

# SYLLABUS

---

**INTERNATIONAL EUROPEAN  
UNIVERSITY**



**EUROPEAN SCHOOL  
OF BUSINESS**

**Software Economics**  
**Educational program «Software engineering»**

**2024**



# SYLLABUS



1	Name of the course and educational program
	Software Economics Educational program “Software engineering”
2	Course description
	In addition to the set of knowledge related to the theory and practice of managing software development processes, significant importance is placed on issues of economic planning and justification of software projects. Therefore, the goal of the Software Economics discipline is to develop a set of knowledge and skills for students to master the terminology of software engineering economics, its processes, objects, metrics, and indicators, procedures and conditions for applying constructive cost models, and enhance their ability to use acquired knowledge to solve typical management tasks in software engineering.
3	Study prerequisites
	The academic discipline is related to such disciplines as Higher and Applied Mathematics, Probability Theory and Mathematical Statistics, Fundamentals of Software Engineering, and Software Project Management and can be used to prepare qualifying papers in the specialty.
4	Amount of credits/hours
	3 ECTS credits/ 90 hours
5	Training format
	Blended learning
6	Classroom location
	Room 405, <a href="https://dist.ieu.edu.ua/course/index.php?categoryid=644">https://dist.ieu.edu.ua/course/index.php?categoryid=644</a>
7	Information about the teacher
	<b>Volodymyr Fedorov, PhD in Physics and Mathematics</b>
8	Department
	Department of Information Technologies
	
9	Office location
	Kyiv, Akademika Glushkova Ave., 42 B, room 505
10	Schedule of counseling
	Every Monday from 12:00 to 16:00 with prior appointment via corporate mail



# SYLLABUS



## 11 E-mail of the teacher

volodymyr.fedorov @ieu.edu.ua

## 12 Course objectives

To provide students with basic knowledge of investment analysis and the technical and economic justification of custom and market-oriented software projects, to provide future software engineers with a modern level of economic knowledge in information technology and skills to meet the primary requirements for performing and documenting economic calculations.

## 13 The role of academic discipline in achieving program results

PLO 1. To analyze, intentionally search for and select information and reference resources and knowledge required to solve professional problems, taking into account current scientific and technological achievements.

PLO 23. To be able to document and present the results of software development.

PLO 24. To be able to calculate the economic efficiency of software systems

## 14 Learning outcomes

Know:

- key indicators of the resource potential of the IT enterprise and the efficiency of its utilization;
- theoretical and methodological foundations of software economics;
- types of costs for the development, maintenance, and implementation of software;
- cost distribution across the life cycle of complex software systems;
- methods for assessing the efficiency and profitability of software systems.

Be able:

- economically justify the development of a software product;
- determine the estimated cost of creating and developing a software product;
- assess the labor intensity of tasks;
- calculate the cost estimate of a software product and services in the IT sector;
- perform pricing calculations for software and IT services;
- utilize tools for software cost estimation;
- prepare the economic part of software and operational documents.

## 15 Course content

Topic 1. Features of the IT market in Ukraine

Topic 2. Features of software development economics

Topic 3. The role of economic components in the software life cycle

Topic 4. Key metrics for software product assessment

Topic 5. Functionally-oriented metrics

Topic 6. Non-algorithmic methods for cost estimation

Topic 7. Algorithmic models for cost estimation

Topic 8. Ensuring data integrity in DBMS

Topic 9. Non-relational (NoSQL) DBMS

Topic 10. The Putnam model

Topic 11. The COCOMO model.



# SYLLABUS



## 16 Course materials and requirements

1. F. Brooks. The Mythical Man-Month: Essays on Software Engineering. Translated from English: Symbol-Plus, 2006.
2. S. McConnell. How Much Does Software Cost? Translated from English: Peter, 2007. 295 p.
3. Royce Walker. Software Project Management: A Unified Framework. Translated from English: Lori, 2006. 422 p.
4. R.T. Futrell, D.F. Shafer, L.I. Shafer. Quality Software Project Management: Achieving Optimal Quality with Minimum Costs. Translated from English. M.: Williams Publishing House, 2004. 1125 p.
5. S. McConnell. Surviving as a Software Manager: A Guide for Software Project Managers. Translated from English: Peter, 2006.
6. O.A. Shevchuk, N.V. Roshchyna, M.M. Duchenko. Economics and Organization of Production: Recommendations for Preparing the Economic Part of Theses. Study Guide. K.: Igor Sikorsky KPI, 2022. 47 p.
7. M.K. Buhir. Mathematics for Economists: Guide. K.: Academy, 2003. 520 p.

## 17 Technical requirements for working on the course

In order to access the course materials, you will need regular access to a computer and the Internet. In order to successfully study and pass the exam from the training course, it is necessary to constantly familiarize yourself with the materials posted on the university's remote platform (Moodle) in the course " Software Economics ". You also need to create reporting documents for the performance of practical work and upload them to the platform (the platform can only be used from a corporate email account). In the case of problems with access to the distance learning platform, it is necessary to notify the dean's office or the headmaster, or the course teacher directly.

## 18 Learning process

The process of studying the course " Software Economics " includes lectures and practical sessions. During the lectures, such teaching methods as lecture, lecture-conversation, discussion, discussion of problematic issues, demonstration, and analysis of various situations will be used according to the topic of the lectures. During practical classes, such teaching methods as surveys, testing, performance of individual tasks, performance of analytical and calculation works, solved specific problems and situations will be used).



## 19 Signs of discipline

<b>Term of teaching</b>	<b>Semester</b>	<b>International Disciplinary integration</b>	<b>Course study</b>	<b>Cycles: general training/ professional training/ free choice</b>
1 semester	8th semester	No	4th year	Professional training course



# SYLLABUS



20

## Evaluation policies

You will have different ways to demonstrate your knowledge and skills throughout the semester. This includes how you attend class, how and what you contribute to topic discussions, how you complete and complete lab assignments and tests on time, how you complete independent work assignments, and the ability to present your work. In addition, it is possible to perform tasks that are performed individually or in a small group in the form of a student scientific work.

Activities during the semester	Maximum number of points during the semester
Current work (attendance, control during the lecture)	10
Practical works	35
Independent works	15
<b>Together</b>	<b>60</b>
<b>Pass/Fail test</b>	<b>40</b>
<b>TOTAL</b>	<b>100</b>

21

## Rating scale

The grade for the discipline is defined as the sum of the points scored for the current activity in the semester. Each module includes an assessment score for the student's current work. Module control activities are carried out upon completion of the study of the taught material of this module. The minimum number of points for the current educational activity, which allows the discipline to be counted as completed, must be at least 60. The maximum point for the discipline is 100.

The total grade for studying the discipline is set according to the national and European scale (EKTS).

The overall final grade in points, according to the national scale and according to the ECTS scale, is entered in the student's assessment and examination information, study card and student's assessment book.



### Rating scale: national and ECTS

The sum of points for all types of educational activities	Evaluation ECTS	Evaluation on a national scale	
		for an exam, course project (work), practice	for credit
90-100	A	perfectly	Enrolled
82-89	B	good	
74-81	C		
66-73	D	satisfactorily	
60-65	E		
30-59	FX	unsatisfactory with possibility reassembly	not counted with the possibility of retaking
1-29	F	unsatisfactory with mandatory repeated sstudy of the discipline	not enrolled with mandatory repeated study of the discipline



# SYLLABUS



22

## How to find out your score

To check your assignment grades and read the teacher's comments, you need to check the relevant tabs on the distance learning platform (Moodle) in this course.

You can also get information about the received grades in the joint chat of the subject group (Viber or Telegram) or directly from the course instructor via corporate mail, messengers or by appointment on the days of consultations.

23

## Course policies

For the productive educational and cognitive activity of the applicants when studying the discipline, thematic lectures are held and practical classes are conducted in the form of laboratory works.

In classes and during his stay at the university, the student must treat teachers, staff and other students with respect, attend classes according to the schedule, come on time and not leave the classroom without the teacher's permission. It is necessary to complete all academic tasks and their work within the specified time.

The teacher, in turn, must constantly raise his professional level, pedagogical skill, and general culture, provide conditions for students to master educational programs at the level of mandatory requirements for the content, level and scope of education, and promote comprehensive professional development of students. It is mandatory to follow the educational and thematic plan, not to be late for classes, not to allow any manifestations of corruption, discrimination, bullying, harassment and oppression of the rights of those seeking education.

Education is based on the application of active learning methods. Active participation is expected and the norm. Attendance and active participation make up 80% of the grade. A student who, for good reasons, documented, was not subject to current control has the right to undergo current control within a two-week period after returning to studies.

A student who was absent from classes without valid reasons, did not participate in current control activities, did not liquidate academic debt, is not allowed to take the final semester control of knowledge in this discipline, and on the day of the exam in the examination information by a scientific and pedagogical employee the grade "not admitted" is issued. Retaking the exam in the discipline is prescribed on the condition that all types of educational, independent (individual) work provided for in the work curriculum of the discipline are performed, and is carried out in accordance with the liquidation schedule approved by the directorate.

The academic integrity of any institution of higher education requires integrity in teaching and research, so academic integrity is required of all MEU students. Academic dishonesty is prohibited in all programs at our university. All participants in the educational process are guided by the principles of academic integrity.



24

## Completing the task late, correcting grades, working out

Assignment reports must be uploaded to Moodle by the due dates specified in the course schedule. Best practice would be to complete assignments as soon as possible after receipt to allow enough time to actively participate in class. If more time is needed to complete the task, flexible deadlines are available. Completed assignments are accepted for full credit until the last class in the discipline on the schedule, after which 40% partial credit based on the grade received will be awarded within a week of the last day of class. Assignments that were not submitted at all will receive 0.



# SYLLABUS



If classes are missed for more than one week due to illness or other reasons, it is necessary to contact the teacher to agree on alternative options for completing tasks. Deadlines work both ways, and meeting them ensures that your instructor provides timely feedback on your assignments to ensure you stay on course.



## 25 Teacher's response time (about checking assignments)

Via corporate mail (within 24 hours), via messengers (within 1-2 hours).

## 26 Effective communication

Effective communication is essential to success in this course, we recommend using the following channels:

Forum of questions and answers: for general course questions, you need to check the FAQ section in Moodle and then post your question in the Q&A forum to ask your colleagues or the instructor (guaranteed to receive a notification by e-mail every time a new publication or an answer to a question appears);

E-mail: have a personal question related to studying the course, write to the teacher directly;

Social networks, messengers: personal communication with classmates, teacher;

Face-to-face meeting: communication with classmates during classes and with the teacher on consultation days.

## 27 Policy of publication and distribution of course materials

Students may not post, publish, sell, or otherwise publicly distribute course materials without written Permission the teacher. Such materials include: lecture notes, slides (presentations) of lectures, video or audio recordings, tasks, problem sets, tests, other students' works and answers, etc. Students who sell, post, publish, or distribute course materials without written permission or otherwise may be subject to disciplinary action, up to and including withdrawal.

The use of generative AI is permitted subject to adherence to the principles of academic integrity.

## 28 Expected workload and involvement of students

Approximately 2-3 hours per week should be allocated to work in this course. If circumstances arise that force you to spend more time on one of the tasks, you must inform the teacher by e-mail (messenger).

An extension of the submission deadline is possible only under the condition that the teacher is informed in advance that it is impossible to submit the assignment by the specified time. Students are expected to have a backup plan in case of computer malfunctions or Internet outages.

## 29 Support services

Electronic schedule: <https://rozklad.ieu.edu.ua>

Online library: <https://onlinelibrary.ieu.edu.ua>

Repository: <https://sed.ieu.edu.ua/index.php/sed/index>

Educational Ombudsman: <https://ieu.edu.ua/pro-mieu/ombudsmen>



# SYLLABUS



30

Course schedule

Topic name	Content of practical class
<p><u>Topic 1.</u> FEATURES OF THE IT MARKET IN UKRAINE</p> <p><u>Topic 2.</u> FEATURES OF SOFTWARE DEVELOPMENT ECONOMICS</p>	<ul style="list-style-type: none"> <li>▪ <u>Control during the lecture:</u></li> <li>▪ <u>Tasks for independent work:</u> Evolution of software economics</li> <li>▪ <u>Practical work No. 8.</u> Economic efficiency of the software product.</li> <li>▪ <u>Tests</u></li> </ul>
<p><u>Topic 3.</u> THE ROLE OF ECONOMIC COMPONENTS IN THE SOFTWARE LIFE CYCLE</p>	<ul style="list-style-type: none"> <li>▪ <u>Control during the lecture:</u></li> <li>▪ <u>Tasks for independent work:</u> The relationship between labor intensity and the cost of software development</li> <li>▪ <u>Practical work No. 8.</u> Factors affecting the cost of software development</li> <li>▪ <u>Tests.</u></li> </ul>
<p><u>Topic 4.</u> KEY METRICS FOR SOFTWARE PRODUCT ASSESSMENT</p>	<ul style="list-style-type: none"> <li>▪ <u>Control during the lecture:</u></li> <li>▪ <u>Tasks for independent work:</u> Measurement of software size</li> <li>▪ <u>Practical work No. 8.</u> Process metrics, project metrics, product metrics</li> <li>▪ <u>Tests.</u></li> </ul>
<p><u>Topic 5.</u> FUNCTIONALLY-ORIENTED METRICS</p>	<ul style="list-style-type: none"> <li>▪ <u>Control during the lecture:</u></li> <li>▪ <u>Tasks for independent work:</u> Ranking and assessing the complexity of external inputs</li> <li>▪ <u>Practical work No. 8.</u> Number of Function Points (FP) – metrics by A. Albrecht</li> <li>▪ <u>Tests.</u></li> </ul>
<p><u>Topic 6.</u> NON-ALGORITHMIC METHODS FOR COST ESTIMATION</p> <p><u>Topic 7.</u> ALGORITHMIC MODELS FOR COST ESTIMATION</p>	<ul style="list-style-type: none"> <li>▪ <u>Control during the lecture:</u></li> <li>▪ <u>Tasks for independent work:</u> Principles of algorithmic modeling of software development labor intensity</li> <li>▪ <u>Practical work No. 8.</u> Theoretical and statistical estimation models.</li> <li>▪ <u>Tests.</u></li> </ul>
<p><u>Topic 8.</u> THE PUTNAM MODEL</p> <p><u>Topic 9.</u> THE COCOMO MODEL</p>	<ul style="list-style-type: none"> <li>▪ <u>Control during the lecture:</u></li> <li>▪ <u>Tasks for independent work:</u> Overview of alternative parametric models</li> <li>▪ <u>Practical work No. 8.</u> COCOMO II Model.</li> <li>▪ <u>Tests.</u></li> </ul>
<p><u>Topic 1.</u> FEATURES OF THE IT MARKET IN UKRAINE</p> <p><u>Topic 2.</u> FEATURES OF SOFTWARE DEVELOPMENT ECONOMICS</p>	<ul style="list-style-type: none"> <li>▪ <u>Control during the lecture:</u></li> <li>▪ <u>Tasks for independent work:</u> Evolution of software economics</li> <li>▪ <u>Practical work No. 8.</u> Economic efficiency of the software product.</li> <li>▪ <u>Tests</u></li> </ul>
<p><u>Topic 3.</u> THE ROLE OF ECONOMIC COMPONENTS IN THE SOFTWARE LIFE CYCLE</p>	<ul style="list-style-type: none"> <li>▪ <u>Control during the lecture:</u></li> <li>▪ <u>Tasks for independent work:</u> The relationship between labor intensity and the cost of software development</li> <li>▪ <u>Practical work No. 8.</u> Factors affecting the cost of software development</li> <li>▪ <u>Tests.</u></li> </ul>



# SYLLABUS



31

## Tips for successful study

The goal is unique to everyone, but its correct setting greatly affects the result, as well as the learning process. For example,

- processing the materials of the theoretical component (lectures) of the discipline will provide insight and knowledge about the
- development process and the architecture of the OS itself, and the implementation of the practical component - the acquisition
- of practical skills in the use of methods and tools for creating system software. After all, any training that follows a clear plan and
- with a serious attitude to the material will always be successful.

So, if you want to successfully master this subject, you must be:

- persistent, attentive and inquisitive;
- creative and cheerful, open to communication and discussions
- ready to receive information and knowledge on the subject not only during lectures, but also during extracurricular hours

**See you soon!**