

**MINISTRY OF HEALTH OF UKRAINE**  
**KHARKIV NATIONAL MEDICAL UNIVERSITY**  
**DEPARTMENT OF HYGIENE AND ECOLOGY NO. 2**

**Methodical materials**  
**For students' independent work**  
**on the course of**  
**“HYGIENE AND ECOLOGY”**

**“Assessment of the state of environment and its effect on the population's health”**  
**(hygiene and ecology)**

**For sixth-year students in speciality 7.110101 – General Medicine**

**Student**\_\_\_\_\_

**Faculty** \_\_\_\_\_

**Group** \_\_\_\_\_

**Approved by the Academic Council of Kharkiv National Medical University.**

**Report No. 5 dated 18.05. 2017**

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“Assessment of the state of environment and its effect on the population’s health”  
(hygiene and ecology) for students of the 6<sup>th</sup> year in speciality 7.110101 - General  
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**Section of discipline 6. "Radiation hygiene"**

Subject 21: Regularities of radiation exposure formation of the person in places of residing, its hygienic assessment and ways of decrease. Radiation safety and antiradiation protection at objects with radiation-nuclear technologies.

Subject 22: Hygienic assessment of antiradiation protection of personnel and radiation safety of patients when radionuclides and other sources of ionizing radiation are used at medical-preventive establishments.

Subject 23: Hygienic aspects of residing of population in territories with increased levels of radioactive pollution as a result of the Chernobyl accident. (SIW).

**Section of discipline 7. "Hygiene in extreme situations"**

Subject 24: Organization of hygienic provision during elimination of extreme situation consequences. Features in temporary accommodation of the affected population, rescue and military formations.

Subject 25: Organization of sanitary supervision over nutrition and water supply in conditions of catastrophes and during war.

Subject 26: Organization and carrying out of sanitary supervision over working conditions of disaster fighters in extreme situations. (SIW).

**List of literature**

### Structure of Content of Typical Tasks of Specialist's Activity

Typical Task of Specialist's Activity According to EJD/EPP		Blocks of Substantial Modules According to EJD/EPP								
		SP003	SP007	SP010	SP011	SP012	SP013	SP045	SP048	SP071
1	2.PF.S.1.SM.O.1							*		+
2	2.PF.S.1.SM.O.3				+	+		*		*
3	2.PF.S.1.SM.O.4					+		*		*
4	2.PF.S.1.SM.O.5				+		+	*		*
5	2.PF.S.1.SM.O.6				+	+	+	*		*
6	2.PF.S.1.SM.O.7					+		*		*
7	2.PF.S.2.SP.O.8				+		+	*		+
8	3.PF.S.12.SM.O.27	+		+				*	+	*
9	3.PF.S.12.SM.O.29	+		+				*	+	*
10	3.PF.S.12.DM.O.31	+		+				*	+	*
11	3.PF.S.12.DM.O.32	+	+	+				*	+	*
12	3.PF.S.12.DM.O.33	+	+	+				*	+	*
13	3.PF.S.12.DM.O.34	+	+	+				*	+	*
+ provided by EJD/EPP * introduced in addition (choice of HEE)  <b>Stages of task accomplishment</b> 1. Hygienic estimation of the situation 2. Determination of risk factors 3. Prognostication of consequences 4. Substantiation of measures 5. Normative provision of fulfilment of specialist's activity  Choice of HEE: SP 045, SP 071.		To analyse the state of the environment and influence of its factors on health of population	Demonstrate mastering methods of hygienic estimation of effect of environmental factors	Interpret hygienic laws and general conformities of connection of health with factors and conditions of vital functions environment	Substantiate hygienic measures on prevention of diseases on non-infectious origin	To plan measures on observance of healthy mode of life, personal hygiene and introduce them in practice of health protection	Plan organisational and substantial measures concerning preventive and current sanitary inspection	Co-ordinate realisation of preventive measures with plans of development of territorial, administrative and industrial units	Analyse state of the environment on the basis of integral criteria of estimation of population health state	Substantiate realization of preventive measures according to Ukrainian sanitary laws currently in force

#### List of abbreviations.

General items of hygiene and ecology, (3-rd year)

Special items of hygiene and ecology, (3-rd year)

**Assessment of the state of environment and its effect on the population's health (hygiene and ecology), 6<sup>th</sup> year**

ECTS - European Credit-Transfer System

SI - sign-intellectual knowledge and skills

SP - sign-practical knowledge and skills

SIW - student's individual work

EQC- educational-qualifying characteristic of quality of education

EPP - educational-professional program

SP - subject-practical knowledge and skills

**SI** - subject -intellectual knowledge and skills  
**PF** - knowledge and skill of professional work  
**S** - stereotypic knowledge and skills  
**IESW** - independent extracurricular student's work  
**CEA** - current educational activity  
**TTSA** - typical task of the specialist's activity  
 + - stipulated by EJD / EPP  
 \* - brought in addition (choice of High School)

### System of students' progress estimation

#### Conversion of average mark for current activity to multi-point scale

It is carried out according to "Instruction on assessing educational activity under European Credit-Transfer System of organization of educational process", KhNMU – 2015. The final form of control is differentiated credit.

When assessing mastering each topic of the discipline, a mark is given to the student by traditional 4-point system: "excellent", "good", "satisfactory" and "unsatisfactory".

Total point for current educational activity (CEA) is determined as arithmetic average of traditional marks for each lesson, expressed in round numbers to 2 points after coma and converted to multi-point scale on table 1.

Table 1

Converting average mark for current activity to multi-point scale  
(for disciplines which end with differentiated credit or examination)

4-point scale	200-point scale	4- point scale	200-point scale
5	120	3.91-3.94	94
4.95-4.99	119	3.87-3.9	93
4.91-4.94	118	3.83- 3.86	92
4.87-4.9	117	3.79- 3.82	91
4.83-4.86	116	3.74-3.78	90
4.79-4.82	115	3.7- 3.73	89
4.75-4.78	114	3.66- 3.69	88
4.7-4.74	113	3.62- 3.65	87
4.66-4.69	112	3.58-3.61	86
4.62-4.65	111	3.54- 3.57	85
4.58-4.61	110	3.49- 3.53	84
4.54-4.57	109	3.45-3.48	83
4.5-4.53	108	3.41-3.44	82
4.45-4.49	107	3.37-3.4	81
4.41-4.44	106	3.33- 3.36	80
4.37-4.4	105	3.29-3.32	79
4.33-4.36	104	3.25-3.28	78
4.29-4.32	103	3.21-3.24	77
4.25- 4.28	102	3.18-3.2	76
4.2- 4.24	101	3.15- 3.17	75
4.16- 4.19	100	3.13- 3.14	74
4.12- 4.15	99	3.1- 3.12	73
4.08- 4.11	98	3.07- 3.09	72
4.04- 4.07	97	3.04-3.06	71
3.99-4.03	96	3.0-3.03	70
3.95- 3.98	95	Less than 3	Insufficient

Minimum number of points, which the student should have to be admitted to the differentiated credit – 70, maximum number – 120; minimum positive mark at the differentiated credit – 50 points, maximum mark – 80 points.

Evaluation of the differentiated credit: evaluation of practical skills is carried out by criteria "fulfilled", "did not fulfill", evaluation of theoretical knowledge is carried out according to table 2.

Table 2

Evaluation of theoretical knowledge when practical skills are evaluated by criteria "fulfilled", "did not fulfill"

Number of questions	«5»	«4»	«3»	Oral answer by cards, which include theoretical part of the discipline	For each answer the student receives from 10 to 16 points, which corresponds to: «5» - 16 points;
1	16	13	10		
2	16	13	10		

3	16	13	10		«4» - 13 points; «3» - 10 points.
4	16	13	10		
5	16	13	10		
	80	65	50		

Assessment of the results of studying discipline is carried out immediately after the differentiated credit. The mark on discipline is determined as a sum of points for current educational activity and differentiated credit and makes min – 120 up to max – 200.

Table 3

Correspondence of discipline evaluation in points to evaluation in traditional marks	
Mark of discipline in points	Traditional mark of discipline
180–200	«5»
150–179	«4»
120–149	«3»

**Basic requirements of safety measures**  
**« The Instruction on Safety of Life Activity»**  
**For employees and students who work and study at the University**  
**(approved by order of the Rector of KhNMU No. 412, 2008)**

1. Instructing on safety of life activity is conducted by the teacher of the group before the beginning of the academic year.
2. Classes with students and post-graduates students are conducted on the basis of the internal regulations of the University and its rector's orders.
3. Very often accidents are caused by students' violations of the established rules of behaviour and regulations. In this connection, one should:
  - be attentive when moving on the territory of the University;
  - study the location of the premises and their exits;
  - keep to the right at oncoming movement;
  - not run on the territory of the University;
  - not stand and go under any cargo which moves, as well as in places of possible fall of various subjects;
  - in class, be attentive, not engaged in unauthorized activities and not distract his/her associates.

It is FORBIDDEN for students of the University:

- to switch on and off (except for emergencies) machines and mechanisms, whose operating was not charged by the head of works;
- to taste and smell chemical substances;
- to lean or climb out of the windows of premises;

It is necessary to maintain cleanliness and carry out requirements of personal hygiene on the territory of the University, in its laboratories, lecture halls, sanitary and personal service premises.

**Section of discipline 1:**

**Subject 1: Methodological and methodical fundamentals for studying the influence of a complex of environmental factors on the population's health.**

**Date** \_\_\_\_\_ “ \_\_\_\_ ”20 \_\_\_\_;

**Student's name, year, group** \_\_\_\_\_

**Learning objective**

Master theory fundamentals and basic assessment scheme of environmental factors' influence on population health.

**Basics**

***You should know:***

1. Methodological and technique principles of general hygiene (in the extent of the previous lecture courses and practical studies on given discipline).

2. Elements of theory of probability, mathematical statistics, principles of information science and computer engineering (from the course of biological and medical physics).

**You should have the following skills:**

1. To examine environmental objects for the purpose of sanitation and hygienic assessment, to master sanitary-descriptive technique and other most popular analyses of organism responses to harmful environmental influences

2. To consider principal statistic indices, which characterize environment and population health denaturation.

3. To use reference and normative materials.

**Tasks for self-training:**

At home, the student should give definitions to the following terms:

<b>Term</b>	<b>Definition</b>
<b>Methodology</b>	
<b>Method</b>	
<b>Technique</b>	
<b>Definition of concept “health” (WHO)</b>	
<b>Kinds of effect of environmental factors</b>	1. _____ 2. _____ 3. _____ _____

**Class work** – solve a situational task and make the record:

**Task No. 1.**

In settlement A., 35 cases of typhoid fever are registered at the same time. All patients used water from a public well which was equipped in correspondence with hygienic requirements but there was not equipped toilet 15 m higher by relief. Pathogen of typhoid was found in the well water and in people who used the toilet. Luminophor added to the toilet's cesspool was revealed in the well water in 3 days, that allowed to confirm possibility of getting the agent to the well water.

List research methods used during the investigation of typhoid fever outbreak.

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**Task No. 2.**

What groups of health indices do such indices belong to:

morbidity \_\_\_\_\_

mortality (general and infant mortality) \_\_\_\_\_

physical development \_\_\_\_\_

invalidity \_\_\_\_\_

**Task No. 3.**

What groups of health indices do such indices belong to:

demographic situation \_\_\_\_\_

state of environment \_\_\_\_\_

mode of life \_\_\_\_\_

level of medical care \_\_\_\_\_

social-hygienic indices \_\_\_\_\_

**Task No. 4.**

What groups of health indices do such indices belong to:

mental disease morbidity \_\_\_\_\_

frequency of neurotic states and psychopathy \_\_\_\_\_

psychologic microclimate \_\_\_\_\_

**Task No. 5.**

According to information about atmospheric air pollution, the following  $\text{CO}_2$  и  $\text{NO}_2$  exceeding is revealed: in settlement A – by 3 times; B – by 7 times; C – by 100 times. What prognosis of changes in the level of population health state in these settlements is possible?

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**Task No. 6.**

Population in town X. is constantly influenced by factors of various nature (physical, chemical, social). Coefficient of determination for these factors is 12, 8, 8 correspondingly. Assess the degree of influence of each factor on population health.

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**Task No. 7.**

Population in town K. is constantly influenced by factors of various nature (physical, chemical, biological). Coefficient of determination for these factors is 17, 12, 8 correspondingly. Assess the degree of influence of each factor on population health.

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**Task No. 8.**

Ratio of exceeding MPC for pollutants in town D. is 9. What prognosis of changes in level of population health is possible?

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**Task No. 9.**

Population in town D. is constantly influenced by factors of various nature (physical, chemical). Coefficient of determination for these factors is 3 and 13 correspondingly. Assess the degree of influence of each factor on population health.

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**Theoretical questions to the differentiated credit:**

1. Hygiene as a science, its place in work of doctors of general practice. The purpose, the task and methods of research. Principles of hygienic normalization.
2. The basic directions of scientific research of modern hygiene. Laws of hygiene. Bases of the legislation of Ukraine about public health services and sanitary-and-epidemiologic well-being of the population.
3. Methodological and methodical bases of studying the environmental factors and their influence on health state of the population.
4. The basic plan of hygienic control over working conditions, life and factors of the environment.
5. The general plan of studying and estimation of interrelations of environmental factors and population's health.
6. The technique of the qualitative (conceptual) analysis of the condition of environment and "normalized" forecasting of changes of the level of population's health by condition of pollution of atmospheric air, water, soil.
7. The technique of the quantitative analysis of condition of the environment.
8. Zones of observation, definition of concept. The technique for choice of zones of observation.
9. Concept about basic schemes for research of influence of environmental factors on health of the population.
10. Health of the population as an integrated parameter of the condition of the environment.
11. Concept about epidemiological method of studying health state of the population and the basic ways of its realization.
12. The technique of the qualitative (conceptual) analysis of the level of population's health and its use in doctor's practical activities.
13. The technique of the quantitative analysis of the level of population's health, its use in doctor's practical activities.

**Final test control** – open base tests**Final grade***Teacher's signature* \_\_\_\_\_**Subject 2: Hygienic assessment of a potential risk, produced by environmental factors on the human organism and health of the population.**

Date \_\_\_\_\_ “ \_\_\_\_ ”20 \_\_;

Student's name, year, group \_\_\_\_\_

**Learning objective**

Master theoretical knowledge and general scheme on the risk assessment for population health caused by the environment factors.

**Basics*****You should know:***

1. Main definitions used in the risk assessment methodology.
2. Main stages of the risk assessment methodology.

***You should have the following skills:***

1. To calculate the relative and population health risk.
2. To operate with microcomputer or PC.
3. To identify the hazard factor and state the qualitative value of harmful effects for health.

4. To substantiate the scheme and content of main stages of the risk methodology.
5. To apply information and normative materials.

**Tasks for self-training:**

At home, the student should give definitions to the following terms:

Term	Definition
Risk factor	
Risk	
Danger	
Source of danger (harmful factor)	
Exposition	
Dose	

**Class work** – solve a situational task and make the record:

Stages of situational task solving	Results
1. Hygienic assessment of the situation	
2. Establishing risk factors for individual (collective) health	
3. Prognosis of the consequences of risk factors on the individual (collective) health state	
4. Planning and substantiation of hygienic, prophylactic, improving and rehabilitation measures	
5. Normative provision of the specialist's activity	

**Theoretical questions to the differentiated credit:**

1. Methodology of risk estimation. Characteristic of the problem and the basic terms.
2. The basic stages of methodology of risk estimation.
3. Connection between risk estimation and its management. Risk management and hygienic normalization.
4. Problems of application of risk estimation methodology in Ukraine.

**Final test control** – open base tests

**Final grade**

*Teacher's signature* \_\_\_\_\_

### Subject 3: Hygienic assessment of the influence of natural and anthropogenic components of biosphere on the health of a person and of the population.

Date \_\_\_\_\_ “ \_\_\_\_ ”20 \_\_;

Student's name, year, group \_\_\_\_\_

#### Learning objective

1. Master the fundamental methods of collection, processing and analysis of hydrometeorologic and other information for the hygienic assessment of climate and weather in the region.

2. Master the scheme and methods of assessment of the weather and climate influence on human body and health. To elaborate hygienic recommendations for healthy and sick men for prevention of the heliometeorotropic reactions.

#### Basics

##### *You should know:*

1. Physiology of human thermoregulation and adaptation.
2. Basics of the environmental hygiene.
3. Medical classification of the weather conditions.
4. Methods of medical and meteorological forecast.
5. Methods of heliometeorotropic reactions prevention (permanent, seasonal, urgent) for healthy and sick men suffering from different diseases.
6. General and applied medical classifications of climate.
7. Structure and organization of the climate and the weather conditions inspection and forecast services.

##### *You should have the following skills:*

1. To determine the characterizing climate and weather conditions indices and state a hygienic value of results.
2. To master statistical calculations including the usage of programmable calculator or computer.
3. To present results of statistical calculations using tables, graphs, diagrams, schematic maps.

##### **Tasks for self-training:**

At home, the student should give definitions to the following terms:

Term	Definition
1. Weather	
2. Climate	
3. Climatic zone	
4. Climatic zones of the Earth (list)	
5. Climatic zones of Ukraine (building climate classification)	
6. Microclimate	

**Class work** – solve a situational task and make the record:

Stages of situational task solving	Results
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1. In which climatic zone is the settlement situated?	
2. What climatic and weather conditions are characteristic for this climatic zone?	
3. List the features of physiologic reactions реакций, concerned with staying and acclimatization in this zone.	
4. What features of the climate in this area are unfavorable from hygienic point of view?	
5. Give hygienic recommendations stipulated by features of the climate in this area:	1) water supply and water intake schedule:
	2) improving of heat-shielding properties of buildings:
	3) orientation of residential constructions:
	4) rational accommodation of residential constructions regarding industrial enterprises:
	5) prophylaxis of ultraviolet deficiency

#### **Theoretical questions to the differentiated credit:**

1. Biosphere and its structure. Circulation of substances in biosphere.
2. Structure, composition and properties, hygienic importance of the atmosphere.
3. Structure, composition and properties, hygienic importance of the lithosphere.
4. Structure, composition and properties, hygienic importance of the hydrosphere.
5. The environment, its components.
6. General regularities of influence of the environment on the human organism and health of the population.
7. Weather, definition of concept. Factors which form and characterize weather.
8. Regularities of atmospheric circulation. Formation of different types of weather.
9. The basic thermobaric processes. Temperature inversion.
10. Helio-meteorotropic measures of the human, definition of concept, the mechanism of their occurrence.
11. Medical classifications of weather, importance of parameters which lay in their basis.
12. Influence of meteorological conditions on dynamics of atmospheric air pollution.
13. Influence of weather on human health through distortion of dynamics of atmospheric pollution. Temperature inversion.
14. Medical forecasting of weather, principles and methods of prophylaxis of helio-meteorotropic measures.
15. Climate. Definition of concept. Factors which form and characterize the climate of the region.
16. Classification and hygienic characteristic of climatic zones. Climatic zoning of the territory of Ukraine.
17. Features of climate in different natural-geographical regions.
18. Acclimatization. The basic hygienic issues of acclimatization in the North, the South and in conditions arid zones and high mountains.
19. Hydrometeorological service, technique of processing and importance of data of meteorological observation for a medical-hygienic estimation of climatic-weather conditions.
20. Use of climatic factors with health-improving and preventive purpose, sanatorium treatment at different diseases.
21. Climatic resorts of Ukraine.
22. Scientific and technical revolution, its positive and negative consequences.
23. Positive influence of scientific and technical revolution on human health.
24. Global character of biosphere pollution.

25. Pollution of atmospheric air and its influence on health.
26. Pollution of soil and its influence on health.
27. Pollution of water and its influence on health.
28. General regularities of global pollution of biosphere.
29. Scientific bases and ways of protection of the environment from pollution.

**Final test control** – open base tests

**Final grade**

*Teacher's signature* \_\_\_\_\_

**Subject 4: Hygienic importance of solar radiation and use of its components for prophylaxis of human diseases and sanitation of air, water and subjects.**

**Date** \_\_\_\_\_ “ \_\_\_\_ ”20 \_\_\_\_;

**Student's name, year, group** \_\_\_\_\_

**Learning objective**

1. Become familiar with physical and biological characteristics of ultraviolet radiation (UVR).
2. Master the methods of measuring the ultraviolet radiation intensity.
3. Master the measures of the ultraviolet radiation intensity and the calculations of the exposure to it using the different measuring methods.

**Basics**

***You should know:***

1. Nature, physical characteristics and spectral distribution of the solar radiation.
2. Physical characteristics, spectral distribution and biological effect of the ultraviolet radiation (UVR).
3. Dosimetric units and measuring methods of the UVR.

***You should have the following skills:***

1. Working with ultravioletmeter (uphymeter) according to its instruction.
2. Determination of the reagent titre and substance concentration by volumetric titrimerty methods.
3. Using the mathematical methods of the UVR intensity and dose assessment.

**Tasks for self-training:**

At home, the student should give definitions to the following terms:

Term	Definition
1. Solar radiation	
2. Ultraviolet radiation	
3. Regions of UV- range (list)	
4. Natural illumination	

**Class work** – solve a situational task and make the record:

1. Erythema dose in children of the kindergarten at standard distance 0.5 m from the exciter of 10 lamps LE-30 arose in 1 minute on average. Calculate the preventive dose of radiation treatment, which can be received by the group of 25 children at 2.5 m. – the minimum distance at which a group can be placed.

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2. You are a doctor of medical and sanitary station rendering medical care to miners. Calculate the time of preventive radiation treatment of miners in radiation therapy room, which is equipped by paired rows of erythema lamps LE-30, the lamps are 1.5 m from miners' rank. Erythema dose for calculation was determined at standard distance 0.5 m from a row of lamps and made 1.5 min.

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3. At what distance from an exciter with straight mercury quartz lamp (SMQ) should a group of cardiologic patients be placed for preventive radiation therapy, if erythema dose was 0.5 min. at a standard distance 0.5 m?

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4. Calculate sanitation time for the air in the operating room with help of one lamp LB-30, if the number of microbes before a test sanitation with help of Krotov's apparatus was 8 000 CFU/m<sup>3</sup>, after sanitation 3 800 CFU/m<sup>3</sup> (CFU – colony-forming unit)

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Tasks No. 1 and No. 2 are taken from the source: "Hygiene and Ecology" /V. Bardov. – Vinnytsya, "Nova Knyha", 2008. – P. 48-49.

#### **Theoretical questions to the differentiated credit:**

1. The nature of solar radiation, the basic components of corpuscular and electromagnetic part of solar radiation.
2. Spectral structure of ultra-violet part of solar radiation on border with atmosphere and on the surface of the Earth (A, B, C areas). Ozone layer of the atmosphere and its hygienic importance.
3. Artificial sources of ultra-violet radiation, their physical and hygienic characteristics.
4. Kinds of biological effect of ultra-violet radiation and its features for each area of spectral distribution of UVR.
5. Methods and units of UVR intensity.
6. Concept of erythema, physiological, preventive dose of UVR.
7. The basic kinds and mechanisms of biological effect of UVR.
8. Distinctive properties of biological effect of separate UVR ranges - A, B, C areas.

9. Concept of erythema, physiological and preventive dose of UV irradiation, their quantitative expression at different methods of definition of UVR intensity.
10. Health disorders and diseases connected with UVR deficiency.
11. The basic symptoms of "solar starvation" and indications for preventive ultra-violet irradiation.
12. Using UVR for primary and secondary prophylaxis of different diseases.
13. Kinds of artificial sources of UVR, the characteristic of the principle of their measure, the basic standards. Photaria
14. Superfluous irradiation of the person with the Sun and artificial sources of ultraviolet radiation.
15. "Ozone gaps" as a hygienic problem. UVR as professional harm.
16. Methods and means of protection from excessive UV irradiation.

**Final test control** – open base tests

**Final grade**

*Teacher's signature* \_\_\_\_\_

### **Subject 5: Scientific fundamentals of medical biorhythmology and chronohygiene (SIW).**

**Date** \_\_\_\_\_ "\_\_\_\_" 20 \_\_\_\_;

**Student's name, year, group** \_\_\_\_\_

#### **Learning objective**

1. Strengthen the theoretical knowledge on biological rhythms and their main characteristics and types.
2. Master the methods of determination of the physiological, psychological and physiological, and calculation correlates of the organism biological rhythm.
3. Learn the biorhythmological principles of the rational organization of the people's everyday activity.

#### **Basics**

##### ***You should know:***

1. Initial conditions and development reasons of medical biorhythmology as a science and its psychohygienic value.
2. Main characteristics and classifications of the most widespread biological rhythms.
3. Development reasons and the main clinical manifestations of desynchronization as a medical and hygienic category.

##### ***You should have the following skills:***

1. To determine different types of biological rhythms day curves, the type of day work capacity and calculation biological rhythms.
2. To use during the organization of educational (working) process and in one's free time the biorhythmological principles of the rational organization of the everyday activity.

#### **Tasks for self-training:**

1. At home, the student should give definitions to theoretical questions.
2. Determine the type of the day capacity for work using O. Ostberg's tests in S. Stepanova's modification.

No. of the question	Letter of the answer	Point

3. Determine your biological rhythms by calculation method (see Methodical recommendations or V. Bardov's manual "Hygiene and Ecology").

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4. Using program "Byorhythms" for Windows, 2.31, make calculations by three classic sinusoids.

### **Theoretical questions to the differentiated credit:**

1. Biological rhythms and human health state. Concept about biological rhythms. Preconditions and reasons for origin of medical biorhythmology as a science.
2. Leading characteristics of biological rhythms (level, period, amplitude, acrostage, shape of a day curve, etc.).
3. Classifications of the most widespread biological rhythms.
4. Technique for determination of different types of daily curve of biological rhythms.
5. Technique for determination of type of daily working capacity of the person.
6. Technique for determination of calculated biological rhythms of the person.
7. Concept about desynchronosis as the basic kind of chronopathology and as medical and hygienic category. Kinds of desynchronoses.
8. Biorhythmologic principles of the rational organization of daily activity of the person. Chronohygiene as a basis for prophylaxis of desynchronoses.

**Final test control** – open base tests

**Final grade**

*Teacher's signature* \_\_\_\_\_

### **Section of discipline 2. “Community hygiene”**

#### **Subject 6: Hygiene of water and water supply of settlements. Sanitary protection of water objects. Sanitary protection of soil and purification of inhabited areas.**

**Date** \_\_\_\_\_ “\_\_\_”20 \_\_;

**Student's name, year, group** \_\_\_\_\_

#### **Learning objective**

1. Master requirements to drinking water quality and hygienic importance of some of its indices.
2. Acquire the method of the analysis reading and drinking water quality assessment for local and centralized water supply.

#### **Basics**

##### ***You should know:***

1. Hygienic indices and standards of drinking water quality (physical, organoleptic, chemical composition) and pollution indices (chemical, bacteriological – both direct and indirect), their scientific substantiation.
2. Concept and characteristics of centralized (domestic and drinking water pipeline) and decentralized (wells, groundwater intake structures, catchments) water supply systems.
3. Hygienic characteristic of conventional and special methods of water quality improvement, technology of their implementation on main facilities of water pipeline at centralized water supply systems.
4. Scope of measures during sanitary inspection of exploitation of main facilities of water pipeline (individual components of water pipeline and water supply network) as well as wells and groundwater intake structures (catchments).

##### ***You should have the following skills:***

1. To state a hygienic value of drinking water quality according to results of sanitary inspection of the source of water supply and results of the laboratory analysis of water.



2.To state a hygienic value of different methods of water quality improvement and exploitation efficiency of individual structures and facilities, used for this purpose.

3.To elaborate the complex of measures to improve water quality and to prevent diseases caused by poor water quality.

### Tasks for self-training:

At home, the student should give definitions to the following terms:

Term	Definition
1. Hygienic requirements to drinking water quality	1. _____ 2. _____ 3. _____ 4. _____ 5. _____
2. Sanitary protection of water reservoirs	
4. Sanitary protection of soil	

**Class work** – solve the situational task and make the record:

#### Situational task.

Regional rheumatologic sanatorium “Druzhba” for 100 beds is located in the garden-park area of village S. Water supply is made from an artesian well, built on the territory of the economic zone of the sanatorium. Drainage system- two waterproof cesspools, of 160 i 190 m<sup>3</sup>, respectively, since there is no sewage system in the village. The sewage from the cesspools is removed to the drain station twice a month.

Due to the irregular removal of the sewage, the cesspools are overfilled and sewage water flows to the river, which is used by the population of the village for recreation and swimming. The results of water analyses are shown in the table. Sample No. 1 is taken 1.5 km downstream the place of pollution, No. 2 – near the place of pollution, No. 3- 100 m upstream the place of pollution.

Index, units	Samples		
	1	2	3
Turbidity, mg/dm <sup>3</sup>	20	1500	1500
Smell at 20°C and heating to 60°C, points	2	4	4
pH	6.5	7.7	7.3
Oxidizability, mg O <sub>2</sub> /dm <sup>3</sup>	7	15	15
BOD <sub>20</sub> , mg O <sub>2</sub> /dm <sup>3</sup>	3	7	7

Stages of situational task solving	Results
1.Hygienic assessment of the situation	
2.Establishing risk factors for individual (collective) health	
3.Prognosis of the consequences of risk factors on the individual (collective) health state	
4.Planning and substantiation of hygienic, prophylactic, improving and rehabilitation measures	

5. Normative provision of the specialist's activity	
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### **Theoretical questions to the differentiated credit:**

1. Influence of amount and quality of drinking water and conditions of water supply on the population's health state and life sanitary conditions.
2. Norms of water supply and their substantiation.
3. Infectious diseases, which pathogens are transmitted through water. Features of water epidemics, their prophylaxis.
4. The diseases of non-infectious origin caused by the use of water of poor quality, and means of their prophylaxis.
5. Problem of macro- and microelementoses of water origin. Hygienic importance of water hardness. Endemic fluorosis and its prophylaxis.
6. Endemic caries. Fluorine prophylaxis of the dental caries and its importance in the practice of centralized water supply.
7. Contribution of national hygienists to the scientific substantiation and practical realization of water fluorination in the centralized systems of water supply of Ukraine. Dependence of water fluorination on climatic conditions of the district.
8. Water-nitrate methemoglobinemia as a hygienic problem, its prophylaxis.
9. General hygienic requirements to drinking water quality, their parameters - organoleptic, parameters of natural chemical composition, their hygienic characteristic. State Standard on drinking water.
10. Sources and parameters of pollution and epidemiological safety of water - organoleptic, chemical, bacteriological, their hygienic characteristic.
11. Comparative characteristic of centralized and decentralized systems of water supply.
12. Elements of the waterpipe at diversion of artesian water and water of open reservoirs. Zones of sanitary protection.
13. Standard methods of water purification at the centralized system of water supply (coagulation, precipitation, filtration), their essence and constructions which are used with this purpose.
14. Methods of water disinfection, their classification, hygienic characteristic.
15. Water chlorination, its methods and reagents which are used with this purpose, disadvantages of chlorination.
16. Water disinfection with ozonization and irradiation with ultra-violet rays, their hygienic characteristic.
17. Special methods of water quality improvement, their essence and hygienic characteristic (desalination, deironing, deodorization, deactivation).
18. Methods of sanitary supervision over the centralized systems of water supply (preliminary and current). Kinds of laboratory analysis of water - bacteriological, sanitary-chemical (brief and full).
19. Sanitary supervision over local systems of water supply. Arrangement and exploitation of wells, captations. "Sanation" of wells.
20. Technique of reading of analyses and an expert estimation of drinking water.
21. Soil, definition of concept. Hygienic, epidemic and endemic importance of soil.
22. Basic physical properties of soil (mechanical structure, humidity, porosity, water penetration, filtrational ability, air permeability, capillarity, moisture capacity) and their hygienic importance.
23. Main abiotic components of soil (solid substance, soil moisture, soil air), their natural chemical composition and hygienic characteristic.
24. Soil biocenoses, their classification and hygienic characteristic.
25. Soil as the factor of transmission of infectious diseases pathogens.
26. Sources of soil pollution, their classification and hygienic characteristic.
27. Factors and mechanisms which take part in autopurification of soil.
28. Use of soil for neutralization of waste of economic-household and industrial activity of the human.
29. Hygienic characteristic of methods of collection (according to planned-flat, according to planned-yard), removal and neutralization of solid waste of a household, industrial, building origin.
30. Export system of collecting, removal and neutralization of liquid waste (fields of sewage disposal, fields of plowing).
31. Technique of sanitary inspection of the ground area taking into account its functional destination.
32. Rules, methods and means of sampling and preparation of soil samples for laboratory research.
33. Parameters of sanitary condition of soil, their classification and hygienic importance.
34. Technique of determination of physico-mechanical parameters of soil.
35. Basic scheme of determination of chemical parameters of sanitary condition of soil.
36. Technique of determination of geogelminth ova in soil.
37. Basic scheme for determination of bacteriological parameters of soil sanitary condition and pollution.
38. Approximate scale for estimation of soil pollution level and degree of its health hazard for the population.
39. Technique of hygienic estimation of soil sanitary condition by results of sanitary inspection of the site and the laboratory analysis of samples.

**Final test control** – open base tests

**Final grade**

*Teacher's signature* \_\_\_\_\_

**Subject 7: Sanitary protection of atmospheric air. Hygiene in the planning of inhabited areas.  
Hygiene of living spaces and public buildings and constructions.**

**Date** \_\_\_\_\_ “ \_\_\_\_ ”20 \_\_;

**Student's name, year, group** \_\_\_\_\_

**Learning objective**

1. Strengthen the student's knowledge about chemical composition of the air, the atmospheric and the indoor air pollution sources.
2. Master the main methods of sanitary and chemical analysis of the air samples.
3. Master the methods of the air express analysis using the gas-analyzer UG-2 (YT-2).
4. Master the methods of the hygienic assessment of the indoor air purity.

**Basics**

***You should know:***

1. Physiological and hygienic significance of the air components and their influence on the human health and sanitary living conditions.
2. Atmospheric, indoor and working chemical air pollution factors and indices and their hygienic regulation.
3. Classification of the air sampling methods.
4. Principal scheme of the aspiration method of the air sampling for chemical analyses, devices and measures used for this procedure.

***You should have the following skills:***

1. To justify the choice of the air sampling method for sanitary and chemical research.
2. To calculate the air volume required for analysis and to convert its value to the value in the standard conditions. (0°C and 760 mm Hg).

**Tasks for self-training:**

At home, the student should give definitions to the following terms:

Term	Definition
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1.Sanitary protection of atmospheric air	
2.District planning	.
Practical application of wind-rose	

**Class work** – solve a situational task and make the record:

**Task 1.**

When studying the temperature regimen of the hostel room, it is established: air temperature is 17°C in the middle of the room 10 sm above the floor, 1 m – 19°C, 1.5 m – 20°C. Fluctuations in temperature made 6°C in the daytime. Area - 30 m<sup>2</sup>, room height - 3 m, carbon dioxide content - 0,2%, the number of people in the room – 10. The air laboratory investigation established: oxidizability - 4 mg/m<sup>3</sup>, number of microbs - 5000 CFU, staphylococci -75, streptococci - 20.

Stages of situational task solving	Results
1.Hygienic assessment of the situation	
2.Establishing risk factors for individual (collective) health	
3.Prognosis of the consequences of risk factors on the individual (collective) health state	
4.Planning and substantiation of hygienic, prophylactic, improving and rehabilitation measures	
5.Normative provision of the specialist's activity	

**Task 2.**

In the ward, the temperature of dry thermometer of Assman psychrometer is 26.5 °C, wet thermometer - 24°C, barometric pressure - 755 mm Hg. The area of 2-bedded postoperative ward is 20 m<sup>2</sup>, height - 3 m. Air exchange is 1.5. Laboratory investigation: air oxidability 1 mg/m<sup>3</sup>, microorganism number - 2000 CFU, staphylococci - 25, streptococci- 22. There is one window in the ward, area - 2 m<sup>2</sup>, natural illumination 50 lux, the external horizontal illumination is 5000 lux.

Stages of situational task solving	Results
1.Hygienic assessment of the situation	

2.Establishing risk factors for individual (collective) health	
3.Prognosis of the consequences of risk factors on the individual (collective) health state	
4.Planning and substantiation of hygienic, prophylactic, improving and rehabilitation measures	
5.Normative provision of the specialist's activity	

### **Task 3.**

When studying one-room apartment in a sectional building the following results were obtained: floor - the first, residential area - 32 m<sup>2</sup>, living room orientation – north-west, light coefficient - 1/ 6, room height - 2.7 m. The floor and furniture - chipboard, air temperature - 23°, vertical gradient 5° , horizontal - 2°, air velocity - 0.5 m / s, humidity - 20%. There is forced-air heating. The formaldehyde content in the air - 0.1 mg / m<sup>3</sup>.

<b>Stages of situational task solving</b>	<b>Results</b>
1.Hygienic assessment of the situation	
2.Establishing risk factors for individual (collective) health	
3.Prognosis of the consequences of risk factors on the individual (collective) health state	
4.Planning and substantiation of hygienic, prophylactic, improving and rehabilitation measures	
5.Normative provision of the specialist's activity	

### **Theoretical questions to the differentiated credit:**

1. Chemical composition of atmospheric and exhaled air.
2. Basic sources, criteria and parameters of chemical pollution of atmospheric air, air of residential, public premises.
3. Influence of air pollution with chemicals on human health.
4. Parameters and requirements to air sampling for sanitary-chemical and bacteriological research.
5. Calculation of the minimal volume of air sample necessary for analysis. Units for measurement.
6. Aspiration method of air sampling, devices for air aspiration.
7. Devices for determination of aspirated air volume. Importance and technique of air volume reduction to normal conditions.
8. Absorbing devices, absorbing media, their properties, kinds, destination.
9. Sampling air in vessels of the limited capacity (gas pipettes and others).
10. Concept about express methods (colorimetric, linearly-colorimetric), determination of chemical admixtures in air. Universal gas analyzer UG-2, design and principle of operation. Krotov's device, principle of its operation and ways of application.

11. Living conditions in settlements and human health. Features of formation of the city environment and hygienic aspects of life in a modern city. Urbanization as a socially-hygienic problem.
12. Planning and building of territory of settlement. Principles of functional zoning of territory of settlements, accommodation of inhabited, industrial, building-warehouse and recreational zones in them.
13. Hygienic importance of green plantations.
14. Hygienic importance of microclimate and air environment in inhabited and public buildings.
15. Characteristic of sources of pollution of atmosphere in settlement. Regularities of distribution of pollution in the atmosphere, factors on which the level of air pollution depends. Transformation
16. Influence of polluted air on health and conditions of residing of the population.
17. Direct measure on the organism: acute poisonings, chronic, specific and nonspecific diseases.
18. Ways and means of prophylaxis of negative influence of polluted atmospheric air on health.
19. The state sanitary supervision over construction of inhabited and public buildings, their sanitary-engineering equipment.

**Final test control** – open base tests

**Final grade**

*Teacher's signature* \_\_\_\_\_

## **Subject 8: Hygienic importance of physical factors in conditions of inhabited areas.**

**Date** \_\_\_\_\_ “ \_\_\_\_ ” 20 \_\_\_\_ ;

**Student's name, year, group** \_\_\_\_\_

### **Learning objective**

1. Strengthen and enlarge theoretical knowledge of students about noise and vibration as elements of industrial environment and their influence on organism and health.
2. Master techniques and means of measurement and hygienic assessment of noise and vibration parameters.

### **Basics**

#### ***You should know:***

1. Fundamentals of anatomy and physiology of auditory analyzer.
2. Physical fundamentals of acoustics and vibration.
3. Classification and fundamentals of noise and vibration source.
4. Biological effect of noise and vibration, and prevention of their negative influence on human organism.

#### ***You should have the following skills:***

1. To use noise dosimeter and noise and vibration spectrum analyzer.
2. To detect threshold of audibility using of audiometer.

#### **Tasks for self-training:**

At home, the student should give definitions to the following terms:

Term	Definition
1. Noise	
2. Vibration	
3. Electromagnetic waves	

**Class work** – solve the situational task and make the record:

**Situational task.**

The residents of building No. 172 in Moscovskiy Avenue of city H. appealed to the city SES with the complaint about harmful effect of noise.

During the investigation and laboratory studies it was shown that the general noise level is 65 dBA in an apartment on the first floor, on the third floor - 60 dBA, on the 5th floor - 50 dBA. At the territory of building, a 2-meters from the house traffic noise is 68 dBA. Distance from the building to the first traffic lane is 30 m., trees and shrubs that were before in the gap between the street and the house, are cut down.

It was also found that the basement of the house is taken by the cafe, in which the old freezer runs, the noise of which is 70 dBA, periodically the music center is turned on, the noise of which inside the cafe makes to 100 dBA. Next to the house at 30 m near the shopping center, an open-air café works, in which also constantly, up to 24 hours, a music center plays, the noise from which at 2 meters from the house is 60 dBA.

Stages of situational task solving	Results
1. Hygienic assessment of the situation	
2. Establishing risk factors for individual (collective) health	
3. Prognosis of the consequences of risk factors on the individual (collective) health state	
4. Planning and substantiation of hygienic, prophylactic, improving and rehabilitation measures	
5. Normative provision of the specialist's activity	

**Theoretical questions to the differentiated credit:**

- Noise, vibration, electromagnetic radiation in conditions of the inhabited localities, their sources and adverse influence on population's health.
- Hygienic importance and regulation of noise, vibration and electromagnetic radiation in inhabited and public buildings. The role of planning measures.

**Final test control** – open base tests

**Final grade**

Teacher's signature \_\_\_\_\_

**Subject 9: Features of hygienic requirements to planning and maintenance of medical-preventive establishments.**

Date \_\_\_\_\_ "\_\_\_\_" 20 \_\_;

Student's name, year, group \_\_\_\_\_

**Learning objective**

1. To strengthen the students' knowledge of the hygienic requirements concerning the patient care institutions' location and planning on the basis of assessment and analysis of the study project materials and the normative documents; to teach the students to draw the hygienic conclusions, substantiated resolutions and give the recommendations.

**Basics**

**a. You should know:**

- i. 1. Basic hygienic requirements concerning the planning and regime of exploitation of the patient care institutions, the therapeutic, surgical, infectious diseases and other specialized departments.

**b. You should have the following skills:**

- i. 1. Using the construction drawings of the situational and general layout to determine and assess the project patient care institutions' location and territory zoning, taking into account objects, adjacent to the land parcel, "wind rose", correspondence with the site development, percentage of green area and the constructions' orientation.
- ii. 2. Using the constructions' plans and slits to determine and assess the correspondence of the hospital premises' area, cubic capacity and sanitary accomplishment to hygienic standards; their correspondence to the functional purpose.

**Tasks for self-training:**

At home, the student should give definitions to the following terms:

Term	Definition
1. Hospital	
2. Medical-preventive establishments (MPE)	
3. Systems of hospital construction	
4. Architectural and planning measures	



5.Zones of the hospital site	1. _____ 2. _____ 3. _____ 4. _____ 5. _____
6.Hygienic requirements to the composition of hospital ward units	
7.Hygienic requirements to the indices of microclimate and illumination of operating rooms	

**Class work** – solve situational task No.\_\_\_\_ and make the record:

**Situational task**

District Hospital for 510 beds with a polyclinic 1,000 visits per shift \* (Training project is prepared at the Department)

**Explanatory Note.**

The complex of Regional Hospital for 510 beds with an out-patient department for 1,000 visits per shift is a center for provision of high quality health care to the population, and is designed to serve the district town and the district with population of 100,000, taking into account existing local hospitals.

The complex includes the main building with 450 beds (nine-storeyed), infectious building with 60 beds, an outpatient clinic (two-storeyed) and a block of additional facilities (1 floor).

The out-patient clinic for 1000 visits per shift is designed to provide medical care to the population (to 40,000) who lives in the area, and rendering an advisory care. The hospital is an organizational-methodical and advisory center for the medical-preventive establishments of the district.

In its structure, the hospital has ten departments listed below.

There are such medical-supporting departments of the main building: intensive care unit, departments of rehabilitation, radiology, admission department, administrative, operating unit and clinical diagnostic laboratory.

The area of project application: I - B, II, III climatic areas.

For hospital complex construction, the area of 7.3 hectares should be assigned.

The territory is divided into zones: a hospital zone, a zone of out-patient department, infectious building zone, economic and auxiliary services, and garden-park zone.

The placement of departments per floor of the main building is as follows:

1st floor - obstetrical department, pediatric department with 30 beds for children up to 1 year, the admission department, and the main entrance of the hospital;

2nd floor- department of rehabilitation, obstetrical department and pediatric department with 30 beds for children up to 6 years;

3rd floor - rehabilitation department, intensive care unit, pediatric department with 30 beds for children older than 6 years old;

4th floor - therapeutic department of two sections with 30 beds and rehabilitation;

5th floor - neurological department with 30 beds, therapeutic section with 30 beds and radiological section;

6th floor - department of functional diagnostics and gynecology department of two ward sections with 30 beds;

7th floor - pharmacy, ENT department with 30 beds, ophthalmology department with 30 beds;

8th floor - the surgical department of two ward sections with 30 beds and clinical diagnostic laboratory;

9th floor - trauma section with 30 beds and an operating unit.

Therapeutic and diagnostic departments are located next to every floor of the hospital and have a comfortable relationship with them.

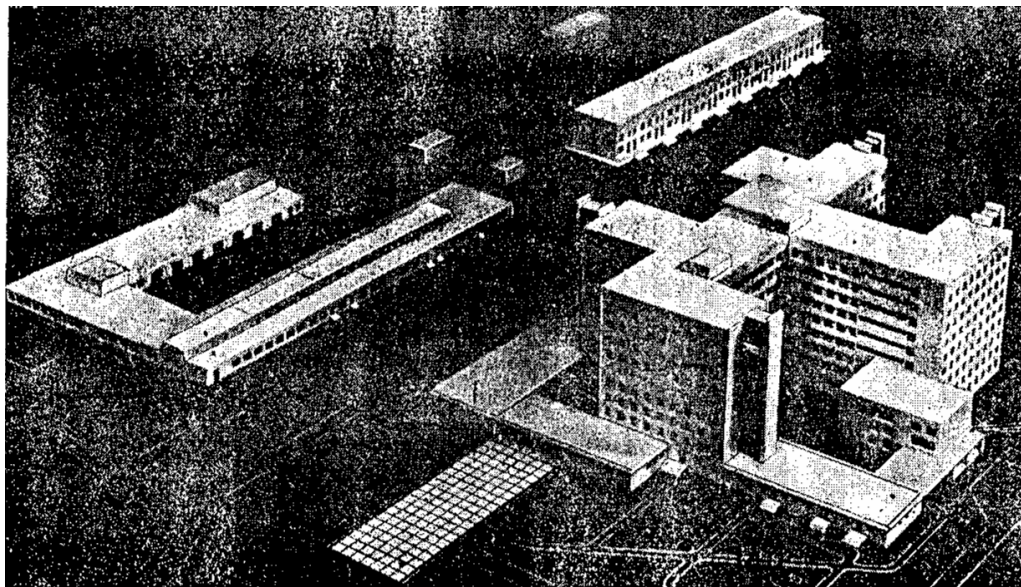
Ward sections have short main corridor lit from two ends. On the border of the corridors the halls of the day stay and posts of nurses on duty are designed.

Infectious building for 60 beds is designed in a II- shaped one-story building, which houses the section of cubicles with 30 beds (one wing) and section of semi-cubicles with 30 beds (second wing). Pathologic anatomy department is designed in a separate isolated building.

Block of economic services is designed in a separate insulated building and at the economic yard, where there are: the central heating unit, boiler room, garage, workshop, laundry and catering department.

The hospital is designed using frame-panel constructions of II-04 series.

The hospital complex is provided with water heating and mechanical input-exhaust ventilation, hot water from the boiler, electricity from the transformer substation and weak currents from the district telephone station and PBX.



District Hospital to 510 beds with a polyclinic 1,000 visits per shift, (project of the Kiev branch Diprondizdrav, architect A. Zagniboroda, constructor L.Vaymisheva, 1975, Model)

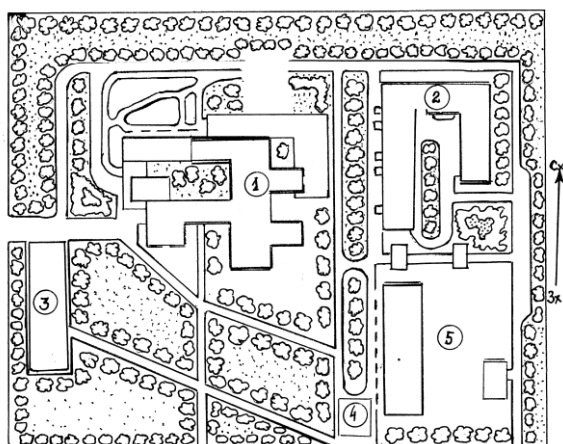
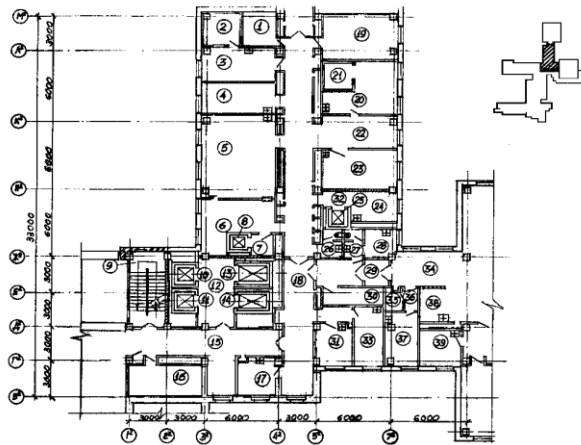


Fig. 1.Scheme (general plan). (Source:"Hygiene and Ecology"/V. Bardov.-Vinnytsya, "Nova Knyha", 2008.

Legend:

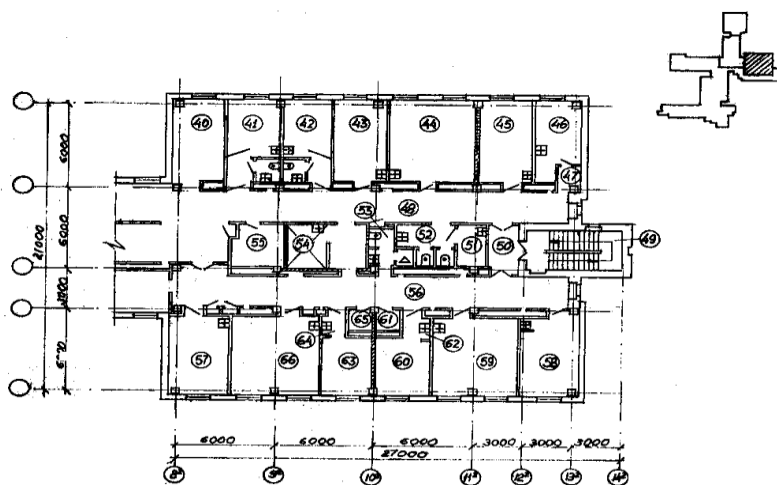
1. 9-storey main building with diagnostic and medical departments and a 450-bed hospital.
- 2 .One-storey infectious building with 60 beds.
3. Two-storey out-patient department.
- 4 . Pathologoanatomic building.
- 5 .Economic zone.



Legend:

- 1.
- 2.

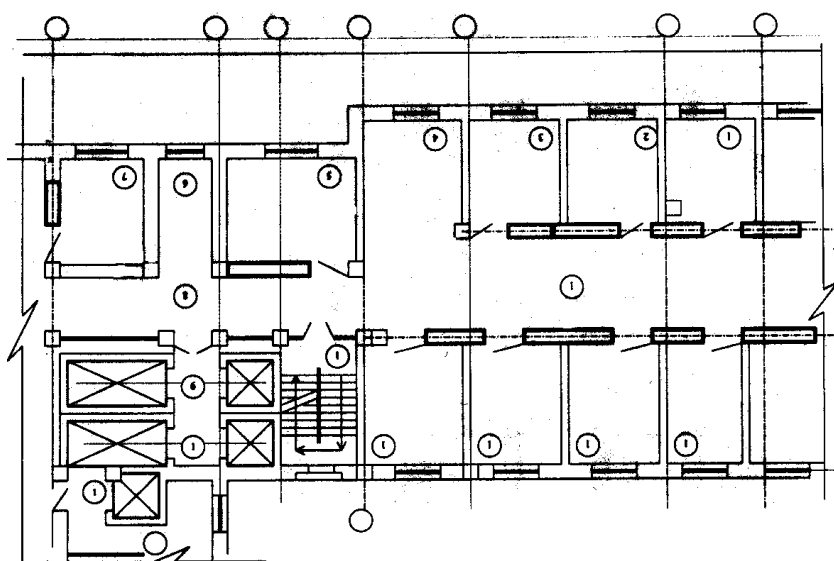
Fig. 2. Detail of a typical plan of the operating unit



Legend:

- 1.
- 2.

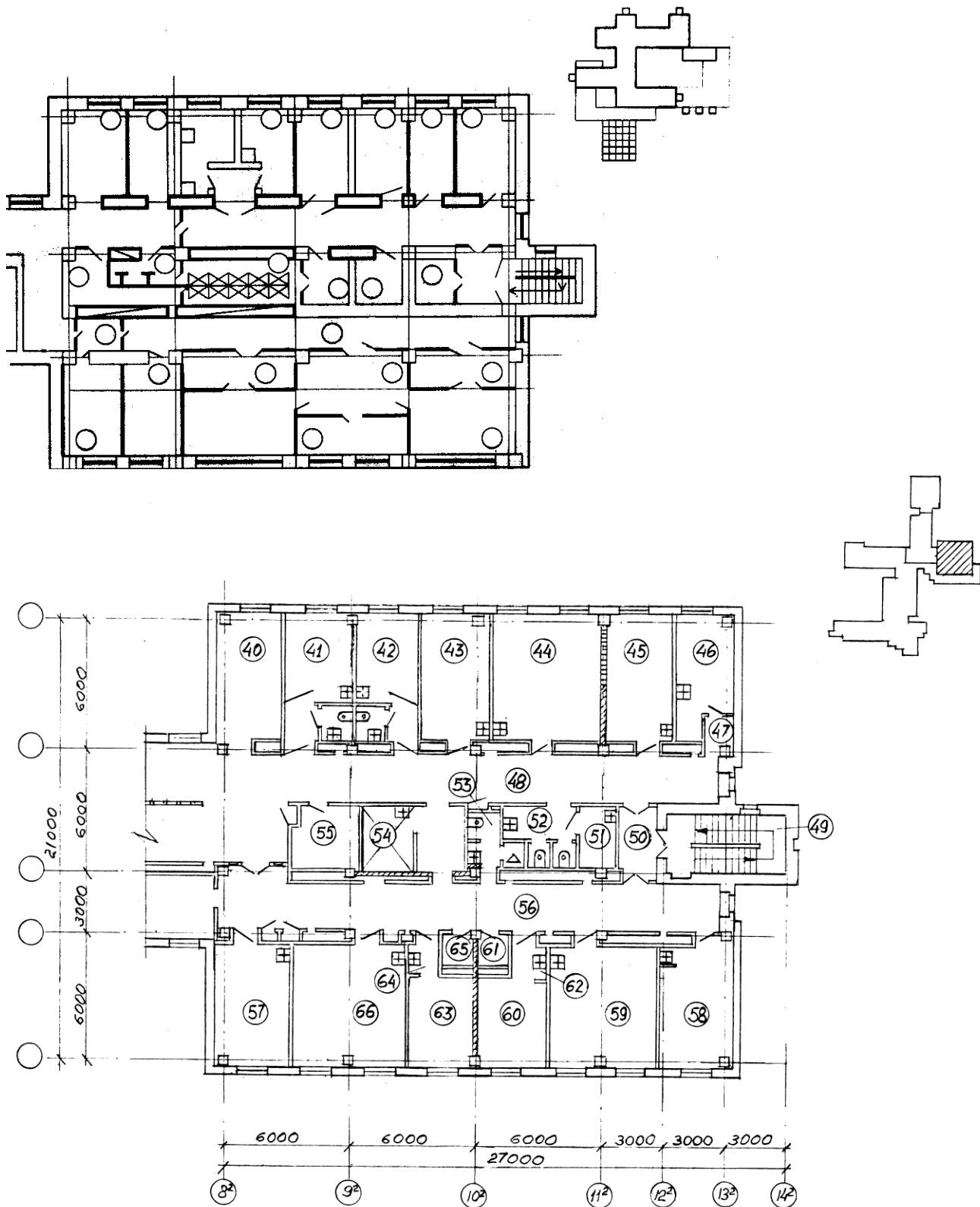
Fig. 3. Fragment of a typical plan of the therapeutic department



Legend:

- 1.
- 2.

Fig. 4 Typical ward section of children's department



Legend:

- 1.
- 2.

Fig. 6. Detail of a typical ward section

Stages of solving of situational task:

1. Examination of the explanatory note.
2. Reading the drawings of a typical plan of one of the departments of medical-preventive establishment.
3. Conclusion:

**Theoretical questions to the differentiated credit:**

- ### Final test control – open base tests

*Teacher's signature*

**Subject 10: Modern problems of the nosocomial infection and a complex of hygienic measures for their prophylaxis. Primary prophylaxis of HIV-infection. Prophylaxis of HIV-infection at medical establishments**

Date \_\_\_\_\_ “ \_\_\_\_ ”20 \_\_;

Student's name, year, group \_\_\_\_\_

**Learning objective**

1. Interpret the definition “nosocomial infection”.
2. Determine risk groups and factors concerning origin of nosocomial infection in patients.
3. Analyze and estimate the factors of transmission of nosocomial infection.
4. Recognize epidemiologic features of nosocomial infection course.
5. Determine necessary organizational, preventive and epidemic measures of prophylaxis and struggle with nosocomial infection

**Basics**

***You should know:***

1. Definition “nosocomial infection” and problems, connected with it, main causes of their origin.
2. Structure, main pathogens, sources and factors of transmission.
3. Measures on nosocomial infection localization in hospitals of different types.

***You should have the following skills:***

1. Recognize epidemiologic features of course of different nosocomial infections.
2. Determine risk groups and factors concerning origin of nosocomial infections in patients and medical workers.

**Tasks for self-training:**

At home, the student should give definitions to the following terms:

<b>Term</b>	<b>Definition</b>
1.Nosocomial infection	
2. Sources of pathogens of nosocomial infections	
3.Carriers (bacilli-carriers)	
4.Ways and factors of transmission of nosocomial infections	
5.Sanitary-hygienic measures on prophylaxis of nosocomial infections	

**Class work** – solve situational task No.\_\_\_\_ and make the record:

**Situational task.**

14.02.05, a sanitary-epidemiological station of Kharkov received informal reports (mass media) of nosocomial infections in 23 patients who were operated on in an ophthalmology clinic. Emergency reports were not sent to SES.

Specialist team consisting of a doctor in community hygiene (commission chairman), epidemiologist, head of epidemiological department conducted an investigation and examination of the clinic. It was found: ophthalmic clinic is located in a residential building where it occupies 2 floors. A certificate of state registration, a license to practice medicine (ophthalmology and pediatric ophthalmology), conclusion and resolution to start work are presented. Current medical documentation is available in the following amounts: the registers of preventive sanitization, sterilization, tests on quality of processing medical instruments, utilization of disinfectants, work of bactericidal emitters (with time accumulation), general cleanings.

Adjacent land site is not developed, not fenced, not planted with trees, open waste bins are placed near the front

entrance from the direction of yard.

A set of premises is insufficient. There are neither sanitary inspection room nor sanitary facilities (cloakroom, shower) in the operating unit.

The medical-preventive establishment is connected to centralized networks of water-supply, sewage system, heating, the emergency hot supply is provided. There is a wash-stand with separate taps of hot and cold water with mixer in the preoperative room. Natural and artificial illumination (fluorescent lamps and incandescent lamps) is present.

Ventilation in the toilets is natural through the uniform exhaust channels for the whole house. Some rooms, including operating room, preoperative room, argon-laser therapy room, have air conditioning with a 14-fold exchange with a predominance of inflow (ratio 5.3). The air intake is carried out in the yard near the building. Primary and fine filters are used in the air conditioning, but additional cleaning on bacterial filters are not available.

In a sudden study of microbial contamination of air in the operating room it is established: general contamination before work - 750 CFU/m<sup>3</sup>, the number of *S. aureus* is 4 in 250 liters of air, during work - 2500 CFU/m<sup>3</sup>, the number of *S. aureus* is 16 in 250 liters of air.

Patients used expendable linen. Overalls were sent to the firm laundry. Temporary storage of dirty linen (1-2 days) was carried out in bags in stock, where clean linen was also kept. Transportation of clean and dirty linen was carried out with firm lorry in different containers.

Wet cleaning was carried out 2 times a day with the use of disinfectants. General cleaning was carried out 1 time per quarter, whereas in operating unit - 1 time a month. There are 5 stationary, 1 portable germicidal lamps in the operating room, preoperative room, sterilization room at the rate of 0.5 W / m<sup>2</sup> of the room. Routine microbial purity control of the rooms was not performed.

Pre-sterilization processing of instruments and sterilization is carried out in the sterilization room of 8.4 m<sup>2</sup>, which houses the distiller, cassette autoclave, washbasins for washing hands of surgeons. The solutions of disinfectants are prepared in the same room. Sterile instrument is kept in a sterile cassette.

In a sudden research for sterility *Pseudomonas aeruginosa* is revealed. The same microorganism was detected in swabs from the surfaces of the operating room, preoperative, sterilization room and dirty linen of surgeons. Persons without timely medical examination and investigation are revealed among medical staff.

Stages of situational task solving	Results
1. Hygienic assessment of the situation	
2. Establishing risk factors for individual (collective) health	
3. Prognosis of the consequences of risk factors on the individual (collective) health state	
4. Planning and substantiation of hygienic, prophylactic, improving and rehabilitation measures	
5. Normative provision of the specialist's activity	

#### Theoretical questions to the differentiated credit:

1. Nosocomial infections, modern approaches of concept definition.
2. Theories and concepts of nosocomial infections.
3. Ways of transmission of nosocomial infections.
4. Factors of transmission of nosocomial infections.
5. The role of opportunistic pathogenic microflora in occurrence of nosocomial infections.
6. Sanitary-hygienic and epidemiological supervision over spreading of nosocomial infections.
7. Main principles of prophylaxis of nosocomial infections.
8. Bases of investigation of the outbreaks of nosocomial infections in establishments of public health services.
10. Sanitary-hygienic measures on prophylaxis of nosocomial infections in specialized hospitals and departments.
11. Isolation-restrictive measures in prophylaxis of nosocomial infections.
12. Sanitary-hygienic regimen of hospitals.
13. Sanitary-hygienic measures on prophylaxis of nosocomial infections in the personnel of medical-preventive establishments.

14. The rights and duties of the personnel of medical-preventive establishments concerning prophylaxis of nosocomial infections.

**Final test control** – open base tests

**Final grade**

Teacher's signature \_\_\_\_\_

**Subject 11: Hygienic assessment of conditions of patients' stay at medical-preventive establishments (SIW).**

**Date** \_\_\_\_\_ "\_\_\_\_"20 \_\_\_\_;

**Student's name, year, group** \_\_\_\_\_

**Learning objective**

1. Master the knowledge on the hygienic conditions and harmful factors influencing the efficacy of patients' treatment.
2. Become familiar with the legislative and organizational measures of the provision of the optimal regime, hygienic conditions for patients of the in-patient departments.
3. Master the general scheme and methods of subjective (sanitary inspection) and objective sanitary control of the conditions of patients' stay at the hospital.

**Basics**

***You should know:***

1. Basic hygienic requirements concerning the planning, equipment, regime, exploitation of the treatment, diagnostic, accessory and consumer subdivision of the in-patient departments.
2. Hygienic standards of microclimate, air, ventilation, natural and artificial lighting of different subdivisions of the medical institution, their importance in the patients' treatment efficacy.
3. Harmful and dangerous factors of different subdivisions of the medical institution (diagnostic, physiotherapeutic, balneal etc.), their influence on the patients' health.

***You should have the following skills:***

1. To carry out the sanitary inspection and determine the objective figures of the hygienic condition of the medical institution different subdivisions.
2. To determine and assess harmful and dangerous factors of different subdivisions of the medical institution and their influence on the patients' health.

**Tasks for self-training:**

At home, the student should answer theoretical questions and solve the situational task.

**Situational task.**

When studying the working conditions of patients in the ward of the neurologic department, the following results are obtained: air temperature - 20 ° C, air velocity - 0.15 m / s, relative humidity - 75%, content of carbon dioxide - 0.7%. By what group of the above indices are sanitary conditions of patients violated?

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**Theoretical questions to the differentiated credit:**

1. Hygienic importance of planning, equipment, optimum regimen of exploitation of medical-preventive establishments as conditions for increase of effective treatment of patients, prophylaxis of nosocomial infections and creation of safe working conditions of the medical personnel.



2. Hygienic requirements to accommodation, planning, sanitary-engineering equipment of admission departments of the different type and discharge of patients.
3. Hygienic requirements to planning, sanitary-engineering equipment, regimen of exploitation of departments of the therapeutic, surgical type, operational units, intensive care units.
4. Hygienic features of planning, sanitary-engineering equipment, regimen of exploitation of infectious, children's, tuberculous and other specialized departments of medical-preventive establishments.
5. Hygienic requirements to planning, sanitary-engineering equipment and regimen of exploitation of ward sections and wards of different departments of medical-preventive establishments.
6. Hygienic requirements to planning, sanitary-engineering equipment and regimen of exploitation of roentgenological, radiological, physiotherapeutic departments of hospital establishments.
7. Organization of Nutrition for patients in hospitals and hygienic supervision over its adequacy and safety.
8. Sanitary-hygienic requirements to collecting, removal and neutralization of liquid, solid and specific waste formed in hospitals.

**Final test control** – open base tests

**Final grade**

*Teacher's signature* \_\_\_\_\_

**Section of discipline 3.  
“Hygiene of nutrition”**

**Subject 12: Nutrition in preventive medicine. Organization of nutrition at medical-preventive establishments and industrial enterprises.**

**Date** \_\_\_\_\_ “\_\_\_”20 \_\_;

**Student's name, year, group** \_\_\_\_\_

**Learning objective**

Master methods of determination of individual or organized collective actual nutrition and its adequacy to the energy expenditure and nutrient needs.

**Basics**

***You should know:***

1. Social-economic and sanitary-hygienic basics of individual and collective nutrition.
2. Calculative, laboratory and other methods of determination of the individual or organized collective nutrition sufficiency.

***You should have the following skills:***

1. To determine and assess the social-economic and hygienic nutrition indices – balance, budget, questionnaire results, weight and others.
2. To perform the laboratory research of the daily intake and analyze received results and their adequacy to the energy expenditure and nutrient requirements.
3. To study and assess the nutrition of individuals and organized collectives using calculation methods, menu schedule.

**Tasks for self-training:**

At home, the student should:

1) give definitions to the following terms

<b>Term</b>	<b>Definition</b>
<b>1. Rational nutrition</b>	
<b>2. Diet</b>	
<b>3. Medical (dietary) nutrition</b>	

<b>4. Medical-preventive nutrition</b>	
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2) solve situational tasks:

1. Daily energy expenditures of a mason (IV group of labor intensity) make 4500 kcal. The mason's daily diet contains 120 g of protein, 95 g of fat, 600 g of carbohydrates.

Calculate the mason's need in nutrients and calorie content of his diet. Make a conclusion about the adequacy of his nutrition.

Calculation: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

2. The calculations on menu-layout of daily diet of vocational school students producing hand plumbing tools (III class of labor intensity), established: calorie content -3200 calories, the diet includes: 105 g of protein, 90 g of fat, 560 g of carbohydrates, vitamin C -130 mg, vitamin A (carotene) - 0.8 mg, vitamin B<sub>1</sub> -1.6 mg, B<sub>2</sub> -0.8 mg, PP - 9.5 mg, B<sub>6</sub> -1.3 mg; calcium -800 mg, phosphorus -1200 mg, iron - 9 mg.

The students' energy expenditures make 3100 kcal on average. Calculate the students' need in nutrients, make conclusions about the adequacy of their nutrition.

Calculation: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Class work** – solve situational task No.\_\_\_\_ and make the record:

Situational task.

Using the table of calculation of energy expenditures for adults (depending on age) given below calculate your daily energy expenditures.

Men (basal metabolism)					Women (basal metabolism)				
Body mass, kg	18-29	30-39	40-59	60-74	Body mass, kg	18-29	30-39	40-59	60-74
50	1450	1370	1280	1180	40	1080	1050	1020	960
55	1520	1430	1350	1240	45	1150	1120	1080	1030
60	1590	1500	1410	1300	50	1230	1190	1160	1100
65	1670	1570	1480	1360	55	1300	1260	1220	1160
70	1750	1650	1550	1430	60	1380	1340	1300	1230
75	1830	1720	1620	1500	65	1450	1410	1370	1290
80	1920	1810	1700	1570	70	1530	1490	1440	1360
85	2010	1900	1780	1640	75	1600	1550	1510	1430
90	2110	1990	1870	1720	80	1680	1630	1580	1500

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 \_\_\_\_\_  
 \_\_\_\_\_

**Theoretical questions to the differentiated credit:**

1. Alimentary diseases (primary illnesses).
2. Secondary illnesses of insufficient and excessive Nutrition.
3. Functions of food and factors which provide them.
4. Theories and concepts of Nutrition.
5. Kinds of biological measure of food.
6. Use of protective and pharmacological, biological measure of food with the purpose of the organization of medical-preventive, ecological-protective, medical and dietary Nutrition.
7. The basic requirements to construction of the human diet.

8. Energy value and nutrient structure of diets.
9. The recommended values of physiological need for energy.
10. Energy sources in Nutrition.
11. Proteins, fats, carbohydrates, vitamins, minerals and their importance in Nutrition.
12. Main principles and forms of medical-preventive Nutrition.
13. Purpose of medical-preventive Nutrition. Features of organization of medical-preventive Nutrition at different industrial enterprises.
14. Diets of medical-preventive Nutrition.
15. Principles of dietotherapy.
16. Characteristic of medical diets.
17. Features of medical (dietary) Nutrition in sanatorium and preventorium.

**Final test control** – open base tests

**Final grade**

*Teacher's signature* \_\_\_\_\_

### **Subject 13: Sanitary-and-hygienic control over public catering.**

**Date** \_\_\_\_\_ “ \_\_\_\_ ”20 \_\_\_\_;

**Student's name, year, group** \_\_\_\_\_

#### **Learning objective**

1. Extend the students' knowledge on the nutrition peculiarities of different age groups and occupations people, sportsmen, pregnant women and nursing mothers.

#### **Basics**

##### ***You should know:***

1. Physiological peculiarities of metabolism of children and adolescents, people of elder age group and their health status.
2. Nutrition peculiarities of people involved in mental and physical activity, sportsmen, pregnant women and nursing mothers.

##### ***You should have the following skills:***

1. To carry out the medical control of the nutrition of different population groups taking into account their physiological and age peculiarities, physical and psycho-emotional stress.
2. To carry out the prophylactic measures concerning the nutrition optimization of the above mentioned groups of population according to the “Norms of the physiological requirements of the Ukrainian population for the essential nutrients and energy” № 272-99.

#### **Tasks for self-training:**

At home, the student should answer theoretical questions and solve the situational task.

##### **Situational task.**

According to the analysis of the morbidity of orphans in the boarding school it is found out that the proportion of children who are frequently sick with ARVI is 20%. In carrying out the diagnostic standard for examination of such children it is found that the level of activity of alkaline phosphatase increased in 25% of children. Of the clinical symptoms of vitamin A deficiency by external examination in 70% of children the common feature is the presence of dry hyperkeratosis. Analysis of the diet made in the collection of food history, allowed the doctor to find out that there has been a relative decline in the proportion of fat in the average daily diet of children with a predominance of vegetable fats. The doctor prescribed a physiological dose of UVR to some children.

Give the hygienic assessment of children's health in relation to the main risk factor, analyze the possible consequences of actions of the doctor, fill in the standard algorithm for solving the situational problem.

<b>Stages of situational task solving</b>	<b>Results</b>
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1. Hygienic assessment of the situation	
2. Establishing risk factors for individual (collective) health	
3. Prognosis of the consequences of risk factors on the individual (collective) health state	
4. Planning and substantiation of hygienic, prophylactic, improving and rehabilitation measures	
5. Normative provision of the specialist's activity	

**Algorithm of control of food quality in organized contingents to develop p. 4 of the situational task**  
(quality-control register of the doctor on duty)

Date of meal /Name of doctor on duty	Menu carrying-out (menu-compliance)	High quality (5-rating system)	Output of ready dishes (output-compliance)	Sanitary condition of the nutrition unit	Issue permission	Signature of doctor on duty

## Conclusion

## Recommendations for optimization of nutrition

**Theoretical questions to the differentiated credit:**

1. Features of medical (dietary) nutrition in sanatorium and preventorium.
2. Characteristic of individual diets.
3. Risk factors of nosocomial infections spreading and occurrence of food poisonings in medical-preventive establishments (MPE).
4. Structure and personnel of MPE for system of organization of patients' nutrition.
5. Functional duties of MPE officials concerning organization of patients' nutrition (head physician, doctor on duty, doctor-dietician, senior dietary nurse, and medical staff in departments).
6. The list of basic documents of MPE concerning organization of patients' nutrition.

7. The order of having preventive medical check-ups and surveys of the personnel which has the status of easy approach to the food block, foods and utensils. Absolute and relative contra-indications for work in the food block of MPE.
8. The list of foods and dishes, cooking and realization of which is forbidden in MPE.
9. The list of foods and dishes, which are not allowed to be accepted from relatives of the patient.
10. The list of foods which can be kept in buffet till the next day.
11. Preventive measures on prevention of spreading of acute intestinal infections and occurrence of food poisonings.

**Final test control** – open base tests

**Final grade**

*Teacher's signature* \_\_\_\_\_

### **Subject 14: Food poisonings as a sanitary-and-hygienic problem. Technique of investigation of food poisonings (SIW).**

**Date** \_\_\_\_\_ “ \_\_\_\_ ”20 \_\_\_\_;

**Student's name, year, group** \_\_\_\_\_

#### **Learning objective**

1. Master the knowledge on food poisonings, their etiology, clinic, methods of investigation, general and specific prophylaxis.

#### **Basics**

***You should know:***

1. Definition of “food poisoning” and their classification.
2. The food poisoning etiology, pathogenesis, clinic and prevention.

***You should have the following skills:***

1. To determine the type of food poisoning, provide the medical help in their cases.
2. To organize, investigate and determine the cause (food product or meal) of food poisoning.
3. To organize preventive measures for the elimination of the food poisoning causes and food poisoning prevention.

#### **Tasks for self-training:**

At home, the student should answer theoretical questions and solve the situational task:

##### **Situational task No 1.**

In the summer camp, 25 children got sick in the end of the day (total number of children - 40) with complaints: headache, sore throat, rumbling in the stomach. Some of them (9 children) complained of nausea, vomiting, periodic abdominal pain, and diarrhea. On examination, hyperemia of eyes, pharynx was observed, body temperature 38-38.5°C, in palpation of the abdomen - the sensation of pain.

In a survey of children it is found out that they had porridge with sausage, tea for breakfast; for lunch - soup, meat patties with potatoes, fruit compote. Sanitary condition of the catering department is satisfactory, medical examination of the staff is timely. But one of the cooks was missing for a week (she was "unwell"), returned to work two days ago.

The student must:

-make a preliminary diagnosis

Point out “guilty” food

What documents should be drawn up first of all and in the future.

Make a conclusion:

Provide and substantiate preventive measures:

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**Situational task No. 2.**

All family members got sick at the same time (5 persons), including 2 children. Emergency doctor found: complaints of shortness of breath, pain in the heart and stomach, weakness of vision ("mist in the eyes"), a doubling of the image, strabismus, nystagmus, difficulty of swallowing and speaking, general weakness. Body temperature is not increased. Family members ate: breakfast - scrambled eggs, tea, lunch - soup with pork, fried potatoes with sausages and pickled mushrooms, fruit compote.

The student must

Make a preliminary diagnosis: \_\_\_\_\_

Point out "guilty" food: \_\_\_\_\_

What documents should be drawn up first of all and in the future \_\_\_\_\_

Make a conclusion: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Provide and substantiate preventive measures: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Theoretical questions to the differentiated credit:**

1. Food poisonings, their definition and classification.
2. Food toxicoinfections: definition, etiology, diagnostics, clinic, principles of prophylaxis.
3. Bacterial toxicoses, their etiology, diagnostics, clinic, prophylaxis.
4. Mycotoxicoses, their etiology, diagnostics, clinic, prophylaxis.
5. Food poisonings of non-microbial nature.
6. Food poisonings of unestablished etiology, hypotheses of their occurrence, features of clinic.
7. Technique of investigation of the reasons of food poisonings. Documents, which are drawn up during and after investigation of food poisoning.
8. Instructive-methodological and legislative documents which are used during investigation of food poisonings and their prophylaxis.
9. Preventive measures on liquidation and prevention of food poisonings.

**Final test control** – open base tests

**Final grade**

*Teacher's signature* \_\_\_\_\_

**Section of discipline 4.**  
**“Occupational hygiene”**

**Subject 15: Legislative fundamentals for carrying out sanitary supervision in the field of occupational hygiene.**

**Date** \_\_\_\_\_ “\_\_\_”20 \_\_;

**Student’s name, year, group** \_\_\_\_\_

**Learning objective**

1. Learn about general hazards caused by industrial environment and occupational injuries and diseases as their consequences.
2. Learn about methods and techniques for determination of the most common types of occupational hazards and their impact on worker’s organism and health; about legislative, administrative, technical measures for health protection and prevention of occupational diseases.

**Basics**

***You should know:***

1. Fundamentals of Ukrainian legislation in the field of hygiene and labour protection.
2. Classification and characteristics of occupational hazards.
3. Physiologic, biochemical and pathophysiological signs and characteristics of organism’s response to occupational hazards.

***You should have the following skills:***

1. To determine basic agents of industrial environment and work process that may have negative impact on the worker, to reveal and assess signs of such impact on organism.
2. To substantiate and carry out sanitary and hygienic measures regarding safe working conditions.

**Tasks for self-training:**

At home, the student should answer theoretical questions and give definitions to the following terms:

<b>Term</b>	<b>Definition</b>
Sanitary legislation	
Labour legislation	
Sanitary rules and norms	
Hygienic norm	
Hygienic regulation	
Criteria for establishing hygienic norms	
Maximum permissible level	
Maximum permissible	

concentration	
Sanitary inspection	
Occupational disease	
Occupationally-related disease	
Preliminary medical checkup	
Periodic medical checkup	

**Class work** – solve situational task No.\_\_\_\_ and make the record:

<b>Stages of situational task solving</b>	<b>Results</b>
1.Hygienic assessment of the situation	
2.Establishing risk factors for individual (collective) health	
3.Prognosis of the consequences of risk factors on the individual (collective) health state	
4.Planning and substantiation of hygienic, prophylactic, improving and rehabilitation measures	
5.Normative provision of the specialist's activity	

**Theoretical questions to the differentiated credit:**

1. Sanitary legislation in the field of labour protection.
2. Preliminary and periodic check-ups of workers, the organization of their carrying out, preparation of the registration and accounting documentation.
3. Main principles and criteria of hygienic normalization of industrial poisons in the air of working zone as bases for prophylaxis of poisonings.
4. Methods and means of occupational pathology prophylaxis and protection of work at industrial enterprises.
5. Characteristic of documents which are necessary during investigation of cases of occupational poisonings or diseases.
6. Safety precautions, industrial sanitary, sanitary education of workers as means for prophylaxis of occupational diseases and poisonings.

**Final test control** – open base tests

**Final grade**

Teacher's signature\_\_\_\_\_



## Subject 16: Hygienic assessment of factors of the labour process and industrial environment.

Date \_\_\_\_\_ “ \_\_\_\_ ”20 \_\_;

Student's name, year, group \_\_\_\_\_

### Learning objective

1. Master hygienic assessment procedure of work intensity and tension for overwork prevention and increase of working capacity.

### Basics

#### *You should know:*

1. Fundamentals of physiology of physical and mental work, its classification.
2. Methods of assessment of work intensity and tension.
3. Methods and technique of labour management and overwork prevention improvement.

#### *You should have the following skills:*

1. To determine and assess work intensity and tension characteristics and signs of fatigue and overwork.
2. To recommend rational work and rest conditions at physical and mental work according to their intensity and tension.

### Tasks for self-training:

At home, the student should answer theoretical questions and give definitions to the following terms:

Term	Definition
Physical work	
Mental work	
Weight of work	
Intensity of work	
Tiredness	
Overfatigue	
Labor monotony	
Industrial noise	
Noise illness	
Industrial vibration	
Vibrational illness	

**Class work** – solve situational task No.\_\_\_\_ and make the record:

<b>Stages of situational task solving</b>	<b>Results</b>
1.Hygienic assessment of the situation	
2.Establishing risk factors for individual (collective) health	
3.Prognosis of the consequences of risk factors on the individual (collective) health state	
4.Planning and substantiation of hygienic, prophylactic, improving and rehabilitation measures	
5.Normative provision of the specialist's activity	

**Theoretical questions to the differentiated credit:**

1. Kinds of work, their physiologic-hygienic characteristic. Physical work, its weight and intensity. Mental work, its intensity. Features of operator's work.
2. Physiological changes in the worker's organism during physical and mental work, operator's work. Tiredness and overfatigue, the explanation and scientific substantiations of their development.
3. Modern principles and criteria of hygienic assessment of work and its classification by the degree of weight and intensity.
4. Methods of research of the organism's functional condition during mental and physical work. Ergograph, physiological and psycho-physiological tests. Studying of work capacity and fatigue by means of simulators, tremometers, dynamometers, chronoreflexometers.
5. System of preventive measures on rational organization of labour process. Psycho-physiological professional selection, diagnostics of psycho-overfatigue.

**Final test control** – open base tests

**Final grade**

*Teacher's signature* \_\_\_\_\_

## Subject 17: Occupational hygiene of medical workers at medical-preventive establishments (SIW).

Date \_\_\_\_\_ “ \_\_\_\_ ”20 \_\_\_\_;

Student's name, year, group \_\_\_\_\_

### Learning objective

1. Master the knowledge on the hygienic conditions and harmful factors influencing medical workers' health.
2. Become familiar with the legislative and organizational measures of the provision of the optimal regime, hygienic conditions for the medical workers' labour protection.
3. Master the general scheme and methods of subjective (sanitary inspection) and objective sanitary control of the conditions of medical personnel labour at the hospital.

### Basics

#### *You should know:*

1. Basic hygienic requirements concerning the planning, equipment, regime, exploitation of the treatment, diagnostic, accessory and consumer subdivision of the in-patient departments.
2. Hygienic standards of microclimate, air, ventilation, natural and artificial lighting of different subdivisions of the medical institution, their importance in the conditions of medical personnel labour.
3. Harmful and dangerous factors of different subdivisions of the medical institution (diagnostic, physiotherapeutic, balneal etc.), their influence on the medical personnel health.

#### *You should have the following skills:*

1. To carry out the sanitary inspection and determine the objective figures of the hygienic condition of the medical institution different subdivisions.
- 2 To determine and assess harmful and dangerous factors of different subdivisions of the medical institution and their influence on the medical personnel health.

### Tasks for self-training:

You should give a complex hygienic assessment to the work of a medical worker according to the work conditions chart obtained on the work place certification:

### WORK CONDITIONS CHART No. \_\_\_\_

Enterprise (organization, institution) Central District Hospital, Kharkiv region., S. district, urban village S., 75, Krasnoarmeyskaya str.

Production \_\_\_\_\_

Workshop (section, department) patient department of S. CRH

Number of the workplace 1

Occupation (post) surgeon

**Code 3231**

code for ETKD, CD, full name

Numbers of similar work places \_\_\_\_\_

#### 1. Evaluation of the factors of industrial environment and labor process

No.	Factors of industrial environment and labor process	Date of study	Normative value (MPL, MPC)	Actual value	Class III - harmful and dangerous conditions of work and character of work			Duration of action, % for shift	Note
					1 degree	2 degree	3 degree		
1	2	3	4	5	6	7	8	9	10
1.	Harmful chemicals, mg/m <sup>3</sup> 2 class of danger:	16.04.10							

2.	Dust of fibrogenous action mainly								
3.	Vibration (general and local)								
4.	Noise (eq.)	16.04.10							
5.	Infrasound								
6.	Ultrasound								
7.	Nonionizing radiation:								
8.	Microclimate in premise: - air temperature, °C - velocity of air movement, m/s - air relative humidity, % - infrared radiation, Wt/m <sup>2</sup>	16.04.10							
9.	Outside air temperature (during work in the open air), °C - in summer - in winter								
10.	Atmospheric pressure								
11.	Biological factors: - Microorganisms 1 class of danger _____ 2 class of danger _____ 3-4 classes of danger _____ - Protein preparations 1 class of danger _____ 2 class of danger _____ 3-4 classes of danger _____ - Natural body components (amino acids, vitamins etc.) 1 class of danger _____ 2 class of danger _____ 3-4 classes of danger _____								
12.	Weight of labor: Dynamic work: - capacity of external work (Wt) at work with participation of muscles of lower extremities and trunk - same at work with primary participation of thoracic girdle muscles - mass of weight lifting and displacement, kg - minute stereotype movements of hands and fingers (number per shift)	16.04.10							
			m 90 w 63						
			m 45 w 30.5						
			m 30 w 7						
			20001-40000	348					
	Static load: - value of load per shift (kgf) at holding a load: with one hand with both hands with participation of trunk and legs muscles								
			18001-43000						
			43001-97000						
			61001-130000						
13.	Working posture: In bending position up to 30 % of shift duration	16.04.10							
			25 %	9					

	or stay in forced position (stay kneeling and squatting), % of shift duration			-					
	Bendings of trunk, numbers		up to 100	48					
	- displacement in room, km (transitions, caused by technological process)		up to 10	0,1					
<b>14.</b>	<b>Labor intensity</b>	16.04.10							
	Attention:								
	- duration of concentration (% of shift duration),		51-75	52					
	- density of signals per hour on average		176-300	112					
	<b>Intensity of analyzer functions:</b>								
	- vision (category of visual work according to BNR II-4-79),		accurate	of low accuracy					
	- hearing (at production need of speech perception or signal differentiation)		90-70	90					
	<b>Emotional and intellectual intensity</b>		Work in accordance with schedule with possibility of correction	Work in accordance with schedule with possibility of correction					
	<b>Monotony:</b>								
	- number of elements in often repeatable operations		10-4						
	- duration of fulfilling repeatable operations (seconds)		100-20						
	- time of observation of course of industrial process without active actions (% of shift duration)		81-95						
<b>15.</b>	<b>Number of shifts</b>		3-shift, 2- shift with a night shift	6 h. 30 min. 1 shift					
	<b>Number of factors</b>								

#### Hygienic assessment of conditions of work:

Conditions and character of work of the surgeon of CDH belong to \_\_\_\_\_ class of conditions of work

#### Theoretical questions to the differentiated credit:

1. Hygienic importance of planning, equipment, optimum regimen of exploitation of medical-preventive establishments as conditions for creation of safe working conditions of the medical personnel.
2. Professional harm, hygiene and labor safety of the medical personnel in different departments of the hospital establishment.
3. Professional harm, hygiene and labor safety of the medical personnel of diagnostic, physiotherapeutic, balneological departments, intensive care units and other specific departments and laboratories of the hospital establishment.
4. Legislative and organizational measures on medical workers' labor safety.
5. Personal hygiene of the medical personnel in system of public health services and maintenance of favorable working conditions and prophylaxis of nosocomial infection and occupational diseases.

**Final test control** – open base tests

**Final grade**

*Teacher's signature* \_\_\_\_\_

**Section of discipline 5.  
“Paediatric hygiene”**

**Subject 18: Physical development as an important criterion for assessing children and teenagers' health.**

**Date** \_\_\_\_\_ “\_\_\_”20 \_\_;

**Student's name, year, group** \_\_\_\_\_

**Learning objective**

1. Strengthen theoretical knowledge about factors and conditions of environment which influence the formation of children's health, general patterns of the child and adolescent organism growth and development, main criteria and indices of the children and adolescents health.
2. Master methods of complex assessment of the children and adolescents health and physical development.

**Basics**

***You should know:***

1. Principal factors of environment and social conditions of life, which influence health of children and adolescents.
2. Main patterns of growth, development and peculiarities of morphological and functional state of the child and adolescent organism.
3. Methods of assessment of the children and adolescents health and physical development and criteria of allocation by health groups.

***You should have the following skills:***

1. To determine the health groups, somatometric, somatoscopic and physiometric indices of the children's and adolescents' physical development.
2. To assess of the children's and adolescents' physical development.

**Tasks for self-training:**

At home, the student should answer theoretical questions and give definitions to the following terms:

<b>Term</b>	<b>Definition</b>
Health	
Physical development	
Uniform technique of anthropometric study	
Somatometric indices	
Somatoscopic indices	
Physiometric indices	
Method of signal deviations	
Passport age	

Biologic age	
Criteria of biologic age	

**Class work** – solve situational task No.\_\_\_\_ and make the record:

Situational task 1.

When analysing the health state of 650 school-age children it is found out that 35 pupils have an average harmonious physical development and they were not sick for the last year, or sick one time with an acute respiratory illness; 280 children have disharmonious physical development, complaining of weakness, decreased capacity for work, bleeding gums, worsening of vision in the dark; 150 pupils have chronic diseases of the gastrointestinal tract; 220 children suffer from chronic bronchitis.

The school is located in the converted building, one of the recreations of 75 m<sup>2</sup> and 3 m height is used as a gymnasium. Instead of a school canteen, there is a buffet where finished products (soft drinks, chips, crackers, etc.) are sold. Over the past two years, the school heating system provides winter temperature within 15-17°C.

Stages of situational task solving	Results
1. Hygienic assessment of the situation	
2. Establishing risk factors for individual (collective) health	
3. Prognosis of the consequences of risk factors on the individual (collective) health state	
4. Planning and substantiation of hygienic, prophylactic, improving and rehabilitation measures	
5. Normative provision of the specialist's activity	

**Theoretical questions to the differentiated credit:**

1. Factors of the environment and social conditions of life, which influence processes of children and teenagers' health formation.
2. General regularities of growth and development of the child's and teenage organism. Criteria of estimation and parameters of children and teenagers' health.
3. Technique of the complex estimation of children and teenagers' health state. Features of distribution of children and teenagers into groups of health.
4. Physical development as an important criterion of estimation of health state. Basic parameters of physical development.
5. Rules of anthropometry. Requirements to tables of regional standards of physical development.
6. Concept about biological and calendar age. Parameters of the level of biological development of children and teenagers. Modern representations about an epoch-making and intraage acceleration and retardation.
7. Methods for estimation of children and teenagers' physical development.
8. Methods for estimation of health state and physical development of the organized children's collectives.
9. Doctor's tasks on organization and carrying out of health-improving measures in children's collectives. Control system of children and teenagers' health state.

**Final test control** – open base tests

**Final grade**

*Teacher's signature* \_\_\_\_\_

## Subject 19: Hygienic requirements to planning, accomplishment and equipment of children's establishments.

Date \_\_\_\_\_ "\_\_\_\_"20 \_\_;

Student's name, year, group \_\_\_\_\_

### Learning objective

1. Strengthen theoretical knowledge about significance of optimal hygienic conditions maintenance during organization of training and education for preservation and strengthening of schoolchildren health, prevention of "school diseases" appearance.
2. Become familiar with methods of hygienic assessment of land plot and building of educational establishment, its main premises (school class), inspection of conditions for schoolchildren in educational establishment, working out and substantiation of hygienic recommendations for improvement of the training and education organization.
3. Master method of hygienic assessment of school furniture.

### Basics

#### *You should know:*

1. Peculiarities of main environmental factors and conditions, training and education, which influence the children and adolescents health.
2. Health disorders and diseases caused by influence of environmental conditions, training and education.
3. Hygienic requirements to land plot and building, planning, sanitary and technical infrastructure (microclimate parameters, illumination, ventilation, water-supply etc.) of main premises of training and educational establishments.
4. Hygienic requirements to construction and certain parameters of school furniture.

#### *You should have the following skills:*

1. To draw up the plan of inspection of training premise and fill appropriate papers (sanitary description, sanitary inspection act, hygienic conclusion).
2. To research temperature regime, humidity and air movement, illumination, calculate required and actual ventilation volume and rate (air exchange rate).
3. To determine main parameters of school furniture, carry out the school desk marking and pupils seating.
4. To work out and substantiate preventive recommendations concerning improvement of sanitary and hygienic conditions of pupils stay in schoolhouse.

### Tasks for self-training:

At home, the student should answer theoretical questions and give definitions to the following terms:

Term	Definition
Group isolation	
Coefficient of natural illumination	
Light coefficient	
Sanitary gap	
Functional zoning	
Built-up area	



Area of green plantations	
Economic area	
Sports and health-improving area	
Microclimate	
Research area	

**Class work** – solve situational task No.\_\_\_\_ and make the record:

<b>Stages of situational task solving</b>	<b>Results</b>
1.Hygienic assessment of the situation	
2.Establishing risk factors for individual (collective) health	
3.Prognosis of the consequences of risk factors on the individual (collective) health state	
4.Planning and substantiation of hygienic, prophylactic, improving and rehabilitation measures	
5.Normative provision of the specialist's activity	

**Theoretical questions to the differentiated credit:**

1. Factors and conditions of the environment and teaching and educational process, which influence children and teenagers' health.
2. Shift in health state and diseases, which caused by measure of factors of the environment and teaching and educational process.
3. Hygienic requirements to the ground area and buildings of educational establishments. Principle of functional zonation and its importance.
4. Hygienic requirements to planning, organization, equipment, microclimate, ventilation and illumination, as well as sanitary-engineering accomplishment of premises of educational institutions.
5. Technique of estimation of conditions for pupils' stay and training in modern educational institutions.
6. Hygienic requirements to children's furniture and their physiological substantiation.
7. Rools for marking school desks, other educational furniture and seating of pupils. Hygienic requirements to accommodation of school desks in the classroom.
8. Basic preventive measures on improvement of conditions for teaching and educational process and sanitary-and-hygienic conditions of pupils' stay in modern educational institutions.

**Final test control** – open base tests

**Final grade**

*Teacher's signature*\_\_\_\_\_

**Subject 20: Hygienic principles of rational organization of physical education and labour training of children and teenagers. Scientific fundamentals for carrying out medical-professional consultation (SIW).**

Date “\_\_\_” \_\_\_\_\_ 20 \_\_;

Student's name, year, group \_\_\_\_\_

**Learning objective**

1. Master theoretic knowledge on hygienic basics of rational organization of physical and labour training, occupational orientation of schoolchildren in modern conditions.
2. Become familiar with methods of hygienic assessment of organization of physical and labour training for children and adolescents.
- 1.3. Master methods of medical and occupational consultations, occupational selection and prognosis of the level of pupils' occupational activity success.

**Basics**

2.1. You should know:

- 2.1.1. Hygienic basics of rational organization of physical and labour training of children and adolescents.
- 2.1.2. Hygienic requirements to organization of physical and labour training in modern general educational establishments.
- 2.1.3. Main stages and hygienic principles of occupational orientation, medical and occupational consultations and occupational selection of pupils.

2.2. You should have the following skills:

- 2.2.1. To carry out the hygienic assessment of organization of physical and labour training for children and adolescents.
- 2.2.2. To carry out the occupational selection and prognosis of pupils' occupational activity success.

**Tasks for self-training:**

At home, the student should answer theoretical questions and give definitions to the following terms:

Term	Definition
Physical education	
Forms of physical education	
Motor regimen	
Daily motor activity	
Lesson of physical education	
Physical culture minute	
Efficiency of physical education	
Hardening	
Nonspecific hardening	
Specific hardening	

Working education	
Occupational selection	
Occupational consultation	

**Class work** – solve situational task No. \_\_\_\_ and make the record:

Stages of situational task solving	Results
1. Hygienic assessment of the situation	
2. Establishing risk factors for individual (collective) health	
3. Prognosis of the consequences of risk factors on the individual (collective) health state	
4. Planning and substantiation of hygienic, prophylactic, improving and rehabilitation measures	
5. Normative provision of the specialist's activity	

**Theoretical questions to the differentiated credit:**

1. Hygienic principles of the rational organization of physical training of children and teenagers. Kinds, means and forms of physical training in modern educational institutions.
2. Concept about motor activity. Scientific bases and methods of quantitative measurement and hygienic estimation of motor activity. Prophylaxis of hypokinesia.
3. Physiologic-hygienic bases of estimation of the lesson of physical training. Hygienic requirements to places of conducting lessons on physical training.
4. Medical control over the organization of lessons on physical training and hygienic aspects of medical provision of children and teenagers' physical training.
5. Physiologic-hygienic bases of hardening of the children and teenagers' organism. The basic kinds, principles and ways of the organization of hardening.
6. Hygienic principles of rational organization of labour and polytechnical training of children and teenagers.
7. Physiologic-hygienic bases of monitoring procedure for labour training of schoolchildren.
8. Hygienic requirements to the content, regimen and conditions of the organization and carrying out of labour training in conditions of different types of modern educational institutions.
9. Vocational counselling as a hygienic problem. Psycho-physiological aspects of professional self-determination. Professiography.
10. Modern system of vocational counselling, its functions and leading components.
11. Scientific bases of carrying out of medical-professional consultation. Concept about professional selection. Techniques of professional success forecasting.

**Final test control** – open base tests

**Final grade**

*Teacher's signature* \_\_\_\_\_

**Section of discipline 6.  
“Radiation hygiene”**

**Subject 21: Regularities of radiation exposure formation of the person in places of residing, its hygienic assessment and ways of decrease. Radiation safety and antiradiation protection at objects with radiation-nuclear technologies.**

Date \_\_\_\_\_ “ \_\_\_\_ ” 20 \_\_;

Student's name, year, group \_\_\_\_\_

**Learning objective**

1. Consolidate, extend and methodize knowledge about radiation hazard of population, and the personnel at work with radioactive nuclides and other sources of ionizing radiation.
2. Master methods and means of measurement of radiation levels and concentration of radioactive nuclides in the air, water, food substances, of radioactive pollution of the work surfaces, individual doses of irradiation of those working with sources of ionizing radiation, to assess their results.

**Basics**

***You should know:***

1. Qualitative and quantitative properties of ionizing radiation.
2. Sources of ionizing radiation, their occurrence in the environment.
3. Usage of radioactive nuclides and other sources of ionizing radiation in industry, medicine, scientific researches.
4. Biological effect of ionizing radiation and conditions it depends on.
5. Essence of radiation hazard at work with radioactive nuclides and other sources of ionizing radiation in different branches of industry.
6. Foundations of hygienic control of radiation safety and regulations of radiation safety and Primary sanitary regulations of work with active materials and other sources of ionizing radiation.
7. Classification of types and devices of radiation control, principles of work of those devices.

***You should have the following skills:***

1. To prepare of devices of radiation control for work, conduct measurements, read devices, assess results.

**Tasks for self-training**

At home, the student should:

1. Answer theoretical questions - repeat corresponding subjects of module 1 and module 2.
2. Make a table of properties of ionizing radiations characterizing radiation hazard when working with them:

Kind of ionizing radiation	Radiation source	Methods of use	Radiation properties			Ionizing ability	Characteristics of radiation hazard
			energy	Penetration ability			
				In air	In biological tissues		

3. List the conditions which determine the biological effects of ionizing radiation and features of radiation hazards in

mining, refining and use of sources of ionizing radiation in nuclear power engineering, science, medicine, military science

4. List the organizational and technical, hygienic methods and means of protection against ionizing radiation and methods of protection based on the physical laws of radiation attenuation, their legislative solution

**Class work** – solve situational task No. \_\_\_\_ and make the record:

Stages of situational task solving	Results
1. Hygienic assessment of the situation	
2. Establishing risk factors for individual (collective) health	
3. Prognosis of the consequences of risk factors on the individual (collective) health state	
4. Planning and substantiation of hygienic, prophylactic, improving and rehabilitation measures	
5. Normative provision of the specialist's activity	

**Theoretical questions to the differentiated credit:**

1. Radiation hygiene as area of hygienic science and sanitary practice, its purpose and task.
2. Ionizing radiation which are used in industry, science, medicine, their sources.
3. Qualitative and quantitative characteristics of radionuclides as sources of ionizing radiation, units of their measurement.
4. Qualitative and quantitative characteristics of ionizing radiation. Kinds of doses, units of their measurement. Dose rates.
5. Ionizing radiation as industrial harm, conditions which determine radiation danger during work with them.
6. Basic kinds of radiation injuries of the organism and conditions of their occurrence.
7. Acute and chronic radiation sickness, conditions of occurrence, stages of the course, the basic symptomatology.
8. Remote consequences of radiation damages, local damages.
9. Norms of radiation safety (NRSU-97) and the Basic sanitary rules (BSR-01) of work with radioactive substances and other sources of ionizing radiation, principles of hygienic normalization.
10. Methods and means of the radiation and medical control over work with sources of ionizing radiation.
11. Radiometric research methods which are applied in radiation hygiene.
12. Methods of determination of air radio-activity. Ways of sampling air for estimation of specific radio-activity aerosols and gases. Determination of specific activity of air concerning radon and its daughter products of disintegration.
13. Methods for determination of water radioactivity in reservoirs.
14. Methods for studying of radio-activity of foodstuff.
15. Research methods for pollution of working surfaces, the equipment, workers' hands and body. with radioactive substances
16. Methods of radiation control. Devices and installations for measurement of ionizing radiation. Individual radiation control.
17. Structure, tasks and functions of bodies and organizations of sanitary-epidemiological service from section « Radiation hygiene ».
18. The general tasks of sanitary-and-epidemiologic service in the field of radiation hygiene.
19. Preliminary and current sanitary supervision, their structure.
20. Features of work of experts of sanitary-and-epidemiologic station in territories exposed to radioactive pollution.
21. Documentation of sanitary-and-epidemiologic station from section " Radiation hygiene ": the general registration-accounting documentation, the documentation concerning preliminary sanitary supervision, the documentation concerning current sanitary supervision.

**Final test control** – open base tests

**Final grade**

Teacher's signature \_\_\_\_\_

**Subject 22: Hygienic assessment of antiradiation protection of personnel and radiation safety of patients when radionuclides and other sources of ionizing radiation are used at medical-preventive establishments.**

Date \_\_\_\_\_ "\_\_\_\_" 20 \_\_\_\_;

Student's name, year, group \_\_\_\_\_

**Learning objective**

1. Extend, methodize and strengthen knowledge on radiation hazard for personnel and patients of patient care institutions during usage of radioactive nuclides and other sources of ionizing radiations in diagnostic and treatment purposes, on principles and ways of radiation protection.

2. Master methods and ways of radiation control of labour conditions of personnel and protection of patients in X-ray and radiological departments of hospitals.

**Basics**

***You should know:***

1. Ways of use of radioactive nuclides and other sources of ionizing radiations in hospitals with diagnostic and treatment purpose.

2. Peculiarities of biological effects of ionizing radiation.

3. Essence of radiation hazard during working with radionuclides and other sources of ionizing radiation.

***You should have the following skills:***

1. To measure and assess parameters which characterize radiation environment in work and adjacent premises and individual doses of personnel during work with radionuclides and other sources of ionizing radiation.

2. To carry out sanitary inspection of radiological and X-ray departments of hospitals.

**Tasks for self-training:**

At home, the student should answer theoretical questions and give definitions to the following terms:

1. Ionizing radiation as an industrial hazard for personnel of medical institutions
2. Ionizing radiation as a risk factor for patients of medical institutions during the radiological diagnostic and therapeutic procedures.
3. Structure of the radiology department of the hospital. Features of radiation hazards and radiation protection in each structural unit (open, closed sources, long-focus roentgenotherapy).
4. Characterization of radiation hazard in the X-ray diagnostic room and conditions on which it depends. Requirements to the planning of X-ray room.
5. Regulations for radiation safety and benefits for the staff of medical institutions and patients (NRSU-97, OGPU-01, other legal documents).
6. Ways to reduce radiation exposure of staff and patients of medical institutions. Sanitary-technical equipment of X-ray and radiology departments.
7. Methods of collection and disposal of radioactive waste when working with open sources of ionization radiation.
8. Methods and means of sanitary and radiation monitoring when working with sources of ionizing radiation in medical institutions.

**Class work** – solve situational task No. \_\_\_\_ and make the record:

Stages of situational task solving	Results
1. Hygienic assessment of the situation	
2. Establishing risk factors for individual (collective) health	

3.Prognosis of the consequences of risk factors on the individual (collective) health state	
4.Planning and substantiation of hygienic, prophylactic, improving and rehabilitation measures	
5.Normative provision of the specialist's activity	

**Theoretical questions to the differentiated credit:**

1. Ionizing radiation as industrial harm for the personnel of medical establishments.
2. Ionizing radiation as a risk factor for patients of medical establishments when carrying out roentgen-radiologic diagnostic and medical procedures.
3. Structure of radiological department of hospital. Features of radiation danger and antiradiation protection in each structural sub-unit.
4. Characteristic of radiation danger in x-ray diagnostic room and conditions on which it depends. Requirements to X-ray room planning.
5. Rules of radiation safety and privileges for the personnel of medical establishments and patients.
6. Ways of radiation exposure decrease of the personnel and patients of medical establishments. Sanitary-engineering equipment of roentgenologic and radiological departments.
7. Methods of collection and neutralization of radioactive waste when working with the open sources of ionizing radiation.
8. Methods and means of sanitary and radiation control over work with sources of ionizing radiation in medical institutions.

**Final test control** – open base tests

**Final grade**

*Teacher's signature*\_\_\_\_\_

## Subject 23: Hygienic aspects of residing of population in territories with increased levels of radioactive pollution as a result of the Chernobyl accident. (SIW).

Date \_\_\_\_\_ “\_\_\_\_”20\_\_;

Student's name, year, group \_\_\_\_\_

### Learning objective

1. Master calculation methods for estimation of radiation danger and parameters of protection from external irradiation when working with sources of  $\beta$ -,  $\gamma$ - and X-radiation.

### Basics

#### *You should know:*

1. Physical fundamentals of radiation.
2. Action of ionizing radiation upon living organisms.
3. Methods of antiradiation protection, based upon physical laws of weakening of ionizing radiation.
4. Fundamentals of legislation on radiation hygiene.

#### *You should have the following skills:*

1. Carry out mathematical calculations, using calculators or personal computers.
2. Use normative materials.

### Questions for self-training:

1. Qualitative and quantitative characteristics of radionuclides (types of nuclear reactions and the types of radiation that accompany them, the half-life, activity, g-equivalent, units of measurement).
2. The main qualitative and quantitative characteristics of ionizing radiation (their kind, energy, penetration ability, ionizing power, the absorbed dose, the absorbed dose in air, the particle flux density, equivalent dose, effective dose, the absorbed dose in air, the units of measurement).
3. Types of radiation exposure (external and internal exposure) on the body, the conditions on which they depend. Closed and open sources of nuclear radiation.
4. Limit of doses from external and internal exposure. NRSU-97.
5. Methods and means of protection from external and internal exposure of sanitary-hygienic character, their organizational and technical solutions.
6. Methods of protection from external exposure based on the physical laws of weakening (protection with quantity, time, distance, shielding), their legal, organizational and technical framework.
7. The principles underlying the choice of material and the calculation of the thickness of shielding from  $\beta$ -,  $\gamma$ - and X-ray radiation.
8. Importance of calculation methods to assess radiation hazards and parameters of protection against external exposure in a complex of measures for radiation protection of the personnel.

### Tasks for self-training:

At home, the student should answer theoretical questions and give definitions to the following terms:

1. Explain how the radiation dose will change due to increased activity of the source by 2, 4, 8 times; increased duration of work by 2, 4, 8 times; increased distance by 2, 4, 8 times.

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2. Explain how protection with quantity, time, distance is carried out in a hospital radiology department (legislative, organizational and technical fundamentals).

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3. List, which materials can be used to make screens that protect against various types of radiation ( $\beta$ -,  $\gamma$ - and X-radiation). \_\_\_\_\_

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Solve the situational task and make the record.

**Situational task.**

The workers of department of radionuclide diagnostic are planning to use yttrium-90 as an open source of radiation, which is a source of  $\beta$ -radiation (half-life - 2.7 days, the maximum energy of  $\beta$ -radiation - 2.26 MeV). Activity in the workplace - 10 kBq, time of work - 2 hours a day. Describe the radiological hazards associated with this radionuclide.

1. Make proposals for the organization of radiation protection

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2. Calculate the required thickness of the shield of plexiglass.

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**Theoretical questions to the differentiated credit:**

1. Ionizing radiation as industrial harm for the personnel of medical establishments.
2. Ionizing radiation as a risk factor for patients of medical establishments when carrying out roentgenologic-radiologic diagnostic and medical procedures.
3. Structure of radiological department of the hospital. Features of radiation danger and antiradiation protection in each structural sub-unit.
4. Principles and means of antiradiation protection.
5. Kinds of antiradiation protection.
6. Characteristic of radiation danger in the X-ray diagnostic room and conditions on which it depends. Requirements to the X-ray unit planning.
7. Rules of radiation safety and privileges for the personnel of medical establishments and patients.
8. Ways of decrease of radiation exposure of the personnel and patients of medical establishments. Sanitary-engineering equipment of roentgenological and radiological departments.
9. Methods of collection and neutralization of radioactive waste during work with the open sources of ionizing radiation.
10. Methods and means of sanitary and radiation control during work with sources of ionizing radiation in medical institutions.
11. Ways of pollution of foods with radionuclides. The role of foods in the increase of internal irradiation of the population.
12. Principles of estimation of results when measuring radio-activity of environmental objects and foodstuff.
13. Principles and criteria of division of territories subjected to radioactive pollution as a result of Chernobyl accident.
14. Regulations of radiation safety.

**Final test control** – open base tests

**Final grade**

*Teacher's signature* \_\_\_\_\_

**Section of discipline 7.**  
**“Hygiene in extreme situations”**

**Subject 24: Organization of hygienic provision during elimination of extreme situation consequences. Features in temporary accommodation of the affected population, rescue and military formations.**

Date \_\_\_\_\_ “ \_\_\_\_ ”20 \_\_\_\_;

Student's name, year, group \_\_\_\_\_

**Learning objective**

1. Get familiar with types and characteristic of field location rescue units in the emergency situations.
2. Learn the units' filed location hygienic requirements, duties of the officials of the units for their provision.
3. Master methods of medical control of unit personnel (and affected population) location during emergencies in the field basic and extempore accommodation, dug-outs, shelters and other constructions deepened into the ground.

**Basics**

***You should know:***

1. Hygienic requirements for the areas, where units will be located and to the planning of these areas.
2. Hygienic requirements for sanitary improvement of land areas for location (water supply, collection, sewage disposal, solid and liquid waste treatment etc.).
3. Microclimate and air chemical compound peculiarities of the field habitation and constructions, deepened into the ground.

***You should have the following skills:***

1. To consider design materials (situational plan, general layout, planning schemes and sectional views of premises etc.), to make up expert's decisions based on these materials.
2. To perform sanitary inspection of the stationing area, premises and services of different function, measure microclimate, air chemicals pollution parameters in such premises.
3. To draw up conclusions and make recommendations based on examination results of design materials or locations.

**Tasks for self-training:**

At home, the student should answer theoretical questions and give definitions to the following terms:

1. Calculate the volume of ventilation in the shelter for 40 people in the first mode of ventilation – neat ventilation, MPC of carbon dioxide -1%. (Appendix 3)

Calculation: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. Calculate the maximum period of stay for the unit of 20 people in the shelter of 100 m<sup>3</sup> in the third mode of ventilation - total isolation, MPC of CO<sub>2</sub> - 3%. (Appendix 3).

Calculation: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. Calculate the cubic capacity of the shelter for stay of 30 people for three hours by the accumulation of heat. (Appendix 3).

Calculation: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Class work.**

**1. By examination of projects of fortification (shelter) and preparing the expert's report you should learn the requirements to planning and equipment of storehouses:**

Closed protective constructions should include the following main premises:

- a) premises for people accommodation equipped with 2- tier plank beds (40 and 135 cm above the floor), 1.8 x 0.6 meters per person. Norms for area: 4 m<sup>2</sup> (special shelters) to 1 m<sup>2</sup> (military field and civil defense shelters); cubic

capacity - from 10 m<sup>3</sup> to 2 m<sup>3</sup> per person respectively. The height of the shelter - 2 m.  
 b) a room for filter-ventilation unit (FVU) ( Fig. 53.13);  
 c) the restrooms (in special shelters they have sewage system with washbasins - 1 for 20-25 persons, urinals - 1 for 40 people); in the field military shelters and civil defense shelters- with external tanks for sewage (on the basis of 1 bucket for 12 people) with a 12-hour stay.  
 d) facilities for water and food supplies and other equipment.  
 e) entrances: the main and escape way of the tambour of "Labyrinth" type and sealed doors; emergency manhole.  
 Heating: heating field furnace (HFF), another type of furnace.  
 Lighting: from accumulators, flashlights, candles.  
 Air intake pipe for FVU should be provided with a dust filter.  
 For officers collapsible shelters of "Bunker" are designed, they consist of the metal sections, which are assembled in the foundation pit and are covered with soil.

**2. By examination of projects of fortification (shelter) and preparing the expert's report you should learn main hazards in closed protective constructions:**

1. Physical factors:
  - Unfavorable microclimate: low radiation temperature from the walls (soil, concrete), quick increase of air temperature and humidity during presence of people, the low air mobility. Under these conditions, the heat emission by radiation increases to 70% (normally 43-45%), the heat emission by convection and evaporation reduces (sweat is excreted, but is not evaporated, and trickles down, causing cold reaction). Condensate appears on cold walls due to high humidity. When working ventilation cold is possible, particularly in inactive (injured) people;
  - The number of heavy positive ions increases, the amount of negative ions in the air reduces that affects adversely the human health;
  - Illumination deficiency during long stay in the shelter, especially that of ultraviolet radiation;
  - Noise, vibration from ventilation, power systems, electrical and magnetic fields from the latter, fluctuations in atmospheric pressure at different ventilation modes.
2. Chemical factors:
  - The lack of oxygen and increased CO<sub>2</sub> concentration from humans and due to soil air - it is poorer in oxygen (14-15%), richer in carbon dioxide (3%). It should be added that leaving of soil CO<sub>2</sub> to the air of the shelter increases with decrease in atmospheric pressure, when heating the shelter (siphon effect) when raising ground water (rain, melting snow), during freezing of the soil surface;
  - The fumes of hydrogen sulfide, ammonia and other gases from the bathrooms, as well as disinfectants (bleach, Lysol).
  - Excretion of the combustion gases of fuel (diesel, heating, kitchen).
2. Psycho-emotional stress, "sensory deprivation" (uncertainty), or depressing information.
3. Hypokinesia: forced body position, long limited mobility results in static fatigue.

**3. By examination of projects of fortification (shelter) and preparing the expert's report you should indicate the main technologic base of primary prevention of destructive factor (CO<sub>2</sub>,%): choose from p. 6.1:**

and

п.6.2:

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### **Situational task 1.**

In summer, during an accident at a chemical object with emission of hazardous chemicals into the atmosphere, 100 civilians were evacuated in the shelter of civil defense with the second mode of ventilation (filter ventilation). The area of the shelter is 120 m<sup>2</sup>, volume - 250 m<sup>3</sup>. The shelter is equipped with two-level plank beds (40 and 135 cm above the floor), with dimensions 1.8 x 0.6 m per one person. The parameters of microclimate: temperature - 29 ° C, relative humidity - 78%. CO<sub>2</sub> concentration - 1.7%. Illumination - from an accumulator.

The shelter has a room for a filtering ventilation aggregate (FVA), rooms for water supplies and food, as well as a toilet room in which there are 6 buckets for sewage.

It is necessary to give the hygienic assessment of the situation, identify risk factors, predict the effects of risk factors on health, substantiate hygienic measures to improve the situation and normative provision of carrying out preventive measures.

### **Situational task 2**

When conducting the examination of the shelter for 150 people using instrumental methods, the doctor-hygienist revealed that the shelter has the following premises: a premise for people, equipped with one-layered plank beds, a room for filtering ventilation aggregate (FVA), toilet room and 1 input. A collapsible shelter of "Bunker" type is designed for officers, they consist of metal sections, which are installed in the trench and covered with soil. Heating is provided with a field stove. Lighting is provided from the battery. The height of the shelter is 2 m. A considerable dustiness is marked in the premises.

It is necessary to give the hygienic assessment of the situation, establish risk factors and possible consequences of their impact to substantiate measures to ensure the monitoring of the health status of military personnel within the current normative provision of specialist's activity.

### **Theoretical questions to the differentiated credit:**

1. Definition and classifications of extreme situations.
2. Natural cataclysms, their influence on sanitary-hygienic conditions for temporary compact residing the population and working conditions of military, civil formations - participants of liquidation of accidents.
3. Technogenic accidents, their influence on sanitary-hygienic conditions of temporary compact residing of the population and working conditions of rescue formations.
4. Social cataclysms, their influence on sanitary-hygienic conditions of temporary compact residing of the population, military formations and civil defence formations.
5. International and national organizational structures on liquidation and medical provision of consequences of natural, technogenic, social disasters.
6. Organizational-regular structure and laboratory-technical equipping medical service of armies on sanitary-hygienic and anti-epidemic provision of the staff in field conditions. Field laboratory complete sets and devices for hygienic researches.
7. Sanitary-hygienic measures on the organization of accommodation of people in conditions of accidents. Hygienic characteristic of temporary habitations in conditions of extreme situations.
8. Hygienic requirements to temporary compact accommodation of military, civil formations, rescue parties and the suffered population during extreme situations depending on climatic-weather and seasonal conditions.
9. Hygienic characteristic of camp tents, wireframe-inflatable, collapsible, container and other field habitations, adverse factors when residing in them and their prophylaxis.
10. Sanitary-hygienic features of accommodation of military, civil formations and the suffered population in underground constructions-dugouts, storehouses.
11. Rules of equipping and exploitation of underground fortification constructions - dugouts, not ventilated storehouses, mode of ventilation of storehouses. Admissible CO<sub>2</sub> concentrations for them.

**Final test control** – open base tests

**Final grade**

*Teacher's signature* \_\_\_\_\_

## **Subject 25: Organization of sanitary supervision over nutrition and water supply in conditions of catastrophes and during war.**

Date \_\_\_\_\_ “ \_\_\_\_ ”20 \_\_;

Student's name, year, group \_\_\_\_\_

### **Learning objective**

1. Describe physiological and hygienic as well as moral and psychological importance of rational food for the units in field conditions during elimination of consequences of emergencies.
2. Acquire the technique of medical control of the food adequacy and safety for the units under field conditions during emergencies.

### **Basics**

#### ***You should know:***

1. Concept of “rational nutrition”, conditions of its provision.
2. Health disorders and diseases, which may occur under non-observance of any of the conditions of rational nutrition.
3. Methods of prophylaxis of alimentary, infectious diseases, helminthiasis, food poisonings, morbid affections through food by poisonous substances (PS), radioactive substances (RS), bacterial substances (BS).

#### ***You should have the following skills:***

1. To assess ration for personnel of the units using different methods:
  - by calculation methods, according to apportionment of foodstuffs (menu-schedule);
  - by means of study of foodstuff assortment for a daily ration, foodstuff storage conditions, food cooking and realization;
  - by method of check-weighing (by weighing of foodstuffs when loading them into a cauldron, by weighing of ready meals);
  - by means of study of food state of human organism of personnel of the units (according to somatoscopic, somatometric, physiometric, biochemical, clinical indices);
  - by express method (using devices) and by means of laboratory analysis of foodstuffs and ready meals.
2. To organize and carry out medical control of adequacy of food for personnel of the units (and for affected population) and to take necessary prophylactic measures to provide adequacy of food.

. To take medical measures in case of the beginning of alimentary, infectious intestinal diseases, helminthiasis, food poisonings, morbid affections through food by strong effect poisonous substances (SEPS), radioactive substances (RS); to investigate causes of their beginning, to take preventive measures. 3

### Tasks for self-training:

At home, the student should prepare the following calculations and fill in an Emergency Report about a food poisoning:

1. The soldiers engaged in removal of buildings after the earthquake, have such amounts of nutrients in their daily diet: protein - 100 grams (including that of animal origin - 30 g), fat - 90 g, carbohydrates - 380 g. Calculate whether such a diet is sufficient if energy expenditures are 4500 kcal . (Take into account that 10% of the food is not assimilated).

Calculation: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. A company of 350 soldiers at rescue operations the battalion supply point used for breakfast: boiled meat of the cow dead in an earthquake, barley porridge, bread and tea. Lunch: soup of concentrates, cutlets of the same dead cow, cereal, juice, bread. Two-four hours after lunch, 40 soldiers had abdominal pain, diarrhea, temperature 37.5 - 38,7°C. 10 people had a slight indisposition. Fatal case were absent. List the duties of a doctor in these circumstances. Fill in the emergency report about food poisoning(conditionally):

Registration form No. 58.

1. Number of military unit or sub-unit of Emergency Control Ministry -
2. Diagnosis -
3. Date of food poisoning, time of onset of symptoms after eating -
4. Place of meal -
5. Number of victims - \_\_\_\_\_, of them hospitalized -
6. Severity of the disease -
7. Suspected product (dish) -
8. The reasons for the poisoning -
9. Actions taken:

Doctor's signature \_\_\_\_\_

Doctor's duties : \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Class work** – solve situational task No. \_\_\_\_ and make the record.

#### Situational task 1.

Case of mass food poisoning in the unit of liquidators of consequences

In July 1989, on the 12th day after the earthquake (in Spitak, Armenia), at midnight, 5 people applied to an aid post of unit of liquidators with complaints: an hour ago there were severe abdominal pain, vomiting, severe weakness, headache. Two of them had diarrhea, pain and cramps in the calves, dry mouth. The pulse of all the five - up to 120-130 per minute, of weak filling. Body temperature 37.8 – 39.8 ° C.

After an hour, other members of the unit started to appeal to the aid post. By morning, the number of cases reached 49 people. At 10:00 am the next day, two liquidators died. Several soldiers of the unit felt pain and a weak stool, but did not apply to the aid post.

Investigation of the case began in the morning, by breakfast. It was found that there was the following menu on the day of onset of the disease in a food point of liquidators (field kitchen):

- Breakfast: barley porridge with fried fish and sauerkraut.
- Lunch: 1<sup>st</sup> dish - soup in meat broth;  
2<sup>nd</sup> dish - beef burgers with barley porridge;  
3<sup>rd</sup> dish - stewed apples (apples are green, culled).
- Dinner: canned fish (cod in tomato sauce) with millet gruel, tea.

In a survey of a part of patients the following is revealed:

- Two of the liquidators did not have breakfast (was on a business trip with a task);
- One liquidator did not dine (he ate with the locals elsewhere);

- One liquidator did not eat soup at lunch, because soup seemed too acidic to him, ill with gastritis;
- The rest of the sick and not sick liquidators of the unit ate all dishes.

Most of the sick was delayed at disassembly of blockages and dined 2.5 hours later than the other members of the personnel of the unit. Nobody of the employees of the field kitchen got sick.

In a study of food point, no serious violations of the sanitary regimen were found. Folding tables, boards for the preparation of food, equipment, utensils are rather clean, but there is a lot of flies. Field kitchen staff knows sanitary rules of cooking in the field clearly enough. However, the doctor conducted lessons for them a long time ago, and the situation after the earthquake was on principle "there is no time".

The survey found that the cabbage was brought in galvanized buckets to the food point, fish – of local catch, meat – of a cow injured during the earthquake, and then killed, that was stored in a refrigerated truck for several days. It was also found that the food point does not have hot water, usual water was warm enough due to hot season, and the staff used it for washing utensils and equipment.

Minced meat was prepared using meat grinders, burgers were cooked on a roasting pan in the oven and kept to dispensation at lunch. It appears, however, that for persons detained by dismantling the rubble, semi-finished cutlets were stored on the kitchen table under a sheet and cooked immediately before serving.

All party of foods was obtained before the day of poisoning, overnight. From a medical assistant of the aid post on duty, who supervised field food point, it is known that the quality of the products was good: meat - out of the refrigerator, the fish - fresh catch, sauerkraut with pickle; canned food - without blowing, of three-year storage. Medical examinations of personnel of field kitchen are carried out in time, their results - without remarks.

You should:

1. Indicate the main technological base of primary prevention of destructive factor by analyzing the stages of the investigation of food poisoning and violated sanitary requirements in the organization of cooking:

#### **Procedures for investigating food poisonings**

The procedure for investigation of food poisoning includes:

1. Organization and rendering emergency medical care to patients, organization of their hospitalization (if necessary).

Point out the possible volume of emergency medical care

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2. Making the necessary documents (emergency report to SES or military sanitary-epidemiological units, referral to hospital, referral to the lab along with the materials from the victims), and others (see. Appendix 7). Indicate the person in charge

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3. Creation of groups of investigation: a sanitary doctor of SES, a physician of the establishment or sub-unit, where the poisoning happened, or the doctor of the medical establishment where the victims contacted, a representative of the administration or the commander of the formation, the cook. Indicate the person in charge:

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4. Drawing the plan of investigation:

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5. Questioning victims (diseased) and those who ate the same food, but did not fall ill, and the food point staff, with recording in the survey letters (Schemes 3, 4 of Appendix 7).

Make conclusions after completing the application:

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6. Sanitary inspection of catering department, field food point and its personnel, inspection and direction of residues of suspected food for the analysis and study of the results of laboratory tests, paperwork. Indicate conclusions of results study

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7. Drawing up a report (act) on the results of the investigation (p. 5 of Appendix 7).  
Indicate the person responsible for drawing up the act of conclusion

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8. Organization of health-improving and preventive measures.  
List the preventive measures

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2. By solving the situational problem you should indicate violations of sanitary requirements directed at:  
- preventing getting of microorganisms to the food:

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- Prevention of the growth of microorganisms on the food

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- realization of thermal treatment of food:

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### **Situational task 2**

A batch of bread is brought to the dining room of a military unit from the garrison bakery. The loaf of bread has correct shape, the crust is pale with lots of cracks. The pulp is macroporous on the cut, in some loaves - with gaps, taste and smell bread-crumbs is expressed sour.

A laboratory assistant of the bakery reported physical and chemical properties of the batch of bread, porosity - 46% humidity - 52%, acidity - 14 ° Turner.

On basis of physical and chemical parameters, draw a conclusion about the quality of bread and the possibility to use it in nutrition of the military unit.

### **Situational task 3**

An independent unit of chemical reconnaissance uses a mine well 15 m deep with water output of 15 m<sup>3</sup> a day for water supply. Organoleptic properties of water are satisfactory, laboratory examinations were not conducted. The walls of the well are lined with cement rings, a head wall is 15 cm above ground level, the clay lock and tiling around the well are absent, water is lifted with help of public bucket.

At a distance of 50 meters from the well there is a toilet with absorbing pit. The terrain is flat, soil is sandy.

In July, the group cases of dysentery appeared in the unit.

It is necessary to give the hygienic assessment of the situation, establish risk factors and possible consequences of their influence, substantiate directions of prevention of infectious diseases using normative provision of specialist's activity.



**Theoretical questions to the differentiated credit:**

1. Rational nutrition, conditions of its provision. Physiological norms of nutrition as a basis of its full value and adequacy to needs of the organism.
2. Organization of nutrition of military and civil formations in field conditions during extreme situations and during war, its form. Battalion points of nutrition, types of field kitchens, other means.
3. Military rations, rations of formations of the civil defence, their hygienic characteristic.
4. Nutrition in conditions of contamination of district and objects with hard poisonous substances, radioactive substances, bacterial substances in conditions of application of the weapon of mass destruction.
5. Food concentrates, dry rations, diets of survival as means of nutrition for the staff of formations during acute period of accidents, operations, other extreme situations.
6. Duties of medical service, methods and means of the hygienic control over full value and safety of nutrition of staff of formations and the suffered population in field conditions during extreme situations, in conditions of operations.
7. Methods for estimation of the organism food status.
8. Health disorders, diseases, connected with quantitative and qualitative inadequacy of a daily diet, with violation of regimen of nutrition, with variance of quality of foods and dishes to fermental resources of digestive system.
9. Infectious diseases with the alimentary mechanism of transfer, helminthoses, food poisonings, methods of their investigation and prophylaxis in field conditions during extreme situations and during war.
10. Hygienic characteristic of the basic foodstuff, canned food, food concentrates.
11. Parameters which characterize freshness, commercial qualities of foodstuff, signs of spoiling, epidemiological and toxicological danger.
12. Sources, factors and mechanisms which determine contamination of products with poisoning, radioactive substances and bacterial substances.
13. Elements of medical service of formations which duties include carrying out of medical examination of the foodstuffs.
14. Organic means (laboratory complete sets and devices), intended for carrying out of medical examination of the foodstuffs in field conditions.
15. Stages of medical examination of the foodstuffs and probable variants of expert conclusions at different stages of this examination.

**Final test control** – open base tests

**Final grade**

*Teacher's signature* \_\_\_\_\_

**Subject 26: Organization and carrying out of sanitary supervision over working conditions of disaster fighters in extreme situations. (SIW).**

**Date** \_\_\_\_\_ “\_\_\_”20 \_\_;

**Student's name, year, group** \_\_\_\_\_

**Learning objective**

1. Describe peculiarities of working conditions of personnel of the civil rescue units taking part in elimination of consequences of emergency situations and catastrophes.
2. Acquire familiarity with means and technique of medical service of the rescue and civil units for hygienic provision of working conditions of the rescuers who eliminate consequences of catastrophes.

3. Acquire methods and devices of medical inspection of the level of health and efficiency of the rescuers, who eliminate consequences of catastrophes.

### Basics

#### ***You should know:***

1. Importance of hygienic provision of working conditions of the rescue and civil units during elimination of consequences of emergency situations.
2. Characteristic features of working conditions during elimination of consequences of emergency situations depending on their origin.
3. Dangerous and hazardous factors, which accompany emergency situations, influence of these factors on the health level and working capacity of the rescuers who eliminate consequences of catastrophes and of suffered population.
4. Clinical and psychophysiologic methods of evaluation of working capacity, fatigue, health level of the rescuers who eliminate consequences of catastrophes.

#### ***You should have the following skills:***

1. To reveal dangerous and hazardous factors that occur during the emergency situations of different type and may influence on health level and working capacity of the participants of elimination of consequences of these emergency situations .
2. To reveal clinical and psychophysiologic signs of decrease of working capacity, health impairment of the participants of elimination of consequences of catastrophes.
3. To instruct personnel in methods and means of their health and working capacity maintenance during elimination of consequences of catastrophes, in application of personal protective equipment (such as respirators, gas masks, protective clothing), dopes, psychotropic agents and etc.
4. To master the available and appropriate under the conditions of catastrophes methods and devices of medical control of hardness and intensity of performed work, psychophysiologic, physical state of the rescuers who eliminate consequences of catastrophes and affected population.

### **Tasks for self-training:**

At home, the student should fulfil the tasks:

1. List the methods and means of hygienic assessment of:  
weight\_\_\_\_\_

intensity\_\_\_\_\_

tension of labor\_\_\_\_\_

2. Identify the physiological and psychophysiological methods can be used in conditions of disasters and other extreme situations

\_\_\_\_\_

3. Solve the situational task.

#### **Situational task No. 1.**

In dwelling houses destroyed by an earthquake, a fire arose due to the destruction of gas networks, short-circuit of electricity, resulting in dust, smoke, fumes in the air which complicated rescue efforts. There are many victims, injured people, the residents blocked by debris in the houses.

List the requirements and recommendations that you suggest for the liquidators of the emergency in order to ensure their health and capacity for work and help people.

\_\_\_\_\_

\_\_\_\_\_

#### **Situational task No. 2.**

Due to mass death of the population in the area of the explosion at a chemical plant (about 15,000 victims), many participants of the rescue formations arrived to eliminate the consequences of the disaster, had stress, psycho-emotional reactions, which reduced considerably their capacity for work.

Suggest recommendations for stress reduction, restoration (increase) of capacity for work in personnel of arrived formations

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**Theoretical questions to the differentiated credit:**

1. Classifications of accidents and extreme situations of natural, technogenic, social origin.
2. Harmful and dangerous factors which act on liquidators of accidents and other extreme situations of natural origin.
3. Harmful and dangerous factors which act on liquidators of accidents and other extreme situations of technogenic origin at the chemical, petropumping over and similar enterprises.
4. Harmful and dangerous factors which act on liquidators of radiation accidents (by the example of Chernobyl accident).
5. Psychoemotional strain and stress which develop in liquidators of accidents and other extreme situations, methods and means of their prophylaxis and treatment.
6. Preventive importance of a word, command, use of dopes, psychotropic preparations with the purpose of overcoming of stresses, psychoemotional remeasures in liquidators of consequences of the accidents, the suffered population.
7. Hygienic characteristic of individual means of protection which are used by liquidators during fires, flooding, other heavy times.
8. Features of regimen and working conditions, its weight, intensity, duration and tensity during liquidation of consequences of accidents and other extreme situations, methods of their revealing and estimation in conditions of accidents.

**Final test control** – open base tests

**Final grade**

*Teacher's signature* \_\_\_\_\_

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