SYSTEM SOFTWARE. TERM PAPER
(Silabus)

Details of the discipline	
Level of higher education First (bachelor)	
Branch of knowledge	12 Information technologies
Specialty	123 Computer engineering
Educational program	Computer systems and networks
The status of discipline	Normative
Form of training	full-time/part-time
The year of preparation, semester	4th year, 7th semester
Volume of discipline	1 credit (30 hours)
Semester Control/ Control Measures	Term paper / defense of term paper
Timetable	//rozklad.kpi.ua
Teaching language	English
Information about the course / teachers manager	Doctor of Technology Sciences, Prof. V.P. Simonenko, svp@comsys.kpi.ua
Placement of the course	//comsys.kpi.ua

Program of educational discipline

1. Description of the educational discipline, its purpose, subject of study and learning outcomes

The goal of studying the discipline is the formation of students' abilities:

The purpose of the credit module is to form students' abilities to:
- perform an analytical review on the topic of the TP
- analyze the features of the architecture of many processor systems
- study static scheduling algorithms for multi-processor systems
- develop and adjust the static planning program
- to conduct experimental studies of the effectiveness of the program being developed

The main tasks in studying the discipline

According to the requirements of the educational and professional program, after mastering the discipline "System software.TP", students must demonstrate the following learning outcomes:

Know:

– basic principles of organization, planning and management of computing processes in computing systems, complexes and networks

- principles of system software design. Methods of construction and organization of interrupt systems

- the participation of system programs in the organization of the computing process of the computer system when completing tasks

- know the structure and organization of system software that manages data, memory, input/output devices

Be able:

- form tasks for computer work

- operate data sets at different levels of the hierarchical data management system, program the

exchange of information in a computer using standard means of exchange and own exchange drivers

– to design elements of system software that performs special functions of processing system information when performing tasks of planning and distribution of tasks in the computing environment

- connect additional functions to the operating system

Experience:

- works in different operating systems

– operating system installations, operating system modifications

Writing a term paper contributes to the formation of the student's creative thinking, the analysis and selection of the necessary sources and literature on the chosen topic, the ability to formulate conclusions.

The credit module provides the following competences and software results of the educational and practical program of the first level of higher education: ZK3, ZK7, FC11-13, FC15, FC18, FC19, PRN2, PRN7, PRN8, PRN110-12, PRND 14-17, PRNH19.

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

The study of the discipline "System software.TP" allows students to develop the competencies necessary for solving practical problems of professional activity related to the analysis and use of modern information technologies for the creation of system software for modern operating systems. The discipline "System software" is based on the study of such credit modules as "Programming", "System programming", "CS architecture".

Knowledge of programming languages of various levels, skills of working on the CS, and the ability to work in various programming environments are necessary for successful study of the SPZ course.

3 Content of the academic discipline

TP includes three sections. The first section is related to the performance of an analytical review of hardware or software tools for the construction of modern air defense systems.

The other two sections are related to the development of programs for PCS for a given architecture. For the task, it is necessary to perform an analysis of modern static planning algorithms.

In section 2, the development of the program for the distribution of tasks according to the option is carried out. The TP variant defines the architecture of the PCS.

Required:

- to analyze the features of the proposed multiprocessor system architecture
- develop a static planning algorithm
- develop and debug the program
- conduct experimental studies of the effectiveness of the program

An important component of Chapters 2 and 3 is testing programs with variable output data. It is necessary to investigate the effectiveness of the program and compare the results with the search area of the optimal option, which is calculated in advance. To do this, the program execution time is determined, the values of acceleration and efficiency (loading) coefficients are calculated, which are displayed using a Gantt chart.

Each chapter ends with conclusions. Also, the KR ends with a conclusion and a description of the main results of the work. The appendices contain the program listing and algorithm schemes.

Weeks	Steps	Hours
1	Getting a topic and task	1
2-5	Selection and study of literature	4
6-7	Implementation of section 1	2
7-8	Implementation of section 2	2
8-9	Implementation of Section 3	4
11-15	Conducting experimental research	6
16	Submission of coursework for review	
17	Protection of term paper	1
		20

Protection of course work is carried out in the form of an interview with all issues that arose from the manager during the work check.

According to the results of the defense, the evaluation is recognized in accordance with the evaluation criteria given.

The course work assessment is influenced by:
- the quality of the developed software
- the quality of the developed software documentation
- competence and general erudition of a student when answers to questions during protection
- the degree of performance schedule of course work preparation

If the student has submitted for protection not self -done work, the course work is not allowed, which is accompanied by a record "not admitted" in the examination. The same entry is made if the course work is not completed at the time of protection. In these cases, the entry is not allowed to obtain an "unsatisfactory" assessment.

4 Educational materials and resources
Base
1. Tanenbaum R.Modern Operating Systems, 4th edition. 2012.- 360 p.
2. Daniel P. Bovet, Marco Cesati.Understanding the Linux Kernel. 2014. - 640 p.
3. Richard McDougall, Jim Mauro.Solaris Internals. 2016. – 420 p.
4. Chris Cooper, Chris Moore.HP-UX 11i Internals. 2010. – 584 p.
5. Amit Singh.Mac OS X Internals: A Systems Approach. 2017. – 420 p.

Added
6. Brendan Tangney, Donal O'Mahony, "Local Area Networks and Their Application", "Prentice Hall", New York, London, Toronto, Sydney, Tokyo, 2018.- 460 p.

Education content

5. Methods of mastering an educational discipline (educational component)
Policy of academic discipline (educational component)

Both the teacher and the student are obliged to adhere to the Institute's Code of Honor. The main provisions of the policy:
- sections of the course work must be completed according to the established work schedule
- students have the right to appeal the results of the current monitoring of coursework progress, explaining with reasons which criteria they disagree with in accordance with the comments
- in case of discovery of the fact of academic dishonesty, the work will not be counted

Calendar control

Calendar control of students is carried out twice a semester as a monitoring of the current state of meeting the requirements of the syllabus. Conditions of positive calendar control:

- according to the results of the educational work at the first calendar control (8th week), the student receives a "certified" if he completed the scope of work for the first 7 weeks, according to table 3.1

- according to the results of the educational work at the second calendar control (14th week), the student receives a "certified" if he has completed the scope of work for 13 weeks, according to table 3.1

6 Policy of academic discipline (educational component)

Academic Integrity Policy:

All written works are checked for plagiarism and are allowed to protect with correct text borrowings not more than 20%.

Current control

Current control of the course work is performed by checking sections of the course work according to the schedule of course work, which is provided in Table 3.1.

7. Policy of academic discipline (educational component)

Course work is considered as a separate module During the semester, students complete 1course work.

The maximum number of points for the course work: 100 points. Points are awarded for:

a. Timeliness of submission of work for defense 0-20 points,

b. Completion of an explanatory note to the course work 0-20 points,

c. Completing a meaningful assignment for work 0-30 points

d. Defense (answers to teachers' questions) 0-30 points

Criteria for assessing the quality of protection

The course work is defended before the members of the commission. At the defense, the student   presents a report based on the materials of the KR and answers questions.

Evaluation criteria for a presentation based on the materials of the KR and answers to questions:

– mastery of theoretical material up to 10 points;

– the degree of mastery of the program code as a whole up to 10 points;

– the ability to make changes to the program code up to 10 points

Defense of coursework takes place during the last two weeks of the semester (without reduction o points), or during the session (with reduction of points for defense by 50%).

In order for the student to receive the appropriate grades (ECTS and traditional), his rating grade   is translated according to the table:

Rating	ECTS assessment Traditional assessment	Traditional assessment
95…100	A	Perfectly
85….94	B	Good
75…84	C	
65…74	D	Satisfactorily
60…64	E	
28…59	FX	Unsatisfactorily
RD<28	F	Not allowe

Coursework Work Program (Sylabus):

Dr. Techn. Sciences, prof. Simonenko V.P,

Approved by the Department of Computer Engineering (Protocol No. 10 of May 25, 2022)

Agreed by the Fiot Methodical Commission (Protocol No. 10 of 09.06.2022)