mykhailo Anatoliyovych Novotarsky, *novotar @ gmail . com* Assistant *Kovalchuk Oleksandr Myronovych , kovalchuk . oleksandr @ lll . kpi.ua*
Access to the course	*https://classroom.google.com/*

Outline of the Course

1   Course description, goals and objectives, learning outcomes

Course work is performed with the aim of consolidating, deepening and generalizing the knowledge acquired by students during their studies, and applying them to comprehensively solve a specific professional task. Writing and defending a term paper is an important preparatory stage for the next, more difficult task - the completion of bachelor's and master's theses. Course work on software development methodologies and technologies is a mandatory component of the educational and professional program "Computer Systems Software Engineering" for obtaining a bachelor's degree. While studying this discipline, students will get practical software development skills.

The purpose of the course work is to systematize, consolidate and deepen the theoretical and practical knowledge obtained during the study of the discipline "Methodology and technology of software development", the formation of skills in the application of this knowledge when solving specific practical tasks in the field of computer science.

The subject of study of the discipline is:
- theoretical and practical principles of development and support of software products;
- methods and means of interaction between developers during software development;
- software testing methods;
- methods of continuous integration;
- principles of software architecture construction;
- software delivery and deployment methods.

According to the requirements of the EP, the students as a result of studying the module "Methodologies and technologies of software development. Coursework" must demonstrate the following competencies and program learning outcomes:

- ability to analyze subject areas, form, classify software requirements;
- the ability to design software architecture, to model the functioning processes of individual subsystems and modules;
- the ability to ensure software quality;
- ability to develop and maintain software products;
- to be able to apply methods and technologies of developing software products;
- ability to develop software using information security concepts.

According to the results of the study of the educational discipline "Methodologies and technologies of software development. The following **knowledge** must be acquired in the course work :

- conceptual and theoretical knowledge in the field of software engineering;
- the ability to ensure software quality;
- methodological knowledge in terms of applying modern methods and technology for software development.

Skills that should be acquired as part of studying the educational discipline "Methodology and technology of software development. Coursework":

- implementation in the form of a program of one or more interconnected algorithms that
- solve a given applied problem;
- acquisition of practical software development skills;
- use software adaptation approaches to changes;
- apply modern software testing tools;

Such a combination of acquired competences, theoretical and practical knowledge, abilities and skills helps to increase the professional level of bachelor's degree holders in order to carry out effective activities in the field of software product development.

2 Pre-requisites and post-requisites of the discipline (place in the structural and logical scheme of training according to the relevant educational program)

Necessary disciplines: "Algorithms and data structures", "Databases", "Programming Fundamentals", "Object-oriented programming", "Methodologies and technologies of software development"

Knowledge, abilities and skills obtained as a result of studying and completing the tasks of the module "Methodologies and technologies of software development . Coursework" are used in the study of the following disciplines: "Software Engineering Components. Part 4", "Agile Programming Techniques", "Risk and Quality Management of Projects".

3 The structure of the credit module

The course work is an individual task from the discipline "Methodology and technology of software development" and is being prepared for defense in the final period of theoretical training. The

coursework must be prepared for defense within the deadline set by the teacher. An explanatory note is submitted to the defense of the coursework.

The explanatory note includes the following components: title page, term paper tasks, table of contents, which includes the names of all sections and points with page numbers, an introduction, which indicates the purpose and tasks of the term paper; the theoretical part, in which theoretical information on the topic of the work is presented; practical implementation in the programming language. At the end of the explanatory note, there is a conclusion based on the results of the work.

4 Educational materials and resources

1 *Software Engineering at Google by Titus Winters, Tom Manshreck, Hyrum Wright. URL:* https://abseil.io/resources/swe-book

2 *Building Secure and Reliable Systems by Heather Adkins, Betsy Beyer, Paul Blankinship, Ana Oprea, Piotr Lewandowski, Adam Stubblefield. URL:* https://sre.google/static/pdf/building_secure_and_reliable_systems.pdf

3 *Ambler, S. (2002) Agile Modeling: Effective Practices for Extreme Programming and the Unified Process, NewYork, John Wiley & Sons.*

4 *Christopher Fox (2006) Introduction to Software Engineering Design. Addison Wesley*

Policy and control

5 Policy of academic discipline (educational component)

During classes in an academic discipline, students must adhere to certain disciplinary rules:
- extraneous conversations or other noise that interferes with classes are not allowed;
- the use of mobile phones and other technical means is not allowed without the teacher's permission.

The course work is submitted (defended) personally with verification of the obtained practical results and theoretical knowledge necessary for the performance of such work. Validation of practical results includes code review and execution of test tasks.

6 Types of control and rating system for evaluating learning outcomes (RSO)

Semester control: assessment

Admission of a student of higher education to the defense of a course work is carried out by the academic supervisor.

Admission criteria:
- availability of an electronic version of the text part of the coursework in the format .doc, .docx, .pdf or .odt developed in accordance with the requirements;
- availability of an electronic version of the working software development (in accordance with the task set in the work), presented in the form of an installer for one or more common modern operating systems;
- available paperback printed copy of the text part of the coursework,
- issued in accordance with the requirements certified by the academic supervisor;
- correspondence of the content of the text part to the topic of the course work;
- presence in the appendices of the text part of the coursework of the technical task and user instructions for using the software development;
- observance of academic integrity during coursework writing, in accordance with regulatory documents.

The coursework defense includes a short speech by the student with a report, his answers to the questions of the committee members. The student's presentation reflects the relevance of the topic, the task of the coursework, its main results and a demonstration of the software product. The student must demonstrate the ability to answer questions from the subject area of the coursework, conduct a scientific discussion.

At the end of the defense procedure, the committee issues a final overall grade for the course work.

Correspondence of rating points to grades on the university scale

Rating	Grades
100-95	Excellent
94-85	Very good
84-75	Good
74-65	Satisfactorily
64-60	Sufficient
Less than 60	Fail
Admission conditions not met	Not allowed

Working program of the academic discipline (syllabus):

Designed by O. M. Kovalchuk, assistant of the Department of Computer Engineering

Adopted by the Department of Computer Engineering (Protocol No. 10 dated 05/25/2022)

Approved by the methodical commission of the faculty (protocol No. 10 dated 09.06.2022)