PROF. DR. ASSEN ZLATAROV UNIVERSITY - BURGAS

MEDICAL FACULTY

DEPARTMENT OF PHYSIOLOGY, PATHOPHYSIOLOGY, CHEMISTRY AND BIOCHEMISTRY

Approved by

DEAN:

/Assoc. Prof. Rumyana Yankova, PhD/

SYLLABUS

Discipline:	**ASSESSMENT OF THE CHEMICAL FACTORS IN THE ENVIRONMENTAL AND WORKING ENVIRONMENT**
Specialty:	**MEDICINE**
Professional field:	**7.1. Medicine**
Educational and qualification degree:	**MASTER**
Form of training:	**REGULAR**

Burgas, 2024

EXTRACTS FROM THE CURRICULUM

1. GENERAL PARAMETERS OF THE DISCIPLINE			
Total (academic hours):	90	**ECTS:**	3

Auditorium classes	**Non-auditorium classes**	**Auditorium ECTS**	**Non-auditorium ECTS**
45	45	1.5	1.5

Type of Discipline:	**Academic hours per week: /lectures + practices/**	*Course:*	*Semester:*
Elective	1 +2	**I**	**II**

2. STUDY FORMS					
Auditorium classes:	**Academic hours**	**ECTS**	**Non-auditorium classes:**	**Academic hours**	**ECTS**
Lectures	15	0.75	**Consultation**	10	0.5
Practices	30	0.75	**Individual work** - Preparation of protocols	20	0.5
			- Preparing a presentation	15	0.5

3.EVALUATION AND CONTROL	
Forms of evaluation and control	**Relative share in the total score**
Sessional evaluation: exam	**0.4**
Semester (ongoing) assessment:	**0.6**
Forms of semester control:	
- Attendance at classes	0.25
- Ongoing testing before each practical lesson	0.25
- Active participation in classes	0.25
- Presentation on a scientific problem	0.25

ANNOTATION
of the discipline "Assessment of the Chemical Factors in the Environmental and Working Evironment"

Purpose of the course:
The course "**Assessment of the Chemical Factors in the Environmental and Working Environment**" is pre-designed for the students of the specialty "Medicine", full-time form of study.

The aim of the course: The disturbance of the balance established in nature as a result of chemical pollution seriously threatens the health and life of the population (1/3 of the hospital beds in the world at any given time are occupied by people suffering from diseases related to poor quality drinking water and contact with poorly treated wastewater, soil, air). The European norms in the protection of public health, which the Republic of Bulgaria introduces according to the standards of the European Union, require from the workers in the relevant bodies high competence and professionalism, which this course aims to introduce to the students of Medicine.

Main tasks of the curriculum:
The training covers the basic theoretical concepts of analytical determinations and methods for qualitative, quantitative and instrumental analysis of chemical pollutants and evaluation of the results obtained. Students are introduced to conventional and some alternative technologies for the treatment of wastewater and human excreta. Problems of ecological balance are addressed in a discussion form by following global trends. Laboratory measurements of specific factors affecting ecological balance in the environment and workplace are also included. Introduction to alternative wastewater and human waste management systems.

Structure of learning content:

- Environmental education and education for sustainable development.
- Natural environment. Ecological balance.
- Water, soil, air as elements of the natural environment.
- Environmental pollution.
- Methods of chemical analysis of the environment and workplace.
- Assessment of harmful chemical factors and ways of their utilization.

Teaching methods: traditional and innovative teaching methods, lectures, discussion, experiments, multimedia presentations, projects, teamwork, etc.

Forms of independent work: coursework of a referential type, problems for independent solving on topics from practical classes, solving tests, preparation of protocols for laboratory exercises, colloquia.

Methods of evaluation: current control during the classes, lectures, final control – test exam and presentation.

Prerequisites for students' basic knowledge and skills:
Have a good fundamental background in the Natural Sciences from the secondary course and the Chemistry course, studied during the first semester of study in the major.

Expected results:

Upon successful completion of the course, students must:

– Form environmental knowledge and competencies for proper assessment of chemical factors in the environment and workplace.

– To have the skills necessary to find solutions to specific problems, to perform basic operations and procedures for impact on objects under study, to work with laboratory equipment and apparatus, to observe health and safety conditions.

– To have acquired competences for scientific explanation of ecological facts and phenomena, for application of experimental results, competences for observation, modelling, analysis, development of logical and creative thinking, development of independence, teamwork, self-control.

CURRICULUM CONTENT

LECTURES

Topic	Hours
1. Main aims, objectives and principles of environmental education and education for sustainable development. Approaches, methods, forms and means of environmental education	1
2. Environmental education - health education. Formation of environmental competences through chemical knowledge	1
3. Natural environment. Main components - lithosphere, biosphere, hydrosphere, atmosphere. Natural phenomena. Natural equilibrium. Ecological balance	1
4. Water as an element of the natural environment. Water structure, physical, chemical and biological indicators. Requirements for the composition of water when used for different purposes. Water treatment	2
5. Pollution of natural and industrial waters. Protection of water from pollution. Treatment of sewage and polluted water. independence, teamwork, self-control	2
6. Atmosphere. Air as an element of the natural environment. Air pollution. Aero therapy	2
7. Lithosphere. Soils as an element of the natural environment. Soil pollution. Poloid therapy	2
8. Methods of chemical analysis of the environment and working environment - water, food, soil, air, etc. Assessment of harmful chemical factors and ways of their utilization	2
9. Environmental pollution - causes, consequences and trends - sustainable development. Conventional and alternative technologies for wastewater and human waste treatment	2
Total:	**15**

SEMINARS AND EXERCISES

Topic	Hours
1. Pollution, conservation, environmental sustainability. Harmful and hazardous substances - discussion and demonstrations (seminar)	3
2. Qualitative analysis of polluted waters. Analytical methods for the determination of cations and anions (exercise)	3
3. Volumetric analytical methods for determination of physical and physicochemical properties of water - pH, hardness, acidity (exercise)	3
4. Determination of nitrate and nitrite in water and food products (exercise)	3
5. Introduction to environmental sanitation systems for public and household use; introduction to alternative wastewater and human waste management systems. Introduction to health risk and the barriers posed to overcome it (seminar)	3
6. Pollution of the Burgas region with oil and oil products - factors, pollutants, control, impact on the environment and people (seminar)	3
7. Determination of total soil moisture and bulk density (exercise)	3
8. Determination of the active pH reaction of a soil extract (exercise)	3
9. Getting to know the methods of control and prevention of environmental pollutants. Controlled conduct of volumetric analytical determinations (seminar)	3
10. Methods of environmental education: learning through discovery; cooperative learning; independent study; group work, teamwork; debate; discussion; brain attack; situation, case, incident; interactive games; presenting; project-based learning; training with curricula; training with methodological developments of classes, essays; survey (seminar)	3
Total:	**30**

BACKGROUND

for Assessment of the Chemical Factors in the Environmental and Working Environment exam for students of the specialty "Medicine"

1. Main aims, objectives and principles of environmental education and education for sustainable development
2. Environmental education - health education. Formation of ecological competencies through chemical knowledge
3. Natural environment. Main components - lithosphere, biosphere, hydrosphere, atmosphere. Natural equilibrium. Ecological equilibrium
4. Water as an element of the natural environment. Water structure, physical, chemical and biological indicators. Requirements for the composition of water when used for different purposes. Water treatment
5. Pollution of natural and industrial waters. Protection of water from pollution
6. Atmosphere. Air as an element of the natural environment. Air pollution. Aero-therapy
7. Lithosphere. Soils as an element of the natural environment. Soil pollution. Pe-loidotherapy

8. Methods of chemical analysis of the environment and working environment - water, food, soil, air, etc. Assessment of harmful chemical factors and ways of their utilization
9. Environmental pollution - causes, consequences and trends - sustainable development. Conventional and alternative technologies for wastewater and human waste treatment

BIBLIOGRAPHY

1. Peter O'Neill, Environmental Chemistry, 1998, Tomson Science, Germany, ISBN 9780751404838.
2. Connell, D.W., 2005. Basic concepts of environmental chemistry. CRC Press, ISBN 9781566706766.
3. Csuros, Maria. Environmental sampling and analysis for technicians. CRC press, 2018, ISBN 9780873718356.

Students can use any other textbook in Assessment of the chemical factors in the environmental and working environment covering above topics.

Compiled by:

(Assoc. Prof. Rumyana Yankova, PhD)

Approved by a decision of the Council of the Department of Physiology, Pathophysiology, Chemistry and Biochemistry, Protocol №1/13.02.2024.

Head of the Department .....

(Assoc. Prof. Yordan Georgiev, PhD)

Approved by a decision of the Faculty Council of the Medical Faculty, Protocol №...3./15.02.2024г.

Secretary of the Council of the Medical Faculty: ....

(Chief assist. Prof. Ruska Nenkova, PhD)

UNIVERSITY "PROF. DR. ASEN ZLATAROV" - BURGAS
FACULTY OF MEDICINE

AFFIRMATIVE!
DECAN: .....
/Prof. Dr. Rumyana Yankova/

CURRICULUM

Discipline:	**BIOCHEMICAL THERAPY WITH DR. SCHUSSLER'S SALTS**
Specialty:	MEDICINE
Professional field:	7.1. MEDICINE Area of higher education: 7. HEALTH AND SPORT
Educational qualification:	MASTER
Form of study:	FULL-TIME

Burgas, 2024.

EXTRACTS FROM THE CURRICULUM

1. GENERAL PARAMETERS OF THE DISCIPLINE			
Total study employment (hours):	30	**Credits:**	1
Auditorium Employment	**Extracurricular Employment - self-training**	**Auditorium Employment**	**Extracurricular Employment**
15	15	0,5	0,5
Type of Discipline:	**Hours per week: /lectures + exercises/**	*Course:*	*Semester:*
FREE-CHOICE		***II, III, IV***	***winter***

2. STUDY FORMS					
Auditorium Employment:	**Hours**	**Credits**	**Extracurricular Employment:**	**Hours**	**Credits**
Lectures	9	0,3	Consultation (working with a tutor)	6	0,2
Seminar classes	6	0,2	Individual work	9	0,3
Practical lessons	—	—	Abstract	0	0,0

3.EVALUATION AND CONTROL	
Forms of evaluation and control	**Relative share in the total score**
Sessional assessment: exam/test	0.6
Semester (ongoing) assessment:	0.4
Forms of semester control:	
- Attendance at classes	0.6
- Active participation in training sessions	0.4
- Abstract	0.0

ANNOTATION
of the discipline "Dr. Schussler's Biochemical Salt Therapy"

Purpose of the course

The course "Biochemical Therapy with Dr. Schussler's Salts" is designed for students of the specialty "MEDICINE", "MASTER", full-time study.

The objectives of the course "BIOCHEMICAL THERAPY WITH Dr. Schussler's salts" are related to the application of Schussler's salts as a method of treatment that regulates basic biochemical processes at the cellular level.
The content of the course deals with issues related to the role of these minerals, as basic structural elements of the body, for balancing the reabsorption and distribution of the respective trace element in the tissues and maintaining homeostasis in the body. Deficiency or excess of a particular mineral salt leads to characteristic pathophysiological processes and the onset of disease.
Particular attention is paid to the fact that the balance of the 12 essential mineral salts, in the cell and extracellular space, is decisive for their normal functioning.

Structure of the teaching content: lectures, seminar exercises and assignments for independent work are conducted in the teaching of the discipline.

Methods and means of teaching: Teaching methods are a way of working for the university teacher and the student, by means of which the mastery of knowledge, skills and habits is achieved, the students' world view is formed and their abilities are developed. The following methods and means are used in the course "Dr. Schussler's Biochemical Therapy with Salts": lecture with discussion and debate; interactive methods - Heuristic talk, brainstorming, visualization and discussion. The means of multimedia projector and lecture presentation are used. The whole group performs one topic under the guidance of the lecturer. Students are familiarized with the theoretical part beforehand. The seminar exercise ends with a small test on the material from the previous lectures. Credit for the exercise is only given if the student has attended the seminar exercise and passed the test.

Forms of training: the study of the discipline is carried out in the following forms:

1. Lectures in which the basic theoretical knowledge on the topics covered is given. For some of the topics and subtopics that can be studied independently by the students, the lectures are introductory. They reveal the essence of the issues covered by the topics and guide independent work on the recommended literature. Alongside the lecture material, there will be discussions on theoretical issues, problem solving related to the practical application of the methods discussed, didactic tests and case studies, etc.
2. Consultations to clarify basic concepts, statistical characteristics, etc., and guidance on their specific features in order to overcome difficulties in independent work, etc.
3. Independent work of the students is organized through consultations in the lecturers' office hours, through e-mail communication, other forms of work in the

on-line environment, joint work on scientific and professional tasks, covering current tests on a given topic by the lecturer conducting the exercise, etc.

Methods of evaluation

№	Form of semester control in form of control "Examination"	Points $(K)_1$
1.	Attendance at classes	50
2.	Active participation in training sessions	50
3.	Abstract	0
	Total: 100	

№	Forms of evaluation	Written with interview or test	Points $(K)_2$
	Option 1 - Written examination on one topic from the syllabus and interview		
1.	Question from the curriculum		100
	Option 2 - Test covering questions from all topics in the syllabus		
1.	Test		100

The final grade in the course is formed as a total result of the semester and session evaluation, taking into account their relative share in the total grade according to the following formula:

$$\text{Final score } (\mathbf{K}) = 0{,}4 * K_1 + 0{,}6 * K_2$$

Final evaluation in points	up to 49	50 to 61	62 to 74	75 to 88	89 and more
Final grade on a six-point system	Weak (2)	Medium (3)	Good (4)	Very good (5)	Excellent (6)

Prerequisites for students' basic knowledge and skills

Students should have knowledge of human anatomy, human physiology, biochemistry. They should also have an understanding of the different types of medicinal preparations approved for use in Bulgaria and have a good knowledge of the legislation in this area - Health Act, Medical Institutions Act, Medicinal Products in Human Medicine Act, etc. Of course, knowledge of the pharmacological application of preparations containing such elements and salts is also needed.

Expected results

After successful completion of the course, students should know the principles of treatment with the original Schussler's salts of the German Homeopathic Union (DHU) in the form of tablets and ointments, and be able to apply them successfully. They will be familiar with the biochemical properties, functional activity, therapeutic possibilities and applications in clinical practice of the 12 Schussler salts of the DHU.

CURRICULUM CONTENT

LECTURES

Topic	hours
Theme1. Basics of Schussler therapy.	3 hours
1.1. Historical overview	
1.2. The 12 tissue mineral salts.	
1.3. An integrative method for restoring and maintaining health.	
Topic 2. Schussler's salts for pain and inflammation.	2 hours
2.1. Practical aspects in the application of Schussler's salt number 7.	
2.2. Practical aspects in the application of Schussler's salt number 3.	
2.3. Practical aspects in the application of Schussler's salt number 4.	
2.4. Practical aspects in the application of Schussler's salt number 6.	
Topic 3. Schussler salts for tissue strengthening and repair.	2 hours
3.1. Practical aspects in the application of Schussler salt number 1.	
3.2. Practical aspects in the application of Schussler's salt number 2.	
3.3. Practical aspects in the application of Schussler's salt number 11.	
3.4. Practical aspects in the application of Schussler's salt number 12.	
Topic 4. Schuessler salts with active influence on metabolism.	2 hours
4.1. Practical aspects in the application of Schussler's salt number 8.	
4.2. Practical aspects in the application of Schussler's salt number 9.	
4.3. Practical aspects in the application of Schussler's salt number 10.	
4.4. Practical aspects in the application of Schussler's number 5.	
All: 9 hours	

OPERATIONS

Topic	hours
Theme 1. Application of Schussler salts in pain and inflammation - individual approach in different groups of patients, including pregnant women and children.	3 hours
Theme 2. Application of Schussler salts for tissue strengthening and repair.	3 hours
All: 6 hours	

COURSES PROJECT *(abstract)*

Not required.

EXAMINATION QUESTIONNAIRE

TOPIC 1: Basics of Schusslerian therapy.
TOPIC 2: The 12 tissue mineral salts.
Topic 3: Integrative method for recovery and health maintenance.
TOPIC 4: Practical aspects in the application of Schussler's salt number 1, 2, 11 and 12.
TOPIC 5: Practical aspects in the application of Schussler's salt number 3, 4, 6, 7.
TOPIC 6: Practical aspects in the application of Schussler's salt number 5, 8, 9, 10.
TOPIC 7: Dosage and administration of Schussler's salts (tablets and ointments).

PREPARATION LITERATURE

Required
1. Lecture course - Prof. Valentin Stoyanov,
2. Lecture course - Dr. Nonna Petrova

Recommended
1. Basic principles of application of Dr. Schussler's 12 mineral salts. dr. Anastasia Milanova
2. Guide to Schussler Therapy. Г. Х. Heppen, T. Feichtinger

Compiled by:
1.....
(Prof. Dr. Valentin Stoyanov)
2. .....
(Dr. Nonna Petrova)
3.....
(Dr. Dora Pachova)

The curriculum was discussed and approved at a meeting of the Department of ENT, Ophtalmology, Skin and Venereal Diseases, No. ..... from .....

Secretary of the CC, " ORLOSVD":
.....
(Dr. .....)

Head of Department "ORLOSVD":
..
(Assoc. Prof. Daniel Petkov)

The curriculum was approved and discussed at the Faculty Council of the Faculty of Medicine, Minutes No. 18 from 13.01.2025

Scientific Secretary of the FS, MF:

.....

(.. ..)

Р. Ненкова

UNIVERSITY "PROF. D-R ASEN ZLATAROV"-BURGAS

MEDICAL FACULTY

DEPARTMENT OF PHYSIOLOGY, PATHOPHYSIOLOGY, CHEMISTRY AND BIOCHEMISTRY

Approved by!

DEAN:

/Assoc. Prof. Rumyana Yankova, PhD/

SYLLABUS

Discipline:	**CHEMICAL ASPECTS OF NATURAL REMEDIES AND TREATMENTS**
Specialty:	**MEDICINE**
Professional field:	**7.1. Medicine**
Educational qualification degree:	**Master's degree**
Form of training:	**Full-time**

Burgas, 2024

EXTRACT FROM THE CURRICULUM

1. GENERAL PARAMETERS OF THE DISCIPLINE			
Total (Academic hours):	90	**ECTS:**	3
Auditorium classes	**Non-auditorium classes**	**Auditorium ECTS**	**Non-auditorium ECTS**
45	45	1.5	1.5
Type of discipline:	**Academic hours per week: /lectures + practices/**	*Course:*	*Semester:*
Mandatory	1 + 2	**II**	**III**

2. STUDY FORMS					
Auditorium classes:	**Academic hours**	**ECTS**	**Non-auditorium classes:**	**Academic hours**	**ECTS**
Lectures	15	0.75	**Consultation**	10	0.5
Seminars	15	0.75	**Individual work**		
Practices	15		- Preparation of protocols	5	0.25
			- Preparing for the exam	30	0.75

3. EVALUATION AND CONTROL	
Forms of evaluation and control	**Relative share in the total score**
Sessional evaluation: exam	**0.4**
Semester (ongoing) assessment:	**0.6**
Forms of semester control:	
- Attendance at classes	0.1
- Active participation in classes	0.1
- Defense of protocols	0.1
- Control and tests	0.3

ANNOTATION

of the discipline "Chemical aspects of natural remedies and treatments"

The course "Chemical Aspects of Natural Remedies and Treatments" is designed for students of the specialty "Medicine" of the Master's degree, full-time form of study.

The course is aimed:

- to give knowledge about the most common treatments and natural remedies used in Bulgaria and other countries.
- to study the chemical aspects of natural remedies and treatments and the analysis of natural products;
- to deepen the theoretical and practical training of future physicians, with a view to applying knowledge of medical preparations, cosmetics, spa and SPA treatments, etc.;
- to provide knowledge of the chemical composition of mineral water, medicinal mud, lye and herbs, which are a source of health and can be a major method of treatment for a range of ailments.

The course content covers the basic theoretical concepts of natural remedies and treatments - water, air, healing mud, lye, herbs and other natural remedies. Their chemical composition, curative action, distribution, methods of analysis are discussed. The topics are structured as follows:

- Chemical aspects of natural remedies and treatments.
- Types of waters. Water therapy. Mineral waters – nature, chemical composition, application and distribution in Bulgaria.
- Mud therapy and lye therapy. Chemical composition and action of healing mud and lye.
- Medicinal plants – chemical composition, biological and medicinal action.
- Healing natural products and procedures. Phytotherapy, Aerotherapy, Mycotherapy, Thalassotherapy, Apotherapy, Argyrotherapy, etc.

Teaching methods:

A modern approach is applied for teaching the course material, as well as for conducting the practical classes and evaluating the students' results. In the presentation of the lecture material, a multimedia presentation, virtual experiment, demonstration of chemical objects, tables, posters and other sources of information are used for better visualization and comprehension of the material by the students.

The practical sessions are designed to illustrate and consolidate the lecture material, to help to understand it more deeply and to create habits for its practical application. Interactive learning methods such as discussions, debates, case studies, etc. are often used in the classes.

Forms of independent work: course work of a referential type, problems for independent solving on topics from practical classes, preparation of protocols for laboratory exercises.

The control and assessment of knowledge is carried out during the semester with the preparation of a presentation on a given topic, the defense of the protocols of the conducted practical classes and during a session with a compulsory written exam on the discipline.

The prerequisites for the basic knowledge and skills of the students of the specialty "Medicine" refer to a good fundamental preparation in the natural-mathematical disciplines of the secondary course and the Chemistry course, studied during the first semester of study in the specialty. In building on the material covered in the course, students should be able to partially apply knowledge acquired in the previous year's Human Biology, Physics and Biophysics courses.

Expected student learning outcomes are mastery of:

- knowledge of natural healing remedies and treatments;
- knowledge and skills in the analysis of natural products;
- competence in scientific explanation of natural products and application of experimental results;
- competence for observation, analysis, development of logical and creative thinking, development of independence, teamwork, self-control.

Upon successful completion of the course "Chemical Aspects of Natural Remedies and Treatments", students should know and be able to:

- Use and apply in-depth theoretical and factual knowledge in the field of natural healing remedies and procedures, including the analysis of natural products.
- Independently interpret the knowledge acquired by relating it to the application of facts and by critically perceiving, understanding and expressing theories and principles. Have abstract thinking skills by building chemical models.
- Know methods and tools to solve complex problems.
- Apply logical thinking and show innovation and creativity in solving non-standard problems.

CURRICULUM CONTENT

I. LECTURES

Topic	Hours
1. Types of water – composition, structure. Requirements for the composition of water when using it for medical purposes.	2
2. Water treatment. Organoleptic, physical and chemical properties of natural waters. Mineral waters – nature, chemical composition, application and distribution in Bulgaria.	2
3. Mud and lye therapy – chemical composition and action of healing mud and lye.	2
4. Medicinal plants – species, chemical composition, distribution. Biological and medicinal action of natural plants (herbs).	2
5. Natural healing products and treatments. Phytotherapy, Aerotherapy, Mycotherapy, Thalassotherapy, Apotherapy, Argyrotherapy.	2
6. Healing therapies for the recovery of skin diseases, muscle injuries, etc. Organic facial body care products.	2
7. Biological products based on vegetable oils with healing effect against skin imperfections, hormonal imbalance, etc.	2
8. Application of medication (pharmaceuticals) in combination with physiotherapy equipment. Cosmetic facial therapies in combination with equipment.	1
Total:	**15 hours**

II. SEMINARS AND PRACTICES

Topic	Hours
1. *Seminar session.* Chemical aspects of natural remedies and treatments. Mineral waters, mud and lye.	3
2. *Practical session.* Field work on sampling of mineral water sources. Visit, familiarization and study of thermal mineral waters in the Balneotherapeutic Complex of Pomorie and Banevo, Burgas.	3
3. *Practical session.* Field work on sampling with medicinal mud and lye. Visiting and studying sites with medicinal mud and lye – Pomorie/Lake Atanasovsko, Burgas.	3

4. *Laboratory exercise.* Determination of organoleptic properties of water – colour, taste, odour, turbidity, temperature, density.	3
5. *Laboratory exercise.* Determination of medium reaction (pH) of therapeutic muds and waters by colorimetric and potentiometric methods.	3
6. *Laboratory exercise.* Extraction of water-soluble and fat-soluble bioactive components from medicinal plants.	3
7. *Seminar session.* Biological significance of the chemical element iodine. Iodine deficiency diseases – control, prevention.	3
8. *Seminar session.* Phytotherapy in dermatology and cosmetology.	3
9. *Seminar session.* Free radicals and natural products in medicine.	3
10. *Seminar session.* Contemporary scientific approach to "folk", "traditional" and alternative methods of treatment.	3
Total:	**30 hours**

QUESTIONNAIRE

for the examination in the discipline "Chemical aspects of natural remedies and treatments" for students of the specialty "Medicine"

1. Types of water – composition, structure. Requirements for the composition of waters when using them for medical purposes.

2. Water treatment. Organoleptic, physical and chemical properties of natural waters.

3. Mineral waters – nature, chemical composition, application and distribution in Bulgaria.

4. Mud therapy and lye therapy. Chemical composition and action of medicinal mud and lye.

5. Medicinal plants – chemical composition, biological and medicinal action.

6. Healing natural products and treatments. Phytotherapy, Aerotherapy, Mycotherapy, Thalassotherapy, Apotherapy, Argyrotherapy, etc.

7. Iodine – biological significance. Iodine deficiency diseases – control, prevention.

8. Healing therapies for the recovery of skin diseases, muscle injuries, etc. Organic cosmetic products for face and body.

9. Biological products based on vegetable oils with healing effect against skin imperfections, hormonal imbalance, etc.

10. Application of medicines (pharmaceuticals) in combination with physiotherapy equipment.

BIBLIOGRAPHY

1. Mitryushkin, K. Handbook of Nature Conservation. ed. Zemizdat, Sofia, 1984.
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3. Hadzhijiliev, V. et al. Manual for practical activities in biochemistry. NCUTST, Sofia, 1990.
4. V. Chemistry and Medicine. Union of Scientists – Stara Zagora, Stara Zagora, 2019.
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10. Georgieva, N., A. Pavlov, V. Hadzhijiliev, Z. Yaneva, Manual for Laboratory Exercises in Chemistry, ed. Stara Zagora, Thracian University, 2017.

Compiled by:

(Assoc. Prof. Svetlana Zheleva, PhD)

Approved by a decision of the Council of the Department of Physiology, Pathophysiology, Chemistry and Biochemistry, Protocol № 10/09/09/2024

Head of Department:

(Assoc. Prof. Yordan Georgiev, PhD)

Approved by a decision of the Faculty Council of the Medical Faculty, Protocol № 12/20.09.2024

Secretary of the Council of the Medical Faculty:

(Chief assist. Prof. Ruska Nenkova, PhD)

PROF. DR. ASSEN ZLATAROV UNIVERSITY OF BURGAS

FACULTY OF MEDICINE

DEPARTMENT OF PHYSIOLOGY, PATHOPHYSIOLOGY, CHEMISTRY AND BIOCHEMISTRY

Approved by!

DEAN:.... ....

/Assoc. Prof. Rumyana Yankova, PhD/

SYLLABUS

Discipline:	**GLYCOBIOLOGY**
Specialty:	**MEDICINE**
Field of higher education	**HEALTHCARE AND SPORTS**
Professional field:	**7.1. MEDICINE**
Educational and qualification degree:	**MASTER**
Form of training:	**REGULAR**

Burgas, 2024

EXTRACTS FROM THE CURRICULUM

1. GENERAL PARAMETERS OF THE DISCIPLINE			
Total (academic hours):	90	**ECTS:**	3
Auditorium classes	**Non-auditorium classes**	**Auditorium ECTS**	**Non-auditorium ECTS**
45	45	1.5	1.5
Type of Discipline:	**Academic hours per week: /lectures + practices/**	*Course:*	*Semester:*
Elective	1 + 2	**II**	**3rd**

2. STUDY FORMS					
Auditorium classes:	**Academic hours**	**ECTS**	**Non-auditorium classes:**	**Academic hours**	**ECTS**
Lectures	15	0.5	**Consultation**	10	0.3
Seminars	15	0.5	**Individual work:**		
Practices	15	0.5	- working with specialized scientific literature to prepare for seminars;	3	0.1
			- preparation for practical exercises and protocols from them;	3	0.1
			- preparation of a report and presentation on a scientific problem;	9	0.3
			- Preparation for the final exam	20	0.7

3.EVALUATION AND CONTROL	
Forms of evaluation and control	**Relative share in the total score**
Sessional evaluation: exam	**0.4**
Semester (ongoing) assessment:	**0.6**
Forms of semester control:	
- Attendance and active participation during classes	0.1
- Preparation for each exercise and seminar	0.2
- Preparation of protocols of practical exercises	0.15
- Working with scientific literature, preparing a report and presenting a presentation on a scientific problem	0.15

ANNOTATION

of the discipline Glycobiology

Purpose of the course:

The elective course Glycobiology is designed for students of the specialty Medicine, in the third semester of the second year of their full-time form of study.

The aim of the Glycobiology course is to give students basic knowledge about the structural features, biosynthesis, degradation, and biological functions at a cellular and molecular levels with the receptor recognition of low molecular weight carbohydrates, polysaccharides, lipopolysaccharides, glycoproteins, proteoglycans and glycolipids. It also aims the application of the aforementioned knowledge in Medicine with presentation of modern chemical and biological methods for the study of pathological disorders in glycosylated metabolites. The course will support the development of valuable fundamental knowledge during the training of students in pre-clinical disciplines, which will be useful in subsequent clinical disciplines of study.

Main tasks of the curriculum:

The main tasks of the curriculum of the elective course Glycobiology are related to introducing students with the processes of glycosylation in the living cell, the biological functions of glycosylated metabolites, and the methods of studying glycosylated biomolecules, as well as with the possible disorders leading to pathological states. This includes the study of major sections of Glycobiology as a science with assignments on:

- Getting to know the chemical nature of carbohydrates and glycosylated biogenic molecules;
- Getting to know the biological processes of glycosylation of biogenic molecules;
- Getting to know the biological functions of glycosylated metabolites and the cellular mechanisms for their mode of action through the principles of signal transduction;
- Acquaintance with modern chemical and biological methods used in Glycobiology;
- Getting to know the application of Glycobiology in Medicine in the diagnosis and treatment of a number of socially significant diseases.

Structure of learning content:

- Structural features, biosynthesis, degradation and functions of low-molecular carbohydrates, homo- and heteropolysaccharides, lipopolysaccharides, glycoproteins, proteoglycans, and glycolipids;
- Cellular organization of glycosylation at a molecular and chromosomal levels, receptor recognition, and signal transduction in glycosylated metabolites;
- Chemical and biological experimental approaches in the study of pathological changes in glycosylation;
- Application of Glycobiology in Medicine in the treatment of infectious, oncological, cardiovascular, pulmonary, hepatic, renal, gastrointestinal, metabolic, skin, neurodegenerative, musculoskeletal, and psychiatric diseases.

Teaching methods:

A combination of traditional methods by presenting the learning material in a written form on a whiteboard and modern methods with multimedia presentations; discussion on current scientific problems in a seminar format; individual and team tasks in a written test and oral formats.

Forms of independent work:

Preparation of literature references on current scientific problems and their presentation during seminar classes; preparation of protocols from experimental tasks for practical exercises; preparation of reports and multimedia presentations; solving tests.

Methods of assessment: Discussion on the study material during seminars and practical exercises (ongoing assessment); protocols on practical exercises; report and multimedia presentation; final control – test with multiple-choice questions and open-ended questions, and an oral examination. Two grades are formed – an average grade for performance during the semester and a final grade from the exam.

Prerequisites for students' basic knowledge and skills:

Students must have knowledge of the disciplines Chemistry, Physics, Biophysics, Human Biology, Cytology, General Histology and Human Embryology, Human Anatomy and Histology, a good command of English language, as well as to handle the basic functions of Microsoft Word, Excel, and PowerPoint.

Expected results:

Upon successful completion of the Glycobiology course, students should know and be able to:

1. Apply the acquired theoretical knowledge on the main structural features and biological functions of the carbohydrates and glycosylated metabolites studied in subsequent pre- and clinical disciplines, and in their future profession;
2. Analyze the main biological disorders in improper glycosylation of important metabolites, having a primary or secondary role in the development of a number of socially significant diseases;
3. Apply and further develop the studied experimental techniques for the investigation of glycosylated metabolites during the practical exercises in a scientific experiment;
4. Process and analyze experimental numerical data and interpret them;
5. Use the developed skills for critical analysis and innovative interpretation of specialized scientific literature in the interdisciplinary areas of the discipline and to systematize scientific information for the preparation of short scientific reports and publications.

CURRICULUM CONTENT

LECTURES

Topic	hours
1. Introduction to Glycobiology Introduction to Glycobiology as an interdisciplinary science – a historical overview. Role of glycosylation in the evolution of life. Importance of Glycobiology for Medicine	1
2. Glycosylation at a cellular level Cellular organization of glycosylation of noncarbohydrate metabolites. Formation of monosaccharides from non-carbohydrate sources in the human body. Role of enzyme glycosylation genes and clinical significance of enzymes involved in the glycosylation process	1
3. Low molecular weight carbohydrates Structural diversity in low molecular weight carbohydrates. Classification of monosaccharides - orders of aldoses and ketoses. Conformational models and optical isomerism in monosaccharides. Formation and features of the glycosidic bond. Reducing and non-reducing sugars. Main representatives of disaccharides and oligosaccharides with biological activity and their importance for dietary and functional nutrition. Role of synbiotics in the protection of human health	2
4. Polysaccharides and glycosaminoglycans in man and animals Structural features, biosynthesis, and functions of polysaccharides and glycosaminoglycans (hyaluronic acid, heparin, chondroitin sulfate, dermatan sulfate, keratan sulfate) in humans and animals. Catabolism of polysaccharides and glycosaminoglycans in the human body. Disorders in the metabolism of glycogen and glycosaminoglycans	2
5. Polysaccharides from medicinal plants, fungi, microorganisms, algae, and arthropods Structural features and biological activity of homo- and heteropolysaccharides valuable for humans from medicinal plants (pectins, hemicelluloses), fungi (β-glucans, fucogalactans, glucomannans), microorganisms (dextrans, pullulans, curdlans, xanthans, mannans), algae (alginates, agarose, fucoidans, carrageenans, ulvans, galactans), and arthropods (chitin). Possibilities for metabolizing water-soluble and insoluble dietary fibers in the human body. Perspectives in the involvement of polysaccharides in the supplementary therapy in the treatment of cardiovascular, oncological, and chronic inflammatory diseases	1
6. Proteoglycans in man and animals Types of proteoglycans in connective tissue and their functions in man and animals. Importance of proteoglycans in Regenerative Medicine. Disturbances in the metabolism of proteoglycans in atherosclerosis, diabetes, oncological, renal, and musculoskeletal diseases	1
7. Glycoproteins in humans and animals Structural features of N- and O-linked glycans in glycoproteins. Biological functions of glycoproteins in man. Role of sialic acid in viral infections. Formation of	2

advanced glycation end products in hyperglycemia and subsequent pathophysiological consequences. Hexosamine pathway in diabetes and other diseases	
8. Glycolipids Classification and structural features of glycolipids. Biological functions of glycolipids. Disorders of glycolipid metabolism in oncological and neurodegenerative diseases	1
9. Microbial lipopolysaccharides Classification and structural features of lipopolysaccharides isolated from different ecological niches. Biological functions of lipopolysaccharides. Proinflammatory and toxic effects of lipopolysaccharides in the human body. Sepsis	1
10. Cellular recognition of carbohydrate-containing metabolites Classification of glycan-binding proteins. Receptor recognition and cell signaling in glycan-containing metabolites. Significance of antibodies, lectins and galectins in the development of socially significant diseases	1
11. Chemical and biological methods in Glycobiology Isolation and purification of polysaccharides, glycoproteins and proteoglycans. Biomedical experimental approaches in studying glycosylation changes. Structural studies of glycan-containing metabolites by chromatography, mass spectrometry, and nuclear magnetic resonance spectroscopy. Genetic mutation research and bioinformatic analysis. Development of glycan-containing diagnostic laboratory tests. Preparation of new glycosylated therapeutic molecules by chemical and enzymatic synthesis. Therapeutic inhibition of enzymatic glycosylation	2
Total:	**15**

SEMINARS AND PRACTICAL EXERCISES

Topic	Hours
1. Low molecular carbohydrates *Seminar:* Structural diversity in carbohydrates. Classification of monosaccharides - aldoses and ketoses. Conformational models and optical isomerism in monosaccharides. Formation and features of the glycosidic bond. Reducing and non-reducing sugars. Main disaccharides and oligosaccharides with biological activity, and their importance for dietary and functional nutrition. Role of synbiotics in the protection of human health *Practice:* Qualitative test for reducing sugars by Fehling's method. Quantification of fructans in medicinal plants by the Seliwanoff method	3
2. Polysaccharides from medicinal plants and mushrooms *Seminar:* Isolation, purification, structural features, and biological activity of homo- and heteropolysaccharides valuable for humans from medicinal plants and mushrooms. Possibilities for metabolizing water-soluble and insoluble dietary fibers in the human body. Prospects for the involvement of polysaccharides in the supplementary therapy in the treatment of cardiovascular, oncological, and chronic inflammatory diseases *Practice:* Quantification of pectic polysaccharides in medicinal plants by the meth-	3

od of Blumenkrantz & Asboe-Hansen	
3. Polysaccharides from microorganisms, algae, and arthropods *Seminar:* Isolation, purification, structural features and biological activity of valuable for humans homo- and heteropolysaccharides from microorganisms, algae, and arthropods. Perspectives in the application of polysaccharides in the supplementary therapy in the treatment of socially significant diseases Practice: Determination of monosaccharide composition of biologically active polysaccharides by gas chromatography	3
4. Polysaccharides and proteoglycans in humans and animals *Seminar:* Isolation, purification, structural features, biosynthesis, and functions of polysaccharides and glycosaminoglycans (hyaluronic acid, heparin, chondroitin sulfate, dermatan sulfate, keratan sulfate) in humans. Degradation of polysaccharides and glycosaminoglycans in the human body. Disorders in the metabolism of glycogen and glycosaminoglycans *Practice:* Extraction of glycosaminoglycans from mussels	3
5. Proteoglycan analysis *Seminar:* Types of proteoglycans in connective tissue and their functions in humans. Importance of proteoglycans in Regenerative Medicine. Disturbances in the metabolism of proteoglycans in atherosclerosis, diabetes, oncological, renal, and musculoskeletal diseases *Practice:* Separation of extracted glycosaminoglycans from mussels by horizontal electrophoresis	3
6. Glycoproteins in humans and animals *Seminar*: Isolation, purification, structural features of N- and O-linked glycans in glycoproteins. Biological functions of glycoproteins in man. Role of sialic acid in viral infections. Formation of advanced glycation end products in hyperglycemia and subsequent pathophysiological consequences. Hexosamine pathway in diabetes and other diseases *Practice:* Determination of the degree of glycation of bovine albumin	3
7. Cellular recognition of carbohydrate-containing metabolites *Seminar:* Classification of glycan-binding proteins. Receptor recognition and cell signaling in glycan-containing metabolites. Significance of antibodies, lectins, and galectins in the development of socially significant diseases *Practice:* Chromatographic fractionation and purification of biologically active glycoproteins (concanavalin A) with dialysis	3
8. Summary of the application of Glycobiology in Medicine - Part 1 *Seminar:* Classification and structural features of lipopolysaccharides isolated from different ecological niches. Biological functions of lipopolysaccharides. Role of glycosylation in bacterial, fungal, and parasitic infections. Changes in glycosylation during the progression of oncological diseases. Diagnostic significance of glycosylation in congenital diseases *Practice:* Determination of the amino acid composition of biologically active glycoproteins by high-performance liquid chromatography	3
9. Glycolipids	3

Seminar: Classification and structural features of glycolipids. Biological functions of glycolipids. Disorders of glycolipid metabolism in oncological and neurodegenerative diseases *Practice:* Separation of lipids from blood serum by thin-layer chromatography	
10. Summary of the application of Glycobiology in Medicine - Part 2 *Seminar:* Role of glycosylation in cardiovascular, pulmonary, renal, gastrointestinal, skin and psychiatric diseases. Biomedical experimental approaches in studying changes in glycosylation. Structural studies of glycan-containing metabolites by chromatography, mass spectrometry, and nuclear magnetic resonance spectroscopy. Genetic mutation research and bioinformatic analysis *Practice:* None	3
Total:	**30**

QUESTIONNAIRE

for exam in Glycobiology

for students of the specialty Medicine

1. Introduction to Glycobiology as an interdisciplinary science - historical overview. Role of glycosylation in the evolution of life. Importance of Glycobiology for Medicine
2. Cellular organization of glycosylation of non-carbohydrate metabolites. Formation of monosaccharides from non-carbohydrate sources in the human body. Role of enzyme glycosylation genes and clinical significance of enzymes involved in the glycosylation process
3. Structural diversity in low molecular weight carbohydrates. Classification of monosaccharides - aldoses and ketoses. Conformational models and optical isomerism in monosaccharides. Formation and features of the glycosidic bond. Reducing and non-reducing sugars. Main disaccharides and oligosaccharides with biological activity and importance for dietary and functional nutrition. Role of synbiotics in the protection of human health
4. Structural features, biosynthesis, and functions of polysaccharides and glycosaminoglycans (hyaluronic acid, heparin, chondroitin sulfate, dermatan sulfate, keratan sulfate) in humans and animals. Catabolism of polysaccharides and glycosaminoglycans in the human body. Disorders in the metabolism of glycogen and glycosaminoglycans
5. Structural features and biological activity of valuable for humans homo- and heteropolysaccharides from medicinal plants (cellulose, pectins, hemicelluloses), fungi (β-glucans, fucogalactans, glucomannans), microorganisms (dextrans, pullulans, curdlans, xanthans, mannans), algae (alginates, agarose, fucoidans, carrageenans, ulvans, galactans) and arthropods (chitin). Possibilities for metabolizing water-soluble and insoluble dietary fibers in the human body. Perspectives in the involvement of polysaccharides in the supplementary therapy in the treatment of cardiovascular, oncological and chronic inflammatory diseases
6. Proteoglycans in man and animals. Types of proteoglycans in connective tissue and their functions in man. Importance of proteoglycans in Regenerative Medicine. Disturbances in the metabolism of proteoglycans in atherosclerosis, diabetes, oncological, renal, and musculoskeletal diseases
7. Glycoproteins in humans and animals. Structural features of N- and O-linked glycans in glycoproteins. Biological functions of glycoproteins in man. Role of sialic acid in viral in-

fections. Formation of advanced glycation end products in hyperglycemia and the subsequent pathophysiological consequences. Hexosamine pathway in diabetes and other diseases

8. Glycolipids. Classification and structural features of glycolipids. Biological functions of glycolipids. Disorders of glycolipid metabolism in oncological and neurodegenerative diseases
9. Lipopolysaccharides. Classification and structural features of lipopolysaccharides isolated from different ecological niches. Biological functions of lipopolysaccharides. Proinflammatory and toxic effects of lipopolysaccharides in the human body. Sepsis
10. Cellular recognition of carbohydrate-containing metabolites. Classification of glycan-binding proteins. Receptor recognition and cell signaling in glycan-containing metabolites. Significance of antibodies, lectins and galectins in the development of socially significant diseases
11. Summary of the application of Glycobiology in Medicine. Role of glycosylation in bacterial, fungal, and parasitic infections. Changes in glycosylation during cancer progression. Diagnostic significance of glycosylation in congenital diseases
12. Summary of the application of Glycobiology in Medicine. Role of glycosylation in cardiovascular, pulmonary, renal, gastrointestinal, skin, and psychiatric diseases
13. Chemical and biological methods in Glycobiology. Isolation and purification of polysaccharides, glycoproteins, and proteoglycans. Biomedical experimental approaches for studying changes in glycosylation. Structural studies of glycan-containing metabolites by chromatography, mass spectrometry, and nuclear magnetic resonance spectroscopy. Genetic mutation research and bioinformatic analysis. Development of glycan-containing diagnostic laboratory tests. Preparation of new glycosylated therapeutic molecules by chemical and enzymatic synthesis. Therapeutic inhibition of enzymatic glycosylation

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Students can use any other textbook in Glycobiology and related disciplines covering above topics.

Compiled by: ....

(Assoc. Prof. Yordan Georgiev, PhD)

Approved by a decision of the Council of the Department of Physiology, Pathophysiology, Chemistry and Biochemistry, Protocol №8/09.07.2024.

Head of Department .....

(Assoc. Prof. Yordan Georgiev, PhD)

Approved by a decision of the Faculty Council of the Medical Faculty, Protocol №. 10.. 11.07.2024.

Secretary of the Council of the Medical Faculty: ... .

(Chief assist. Prof. Ruska Nenkova, PhD)

UNIVERSITY "PROF. DR. ASSEN ZLATAROV" – BURGAS

MEDICAL FACULTY

DEPARTMENT OF ANAESTHESIOLOGY, OBSTETRICS & GYNECOLOGY, SURGERY, ORTHOPEDICS, TRAUMATOLOGY, UROLOGY, NEUROSURGERY, EMERGENCY AND INTENSIVE CARE

Approved by:
DEAN:
/Prof. Rumyana Yankova, PhD/

SYLLABUS

Discipline:	**MARITIME MEDICINE**
Specialty:	**MEDICINE**
Professional field:	**7.1 Medicine**
Educational qualification degree:	**MASTER**
Form of training:	**REGULAR**

Burgas, 2024

EXTRACTS FROM THE CURRICULUM

1. GENERAL PARAMETERS OF THE DISCIPLINE			
Total (academic hours):	90	**ECTS:**	3
Auditorium classes	**Non-auditorium classes**	**Auditorium ECTS**	**Non-auditorium ECTS**
45	45	1.5	1.5
Type of Discipline	**Number of hours per week: /lectures + practical session/**	*Course:*	*Semester:*
Elective	1+2	**II**	3

2. STUDY FORMS					
Auditorium classes:	**Academic hours**	**ECTS**	**Non-auditorium classes:**	**Academic hours**	**ECTS**
Lectures	15	0.50	Consultations	15	0,50
Seminars	15	0.50	Individual work	30	1,00
Practical lessons	15	0.50			

3. ASSESSMENT AND CONTROL	
Forms of assessment and control	**Relative share in the total score**
Sessional evaluation: exam	0.4
Semester (ongoing) assessment:	0.6
Forms of semester control:	
- Attendance at classes	0.5
- Active participation in classes	0.5

ANNOTATION

of the discipline "MARITIME MEDICINE"

Purpose of the course

The "**Maritime medicine**" course is intended for students of the specialty "Medicine" educational qualification degree "Master" in their second year of study in full-time form and it is elective.

The **Objectives** of the "Maritime medicine" course are related with educating of the students with the basic principles of providing medical assistance to patients located in the seas and oceans. Students learn how to apply the acquired medical knowledge and skills in specific marine environment.

The **Tasks** carried out with the acquisition of the knowledge on "MARITIME MEDICINE" by the students is related to the development of skills for providing of first aid, taking care and rescuing the seafarers, by learning and mastering of specific algorithms of behaviour included in the curriculum of the discipline. The application of the acquired theoretical and practical skills in extreme conditions is a challenge for every medical specialist, providing medical and paramedical care.

The learning of the study material will provide students with sufficient knowledge necessary for their future activities as specialists in the field of health care of seafarers and their professional development.

Structure of the learning content: Lectures, seminars and practical lessons

Methods of teaching: The teaching methods are similar to the methods of work of the university teachers and students, in mastering of knowledge, skills and habits and development of the world view of the students as well as their abilities as specialists. Mathods applied in the reaching of the discipline "MARINE MEDICINE" are: lectures with discussion; interactive methods – heuristic talk, brainstorming, visualization and discussion. A multimedia projector is used to present the lectures. The whole group performs tasks under the guidance of the teacher. Students familiarize themselves with the theoretical part in advance. Each lecture ends with a small test on the study information from the previous one. Certification for the lectures is given only if the student has attended all the lectures and has shown skills of interest in the taught material.

Forms of education: The study of the discipline is organized in the following forms:

1. Lectures in which is given the basic theoretical knowledge on the studied topics. For some of the topics and subtopics that can be studied independently by the students, the lectures are introductory, they reveal the essence of the questions falling within their scope and provoke independent work with the recommended literature's sources. The lectures are accomplished with discussions on theoretical issues, solving of tasks related to the practical application of the methods, didactic tests and case studies, etc.

2. Consultations for clarification of the basic concepts, their statistical characteristics and specific features, for overcoming of any difficulties in independent work, etc.
3. The independent work of the students is organized through consultations in the teachers' reception hours, through e-mail communication, joint work on scientific and professional tasks, covering current tests on a given topic by the teacher conducting the exercises, etc.

Assessment methods

№	Form of semester control of evaluation "Exam"	Points (K_1)
1.	Attendance at classes	50
2.	Active participation in classes	50
3.	Abstract	0
	Total:	100

№	Evaluation forms	Written with an interview or test	Points (K_2)
Variant 1 – Written exam on two questions from the examination questionnaire and interview			
1.	Question № 1 – from section I of the conspectus (1 – 22 questions)		50
2.	Question № 2 – from section II of the conspectus (23 - 45 questions)		50
Variant 2 – Test with questions covering all topics from the examination questionnaire			
1.	Test		100

The final grade for the course is formed as a total result of the semester and sessional evaluation, taking into account their relative share in the overall grade according to the following formula:

$$\text{Final Grade } (\mathbf{K}) = 0{,}4 * K_1 + 0{,}6 * K_2$$

Final grade in points	Up to 49	50 to 61	62 to 74	75 to 88	89 and more
Final grade in points within the six grade system	Poor (2)	Below average (3)	Good (4)	Very good (5)	Excellent (6)

Expected results

After successfully completing the course in the discipline, students should know and be able to use the basic terminology in the field of research thesis development. Studying of the educational material will provide students with sufficient knowledge necessary for their future activities as specialists in the field of managing their own potential as professionals in taking care and rescuing the seafarers.

CURRICULUM CONTENT

LECTURES

№	Theme of the lecture	Duration
1	Structure and functions of the human body	1
2	Anamnesis and examination of the patient	1
3	Basic aspects of patient care	1
4	First aid. Drowning	1
5	Poisoning on board	1
6	Heat and sunstroke. Medical care for castaways	1
7	Mental and neurological diseases	1
8	Sexually transmitted diseases. Skin diseases. Infectious diseases	1
9	Dressings and bandaging. Minor surgeries. Wounds.	1
10	Sea sickness	1
11	Telemedicine. Medical advice and evacuation	1
12	Death at sea	1
13	Control of hygiene on board of the ship	1
14	Prevention (prophylaxis) of diseases	1
15	Ship's pharmacy	1
	TOTAL:	**15 classes**

PRACTICAL SESSIONS

№	Topic	hours
1	Blood and urine test	1
2	Cardiopulmonary resuscitation (CPR). Pediatric emergency	1
3	Alcohol and drug abuse	1
4	Polytrauma. Head and spine injuries. Fractures, sprains and muscle injuries. Chest trauma	1
5	Bleeding	1
6	Shock	1
7	Thermal trauma. Combustion	1
8	Diabetes mellitus	1
9	Diseases of the urogenital system	1
10	Pregnancy and childbirth	1
11	Abdominal pain. Pain relief	1
12	Surgical instruments	1
13	Dental care	1
14	Aseptic and antiseptic	1
15	Hyperbaric oxygenation	1
	TOTAL:	**15 classes**

EXAMINATION QUESTIONNAIRE

1. Structure and functions of the human body
2. Anamnesis and examination of the patient
3. Examination of blood and urine
4. Basic aspects of patient care
5. First aid care
6. Cardiopulmonary resuscitation (CPR)
7. Pediatric emergency
8. Poisoning on the board of the ship
9. Abuse of alcohol and drugs
10. Polytrauma
11. Injuries to the head and spine
12. Fractures, sprains and muscle injuries
13. Chest trauma
14. Bleeding
15. Shock
16. Thermal trauma. Combustion
17. Heat and sunstroke
18. Medical care for shipwrecked persons
19. Drowning
20. Diseases of the eye
21. Diseases of the ears, nose and throat
22. Diseases of the respiratory system
23. Diseases of the heart and cardiovascular system
24. Diseases of the digestive system and abdominal organs
25. Diabetes mellitus
26. Mental and neurological diseases
27. Diseases and the urogenital system
28. Sexually transmitted diseases
29. Skin diseases
30. Infectious diseases
31. Pregnancy and childbirth
32. Abdominal pain
33. Pain relief
34. Surgical instruments
35. Dressings and bandaging
36. Minor surgical interventions. Wounds
37. Dental care
38. Seasickness
39. Telemedicine. Medical advice and evacuation
40. Death at sea
41. Control of hygiene on board the ship
42. Asepsis and antiseptics
43. Prevention (prophylaxis) of diseases
44. Ship's pharmacy
45. Hyperbaric oxygenation

LITERATURE

Mandatory

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Author: .....

(Prof. Dr. Hristo Bozov, MD)

The syllabus is approved by a decision of the Council of the Department of Anaesthesiology, Obstetrics & Gynecology, Surgery, Orthopedics, Traumatology, Urology, Neurosurgery, Emergency And Intensive Care, Protocol № 11/06.11.2024

Head of the Department:

(Assoc. Prof. M. Mirinchev)

The syllabus is approved by a decision of the Faculty Council of the Medical Faculty, Protocol № 15/ 12.11.2024

Secretary of the Council of the Medical Faculty: ..

(Chief Assist. Prof. Ruska Nenkova, PhD)

UNIVERSITY "PROF. Dr. ASEN ZLATAROV" - BURGAS

FACULTY OF MEDICINE

DEPARTMENT OF "INTERNAL DISEASES, SOCIAL MEDICINE, EMERGENCY MEDICINE, PHYSIOTHERAPY AND REHABILITATION"

Approved by!

DEAN:

/Prof. Rumyana Yankova, PhD/

SYLLABUS

Study discipline:	**DIGITAL HEALTH AND TELEMEDICINE**
Specialty:	**MEDICINE**
Professional direction:	**7.1. MEDICINE**
Educational and qualification degree:	**MASTER**
Form of education:	**REGULAR**

BURGAS 2025

SAMPLES FROM THE CURRICULUM

1. GENERAL PARAMETERS OF THE DISCIPLINE			
Total (academic hours):	60	**ECTS:**	2
Auditorium classes	**Non-auditorium classes**	**Auditorium ECTS**	**Non-auditorium ECTS**
30	30	1	1
Type of Discipline:	**Academic hours per week: /lectures + practices/**	*Course:*	*Semester:*
MANDATORY	1+1	**II**	***IV***

2. STUDY FORMS					
Auditorium classes:	**Academic hours**	**ECTS**	**Non-auditorium classes:**	**Hours**	**Credits:**
Lectures	15	0.5	Consultations (work with a teacher)	10	0.3
Seminar classes	15	0.5	Independent work	20	0.7
Practical classes	—	—			

3. EVALUATION AND CONTROL	
ASSESSMENT AND CONTROL FORMS	**Relative share in the total assessment**
Sessional evaluation: exam	**0.4**
Semester (ongoing) assessment:	**0.6**
Forms of semester control:	
- Attendance at classes	0.25
- Ongoing testing before each practical lesson	0.125
- Active participation in classes	0.125
- Control and tests	0.25
- Defense of protocols	0.25

ANNOTATION

of the course "Digital Health and Telemedicine"

Purpose of the course

The course "Digital Health and Telemedicine" is intended for students of the 2nd year, educational and qualification degree "Master", specialty "Medicine". Digital health, artificial intelligence, telemedicine, portable sensors, virtual reality – these new technologies will completely change the way patients and doctors perceive healthcare. These new technologies will significantly affect medical practice and the provision of healthcare in the near future. Additionally, the coronavirus pandemic has caused an explosive increase in the need for digital services, including those related to health and medicine. The course examines these new directions in medical science and their practical application

Objectives

To acquire knowledge in the field of digital health, telemedicine, artificial intelligence, virtual reality and their application in medicine and healthcare

Structure of the learning content

- lecture
- seminars
- discussions
- individual and group practical tasks
- analysis of ready-made statistical information, research of scientific literature

Teaching aids:

Multimedia presentations, discussions, solving practical - clinically oriented tasks.

Assessment of acquired knowledge.

When assessing the knowledge of students, a combination of modern and classical methods is applied.

Current control:

- Oral questioning during the practical session
- Seminars - practical testing and test part

Expected results

After completing the training, students should have the following knowledge and skills:

- Digital health, telemedicine, artificial intelligence, virtual reality and their application in medicine and healthcare

CURRICULUM CONTENT:

THEMATIC LECTURE PLAN

1.	Telemedicine – essence, history, challenges	2 hours
2.	Modern aspects of digital health – digital transformation of healthcare and medicine	2 hours
3.	Prospects and future application of digital technologies and telemedicine in medicine and healthcare	1 hour
4.	Digital health and artificial intelligence, virtual reality - prospects for their application in medicine and healthcare	2 hours
5.	Digital health and telemedicine as a means of dealing with socially significant diseases	2 hours
6.	Digital health and telemedicine as a means of dealing with the epidemic situation caused by COVID-19	2 hours
7.	The technological future of medical specialties	2 hours
8.	Digital health technologies that will change the activities of healthcare professionals	2 hours
	TOTAL	15hours

THEMATIC PLAN OF SEMINAR CLASSES AND PRACTICAL EXERCISES

1.	Introduction and relevance of the topic	1 hour
2.	Digital health and telemedicine - essence, history	2 hours
3.	Digital transformation in healthcare	2 hours
4.	Digital health and artificial intelligence, virtual reality - prospects for their application in medicine and healthcare	2 hours
5.	Modern digital trends that will change future cancer care	2 hours
6.	Digital health and telemedicine as a means of dealing with socially significant diseases	2 hours
7.	Digital health and telemedicine as a means of dealing with the epidemic situation caused by COVID-19	2 hours
8.	The technological future of medical specialties, removing barriers in healthcare with 3D printing	2 hours
	TOTAL	15 hours

DISCIPLINE SUMMARY

„Digital Health and Telemedicine"

specialty "Medicine"

Educational and qualification degree "MASTER",

1. Telemedicine - essence, history, challenges
2. Modern aspects of digital health - digital transformation of healthcare and medicine
3. Prospects and future application of digital technologies and telemedicine in medicine and healthcare
4. Digital health and artificial intelligence, virtual reality - prospects for their application in medicine and healthcare
5. Digital health and telemedicine as a means of dealing with socially significant diseases
6. Digital health and telemedicine as a means of dealing with the epidemic situation caused by COVID-19
7. The technological future of medical specialties
8. Digital health technologies that will change the activities of healthcare professionals in the future

LITERATURE:

Mandatory:

1. Lecture course in electronic form on Digital Health and Telemedicine – Assoc. Prof. Dr. Vl. Gonchev
2. Gonchev, V., Review of some modern applications of digital technologies in medicine and healthcare, University Publishing House "Prof. Dr. Asen Zlatarov", 2021 ISBN 978-619-7559-16-3
3. Gonchev, V., Digital health trends in 2021. Blach Sea Journal of Medicine and Public Health 2021, ISSN 2738-8654 Vol. 4, 2022, 94-101
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10. Mesko, B., Dhunn, Pr., The Technological Future of Medical Specialties, The Medical Futurist 2021
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12. Topol, Eric. The creative destruction of medicine: how the digital revolution will create better health care. New York: Basic Books. 2012 ISBN 978-0465025503

Recommended:

1. Vinarova Zh., M. Vukov, Textbook of Telemedicine, ISBN 954-535-269-8, NBU Publishing House, Sofia, 2002
2. Vinarova, Zh., P. Mihova, CD "Workshop MIS Svogia" ISBN 954-535-424-0
3. Mihova, P., Telemedicine Functions of a Medical Information System Sofia, 2014
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10. Karadjova, Zl., Gonchev, V., Possibilities for the application of digital health and telemedicine in medical tourism in the context of the Covid 19 pandemic, journal "Health Policy and Management" issue 20, 2020, ISSN 1313 – 4981 pp. 229-232

Compiled by: .....

/Prof. Vladimir Gonchev MD, PhD/

The curriculum for the discipline "Digital Health and Telemedicine" for the specialty "Medicine" was adopted at a meeting of the Department of " Internal Diseases, Social Medicine, Emergency Medicine, Physiotherapy And Rehabilitation ", Minutes No. of 18.01.2025г.

Head of Department:

/Prof. Vladimir Gonchev MD, PhD/

The curriculum was adopted and discussed at the Faculty Council of the Faculty of Medicine, Minutes No. 18 of 13.01.2025г.

Scientific Secretary of the Faculty: .....

(Senior Asst. Prof. Dr. Ruska Nenkova)