SYLLABUS OF THE ACADEMIC DISCIPLINE "QUALITY CONTROL AND SOFTWARE TESTING"

Component of the Educational Program – Elective (4 Credits)

Educational and Professional Program	*Information Technologies and Project Management*
Specialty	*122 – Computer Science*
Field of Study	*12 – Information Technologies*
Level of Higher Education	*First (Bachelor's)*
Language of Instruction	*Ukrainian / English*
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Course Page in Moodle:	https://moodle.chnu.edu.ua/course/view.php?id=4564

COURSE DESCRIPTION

The course "Quality Control and Software Testing" covers the fundamentals and modern approaches to ensuring the quality of software products, including testing methods, defect management, and test automation. Students will learn about the software development life cycle and various types of testing (unit, integration, system, regression, etc.). Special attention is given to writing test cases, bug reports, creating test plans, and analyzing testing results. Successful completion of the course will provide students with the knowledge and skills necessary for the role of a software tester or quality assurance specialist, which is essential for effective teamwork in developing and improving software solutions.

Course Objective: To teach students the process of high-quality software development using international standards. Students will learn to inspect and integrate code, participate in defect fixing and application upgrades during testing, perform effective and qualified code inspections, design and implement comprehensive testing plans, apply various testing methods proficiently, and calculate test coverage and efficiency based on multiple criteria.

LEARNING CONTENT OF THE EDUCATIONAL COMPONENT

MODULE 1	
Topic 1	**Concept of Software Quality. Software Quality Model. Characteristics and Attributes of Software Quality According to ISO 9126. Types of Software Quality.**
Topic 2	**Software Development Life Cycle. Key Stages of the Life Cycle. Types and Purpose of Software Development Life Cycle Models. Main Classes of Life Cycle Models: Waterfall, Iterative.**

Topic 3	**Fundamental Testing Stage. Stages of the Software Development Cycle from a Testing Perspective (Requirements Analysis, Design, Development and Programming, Documentation, Testing, Deployment, and Maintenance). Fundamental Testing Process (Planning and Management).**
Topic 4	**Requirements Analysis and Testing. Requirements Analysis. Characteristics of Requirements. Characteristics of Requirements Specifications. Documentation and Requirements Testing Techniques. Testing Axioms. The Role of Testing in the Software Development Cycle. Software Testing Principles.**
MODULE 2	
Topic 5	**Test Results in Software Testing** **Test Deliverables: Definition and Types. Test Strategy. Test Plan. Test Cases/Suites/Scripts. Test Case Set. Requirements Traceability Matrix (RTM). Checklists.**
Topic 6	**Software Testing Life Cycle.** **Phases of the Software Testing Life Cycle (STLC).**
Topic 7	**Executing Test Cases and Reporting** **Bug Report. Defect. Bug Report Template. Defect Severity and Priority. Defect Severity Levels. Defect Priority Levels. Common Mistakes in Writing Bug Reports. Bug Life Cycle. Recommendations for Writing Bug Reports. The Most Common Test Case Management Systems.**
Topic 8	**Specifics of Mobile Application Testing** **Mobile Application Testing. Classification of Tools for Mobile Application Testing. Key Points in Mobile Website Testing Strategy.**
Topic 9	**Specifics of Web Application Testing** **Definition and Main Components of a Web Application. Specifics of Web Application Testing. Architectural Features: Client-Side Focus. Architectural Features: Server-Side Focus. Architectural Features: Database Focus. Differences Between Web Applications and Desktop Applications.**

FORMS, METHODS, AND EDUCATIONAL TECHNOLOGIES OF TEACHING

Forms of Learning:
Lectures, laboratory work, testing, in-class and online distance learning using Moodle and Google Meet platforms.
Teaching Methods:

- Verbal Methods (lecture, discussion, debate, explanation, narration, etc.);
- Practical Methods (laboratory work);
- Visual Methods (demonstration, illustration);
- Working with Information Resources: educational, scientific, regulatory literature, and online resources;
- Independent Work on individual assignments or according to the course program;
- Distance Learning using appropriate online platforms.

FORMS AND METHODS OF ASSESSMENT AND EVALUATION

Types and Forms of Control:
Forms of ongoing assessment include oral or written responses (testing, laboratory work, individual research assignments).

Assessment Methods:

- **Oral Assessment**: Individual and group questioning during lectures and laboratory sessions, defense of laboratory work and individual research assignments.
- **Written Assessment**: Final test-based evaluation.

Ongoing Assessment:

- Laboratory work
- Control testing

Final Assessment: Credit (Pass/Fail Exam).

CRITERIA FOR ASSESSING LEARNING OUTCOMES

The student performance evaluation system is based on ECTS principles and is cumulative. During the semester, students must complete **8 laboratory works (LWs)** and **1 control test**. Each laboratory work is graded with **6 points**, and the control test is worth **12 points**, making the **total maximum score for the semester 60 points** (see the table below).

When completing a laboratory assignment, students must prepare a report and upload it, along with the functional program files, to the e-learning platform for further review (the report formatting requirements are provided on the course page).

The grading of laboratory work is divided into two parts:

- **50% of the points** are awarded for a fully completed and correctly formatted laboratory report.
- The remaining **50% of the points** are awarded after the student successfully defends the laboratory work.

Points may be deducted based on errors as follows:

- **Minor error**: 10-20% deduction.
- **Significant error**: 20-40% deduction.
- **Insufficient theoretical knowledge**: If the student cannot explain theoretical concepts, confuses definitions, or provides logically incorrect statements, up to **50% of the total score** for the laboratory work may be deducted.

Ongoing Assessment (In-Class and Independent Work)									Total for the Semester	Total Points (Credit)	**Total Number of Points**
Lb1	Lb2	Lb 3	Lb 4	Lb 5	Lb 6	Lb 7	Lb 8	Control Testing	60	40	100
6	6	6	6	6	6	6	6	12	60		

Lb1, Lb2, Lb3, Lb4, Lb5, Lb6, Lb7, Lb8 – Topics of Laboratory Work.

Grading Scale: National and ECTS

Total Points	**ECTS Grade**	**National Grade (for Exam, Course Project/Work, Practice)**	**National Grade (for Credit)**
90–100	A	Excellent (відмінно)	Passed (зараховано)
80–89	B	Good (добре)	
70–79	C		
60–69	D	Satisfactory (задовільно)	
50–59	E		
35–49	FX	Fail with the possibility of retake (незадовільно з можливістю повторного складання)	Fail with the possibility of retake (не зараховано з можливістю повторного складання)
0–34	F	Fail with mandatory retake of the course (не зараховано з обов'язковим повторним вивченням дисципліни)	Fail with mandatory retake of the course (не зараховано з обов'язковим повторним вивченням дисципліни)

EVALUATION OF LEARNING OUTCOMES

The evaluation of educational outcomes for students is carried out according to the European Credit Transfer and Accumulation System (ECTS).

The criterion for successful assessment is achieving the minimum threshold levels (points) for each planned learning outcome.

ACADEMIC INTEGRITY POLICY

The adherence to the academic integrity policy by participants in the educational process in studying this course is regulated by the following documents:

- *"Ethical Code of Yuriy Fedkovych Chernivtsi National University"*: [Ethical Code PDF] (https://www.chnu.edu.ua/media/jxdbs0zb/etychnyi-kodeks-chernivets koho-natsionalnoho-universytetu.pdf)
- *"Regulation on the Detection and Prevention of Academic Plagiarism at Yuriy Fedkovych Chernivtsi National University"*: [Regulation PDF] (https://www.chnu.edu.ua/media/n5nbzwgb/polozhennia-chnu-pro-plahi at-2023plusdodatky-31102023.pdf)

INFORMATION RESOURCES

1. https://www.youtube.com/watch?v=sO8eGL6SFsA
2. https://www.youtube.com/watch?v=JEZNzZOY0zA
3. https://www.guru99.com/software-testing.html