PROF. DR. ASSEN ZLATAROV UNIVERSITY - BURGAS MEDICAL FACULTY DEPARTMENT OF PHYSIOLOGY, PATHOPHYSIOLOGY, CHEMISTRY AND BIOCHEMISTRY

Approved by

DEAN:

/Assoc. Prof. Rumyana Yankova, PhD/

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SYLLABUS

Discipline:

ASSESSMENT OF THE CHEMICAL FACTORS IN THE ENVIRONMENTAL AND WORKING ENVIRONMENT

Specialty:

MEDICINE

Professional field:

7.1. Medicine

Educational and qualification MASTER degree:

Form of training:

REGULAR

Burgas, 2024

Page 1 of 6

EXTRACTS FROM THE CURRICULUM

Total (academic hours):		90		ECTS:	3	
Auditorium classes	Non-	auditoriu classes	m	Auditorium ECTS	Non-auditorium ECTS	
45	1	45		1.5	1.5	
Type of Discipline:	Academic h /lectures + j	ic hours per week: s + practices/ Course:		Semester:		
Elective		1 +2		I	п	
2. STUDY FO	ORMS					
Auditorium classes:	Academic hours	ECTS	Non-auditorium classes:		Academic hours	ECTS
Lectures	15	0.75	Consultation		10	0.5
		Individual work - Preparation of proto-		20	0.5	
Practices	30	0.75	- Preparing a presenta- tion		15	0.5
3.EVALUATI	ON AND C	ONTR	OL			
Forms of evaluati	on and control		brook () warn		Relative s the total	hare in score
Sessional evaluation: exam					0.4	
Semester (ongoing) assessment:				· 0.6		
Forms of semester	r control:					
- Attendance at classes				0.25		
- Ongoing testing before each practical lesson				0.25		
- Active participation in classes			0.25			
 Presentation on a 	scientific probl	em			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, selfcontrol.

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 environ- mental education	1
2. Environmental education - health education. Formation of environmental compe- tences 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, chem- ical 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 - wa- ter, food, soil, air, etc. Assessment of harmful chemical factors and ways of their utilization	2
9. Environmental pollution - causes, consequences and trends - sustainable devel- opment. 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 physicochemi- cal 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. In- troduction 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, con- trol, 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 pollu- tants. 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 at-tack; 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

- Peter O'Neill, Environmental Chemistry, 1998, Tomson Science, Germany, ISBN 9780751404838.
- Connell, D.W., 2005. Basic concepts of environmental chemistry. CRC Press, ISBN 9781566706766.
- 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 No...3.1.15.01.20205.

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

(Chief assist. Prof. Ruska Nenkova, PhD)

UNIVERSITY "PROF. DR. ASSEN ZLATAROV" - BURGAS

MEDICAL FACULTY

DEPARTMENT OF NEUROLOGICAL DISEASES, PSYCHIATRY AND PSYCHOLOGY

APPROVED BY THE DEAN

/Assoc. Prof. R. Yankova, PhD/

DISCIPLINE

Subject: VERBAL AND NONVERBAL DOCTOR-PATIENT COMMUNICATION Speciality: 7.1. MEDICINE Field of higher education: 7. HEALTH CARE AND SPORTS Education and qualification degree: MASTER Form of education: REGULAR

> Burgas 2024

General educa employme (hours):	itional nt	90		Credits:		3		
Auditorial	Extr	racurricula		Extracurricula		a Auditorial		
45		45	1.50 L		Extracu	urricula 50		
Type of subject:	Number week: /le seminars	of hours ctures + +practica	per ls/	Course:	Seme	ster:		
Задължителна		1+1+1		1	1	5		
	2. E	DUCAT	ION	L FORMS				
Auditorial:	Hours	Credits	Extra	Extracurricula:		Credits		
Lectures	15	0,50	Consultations (work with a teacher)		10	0,33		
Seminars	15	0,50						
Practices	15	0,50	Self-study - Referencing a scientific text - Course project		25 10	0,83 0,34		
	3.ASSE	SSMEN	TAN	D CONTROL				
A	ssessment	and contro	ol form	8	Rela proportion total ass	tive on in the essment		
Sessional Assessment: Exam				0.4				
Current assessment:				0.6				
Attendarge	control:							
Preparation of an obstract of a minute and active participation in classes			0,2					
- Course project			0,4					
e cause project			0,4					

EXTRACTS FROM THE CURRICULUM

ANNOTATION

The academic discipline "Verbal and nonverbal doctor-patient communication" is an elective subject from second list and is intended for the students of the specialty "Medicine", first year, EQD "Master", full-time form of education.

Aims

The main goal of the course is to form basic knowledge and skills in the field of verbal and non-verbal communication in medical practice. The aim of the education is to help the students to master communication skills, such as verbal and nonverbal techniques, active listening, managing conflict, public speaking. The knowledge corresponding to the studied discipline can be used in medical practice by completing the following educational tasks:

- Effective communication management;

- Understanding nonverbal behavior in clinical interactions;

- Building a comprehensive verbal and nonverbal behavior adequate to the situation, the patient or the audience by mastering various communication techniques that enhance the discussion culture

Structure of the learning content

The discipline has a pronounced scientific and applied orientation. The content of the course is related to three main directions: theoretical aspects of communication with a focus on verbal communication in medical practice; nonverbal communication - modalities and barriers in communication in doctor - patient interaction; creating a good emotional climate.

Practicals are in the field of applied clinical communication. Psychological and sociolinguistic factors specific to verbal clinical communication are presented, which influence the effectiveness of communication in diagnosis, treatment and propaedeutics. Specific nonverbal factors are studied to improve verbal communication in the clinics. The focus of training is also on listening, speaking and perception skills as the main factors for effective communication.

Teaching methods

In the learning process, a central place is given to lectures and practical classes as the main organizational forms, in which a variety of learning methods are offered (presentations, discussions and debates, case work).

Significant attention is also given to working in small groups, case studies and role-plays, project work and research tasks are offered within the practicals.

Forms of self-study

Working with information sources (specialized literature, electronic resources, Internet sources), referencing scientific text, development of a course project.

Assessment methods

The course finishes with a written exam (test). The evaluation is formed by three components: current evaluation of the work in the classes, referencing of the text and presentation of the course project; assessment from a written exam (test).

Prerequisites for students' basic knowledge and skills

The discipline is elective and there are no requirements for the students' prior preparation.

Expected results

The expected learning outcomes are aimed at students acquiring basic knowledge and skills in the field of verbal and nonverbal communication.

- To be able to solve communication problems in clinical settings;
- To be able to prepare and participate in various verbal presentations presentation of course projects;
- To increase the level of decoding skills of nonverbal behavior, as well as to increase own nonverbal competence.

CONTENT OF THE CURRICULUM A. Lectures

1. Main characteristics of communication He	ours:
Meaning and characteristics of communication. Components of the communication process	
2. Types of communication.	
Interpersonal communication. Nonverbal communication	-
Written communication. Oral communication.	-
3. Views of communication. The interaction model of communication. Information transfer. Interactional context of communication.	2
4. Perception in communication.	_
Interpersonal perception. Causal attribution.	- ²
Categorization and stereotyping. Prejudices.	_
5. Basic communication skills. Social competence. Cultural competence	- 2
Active listening and effective feedback.	
6. Nonverbal communication and body language.	_
Types and functions.	-1
7. Effective communication in conflict resolution	
Conflict management styles.	-1
8. Doctor-patient communication. Barriers to effective communication with the patient.	ith 2
First impression. Building a trusting relationship with a patient.	-
9. Telemedicine and doctor-patient communication.	1
Total: 15 hours	5

B. SEMINARS	
Topic: Ho	urs.
 Personal communication skills - sharing and analysis. 	and,
2. Basic communication skills. Social competence.	
3. The process of communication and interaction between doctor and patient.	
4. Nonverbal vocal expressions. Kinesic communication.	
5. Proxemics and communication. Types of personal space. Professional and personal boundaries.	
 Emotional competence in good medical practice. Definitions of emotions. Emotional competence abilities. 	
7. Conflict management.	
Total: 15 ho C. PRACTICALS:	urs
Горіс: Ног	irs:
. A study of nonverbal communication knowledge.	
. Exercises to develop presentation skills.	-
. Exercises to develop emotional competence.	-

COURSE PROJECT

A list of individual assignments related to the lectures is offered, which are prepared and presented within the semester.

LITERATURE FOR SELF-STUDY

Mandatory

- 1. Pease, B. & A. Pease. (2006). The definitive book of body language: The hidden meaning behind people's gestures and expressions. Bantam.
- 2. Lloyd, M. et all. (2018). Clinical communication skills for medicine. Elsevier.
- 3. Balint, J. (2000). The doctor, his patient and the illness. Second ed. Churchill Livingstone

Recommended

- Dott, C., Mamarelis, ., Karam, E., et al. (March 13, 2022). Emotional Intelligence and Good Medical Practice: Is There a Relationship?. Cureus 14(3):e23126. DOI 10.7759/cureus.23126
- Johnson, DR. (Dec. 6, 2015). Emotional intelligence as a crucial component to medical education. Int J Med Educ., 6:179-83. doi: 10.5116/ijme.5654.3044. PMID: 26638080; PMCID: PMC4691185.

Authors: ... (Prof. Dr.G. Panov MD, PhD, DSs) ... (Assoc. Prof. B. Tsonkova, PhD)

The curriculum was discussed and adopted at a meeting of the Department of "Nervous Diseases, Psychiatry and Psychology", protocol No.7 of 22.03.2024.

Head of Department: (Prof. Dr. G. Panov, MD, PhD, DSs)

The curriculum was adopted and discussed at the Faculty Council of the Faculty of Medicine, protocol No. 5 from 23.93 24

Scientific Secretary of the Faculty of Medicine: .. (Chief Assist. Prof. R. Nenkova, PhD)

UNIVERSITY "PROF. DR. ASSEN ZLATAROV" - BURGAS

MEDICAL FACULTY

DEPARTMENT OF NEUROLOGICAL DISEASES, PSYCHIATRY AND PSYCHOLOGY



DISCIPLINE

Subject: STRESS AND MENTAL HEALTH Speciality: 7.1. MEDICINE Field of higher education: 7. HEALTH CARE AND SPORTS Education and qualification degree: MASTER Form of education: REGULAR

> Burgas 2024

General education employment (hours):	al	90		Credits:		3
Auditorium employment	Extracuri	ricular ent		Auditorium employment	Extracurricular employment	
45		45		1.5	1.5	
Kind of the discipline	Number of week: /leo exercises/	of hours pe etures +	r	Course:	Semester:	
Selectable		1+2		I	1	п
Auditorium employment	Hours	Credits:	Ea en	xtracurricular iployment	Hours	Credits
Lectures	15	0.75	Consultations (work with a teacher)		10	0.50
Practical classes	30	0.75	Independent work - Preparation of an abstract		5 30	0.25 0.75
3. EVALUATIO	N AND CO	NTROL	1000 July			The second s
Assessment and control forms				Relative share i the total assessment		
Sessional Assessment: Exam				0.4		
Semester (current) assessment:				0.6		
Forms of semeste	er control:					
- Attendance at classes				0.25		
- Current sustenance before each exercise			0.25			
- Active participation in classes				0.25		
- Protocol protection					0.25	

EXTRACTS FROM THE CURRICULUM

ANNOTATION of the discipline "Stress and Mental Health"

Purpose of the course:

This course is addressed to students of medicine and other medical specialties, with an orientation to deal with the stressors that arise during separation from the family environment, training, realization and others. The main emphasis falls on strategies to cope with stress, not only during students' studies, but also to maintain mental health in general.

Course Objective:

The curriculum in "Stress and Mental Health" consists of two relatively independent, but at the same time related disciplines. They are successively presented to the students. The aim of teaching the discipline is to prepare students to use an easy, organized tool that provides access to proven methods and tools for dealing with stress in the everyday life of the modern person.

Main tasks of the curriculum:

The training covers the main topics related to stress such as paradigm, its essence, typology, psychophysiology, manifestations and consequences. Stress at the workplace is among the most serious challenges for maintaining the health and well-being of workers. Students are extensively introduced to the concept of "stress", as well as what the consequences would be for a person's mental health, if timely measures are not taken to deal with it. In the current course, special attention is also paid to stress and traumatic life experiences, as factors related to oncological diseases. In the form of a discussion and different types of questionnaires, the state of distress is assessed.

Structure of learning content:

- Stress: essence, theories, manifestations and consequences.
- Burnout syndrome: essence, factors for the occurrence and development of consequences.
- Psychosocial distress in cancer patients. methods for diagnosis of distress.
- Recommendations for dealing with distress in everyday life and in the workplace.

Teaching methods: traditional and innovative methods of teaching, lecture, talk, discussion, multimedia presentation, teamwork and more.

Forms of independent work: term paper of reference type, tasks for self-solving on topics from practical classes, solving tests, colloquiums.

Methods of evaluation: ongoing control in conducting classes, conversation, final control test exam and abstract protection.

Preliminary requirements for the basic knowledge and skills of students: Students should have good basic knowledge of psychology and philosophy from the high school course.

Expected results:

After successful completion of the course in the discipline, students must: - to form psychological knowledge and competences to properly assess the stress and ways of dealing with it. - have the skills needed to find solutions to specific problems, to perform basic operations and procedures for impact on mental health. - have mastered competencies for scientific explanation of the influence of stress factors, for the application of various techniques

for coping and mastering stress, competences for monitoring, modeling, analysis, development of logical and creative thinking, development of independence, teamwork, self -control

CONTENT OF THE CURRICULUM PROGRAM Lectures

Topic	hours
1. Etymology and definitions of the term "stress". Typology of stress. Psychophysiology of stress. Stress theories. Theory of general adaptation syndrome. Energy theory for adaptation. Stress theory as a cognitive process.	3
2. Difference in symptoms of distress, anxiety and depression. Stress and personality. Type A theory and Type B behavior. Behavioral model "personality resistance". Stress as a diagnosis. Acute stress reaction. Post -traumatic stress disorder. Adaptation disorders. Stress and social factors.	3
3. Etymology and definitions of the concept of "Burnout". Burnout syndrome as a diagnosis. Psychophysiology of Burnout Syndrome. Symptoms of overheating.	3
4. Factors for the onset of Burnout Syndrome. Risk groups. Burnout syndrome as a dynamic process. Burnout syndrome as a progressive disappointment. An algorithm for prevention and dealing with Burnout Syndrome.	3
5. Psychosocial distress in cancer patients. Diagnosis of distress in patients with cancer. Suicidal ideas and suicidal risk.	3
Generally:	15 ч

Seminars and exercises

Topic	hours
1. Psychosocial risks and stress at work. Symptoms of stress. Self -assessment test. Test at your level of stress. (seminar-exercise)	2
 Ways to deal with stress. Stress techniques. Giving up the topics for abstracts. (seminar) 	2
3. How to recognize and deal with Burnout Syndrome. Dealing with the problem. (seminar)	2
4. Psychological test to check the level of the Burnout. Recovery after diagnosis "Burnout". (exercise)	2

5. Colloquium of etymology and definitions of the term "stress". Typology of stress. Psychophysiology of stress. Stress theories. Theory of general adaptation syndrome. Energy theory for adaptation. Stress theory as a cognitive process. Etymology and definitions of the concept of "Burnout". Burnout syndrome as a	2
diagnosis. Psychophysiology of Burnout Syndrome.	
6. Methods for diagnosis of distress. Social adaptation scale Life Change, Index Scale, PSI-4- Parental Stress Index. The Hoard Glaser questionnaire "Stress Control Type A and Type B" (Discussion - Exercise)	2
7 Resistance Test: Behavioral Model Personality Resistance Hardy Personality.	2
Distress thermometer. (exercise)	
8. Stress Symptom Checklist. Biofeedback method (seminar-exercise)	2
9. Recommendations for dealing with distress in everyday life and at work. A twide -and -one steps toward a healthy lifestyle. Algorithm for changing type A behavior. (prejudice)	2
10. Strategies and techniques for the prevention and management of distress. (exercise)	2
11. Influence of the diagnosis of "cancer" on the mental health of the person. (seminar-discussion)	2
12.Suicidal ideas and suicidal risk in cancer patients. (seminar-discussion)	2
13. Care for patients with advanced cancer. (seminar-discussion)	2
14. Solving medical cases. (Discussion)	2
15. Presentation and protection of abstracts	2
Общо:	30 часа

Synopsis

For the Stress and Mental Health exam for students in the specialty "Medicine"

1. Etymology and definitions of the term "stress". Typology of stress. Psychophysiology of stress.

2. Stress theories. Theory of general adaptation syndrome. Energy theory for adaptation. Stress theory as a cognitive process.

3. Difference in symptoms of distress, anxiety and depression. Stress and personality. Type A theory and Type B behavior. Behavioral model "personality resistance".

4 Stress as a diagnosis. Acute stress reaction. Post -traumatic stress disorder. Adaptation disorders. Stress and social factors.

5. Etymology and definitions of the concept of "Burnout". Burnout syndrome as a diagnosis. Psychophysiology of Burnout Syndrome. Symptoms of overheating.

6. Factors for the onset of Burnout Syndrome. Risk groups. Burnout syndrome as a dynamic process.

7. How to recognize and deal with Burnout Syndrome. Dealing with the problem. Recovery after diagnosis "Burnout".

8. Burnout syndrome as a progressive disappointment. An algorithm for prevention and dealing with Burnout Syndrome.

9. Psychosocial distress in cancer patients. Diagnosis of distress in patients with cancer.

10. suicidal ideas and suicidal risk.

Preparation literature

1. Anakiev, Yu., Textbook for students ed. Plovdiv, Paisii Hilindarski, 2021.

2.Dreeva, L. Psychology of Knowledge, Lik.

3. Promoting mental health at work. Guide to apply a complex approach. EU Publication Service, 2017.

4. Daskalova, F.SOS- Stress, Bonn, 2014.

5. Milev, V., Milev R. Mental Health, Current Problems, Balkan Press., 1994.

6. Online Mental Health magazine, Main IC.

Compiled the curriculum:

(Prof. Dr. G. Panov MD PhD DSc)

The curriculum was discussed and adopted at a meeting of the Department of "Nervous Diseases, Psychiatry and Psychology", protocol No.7 of 22.03.2024.

Head of Department: .

(Prof. Dr. G. Panov, MD, PhD, DSs)

The curriculum was adopted and discussed at the Faculty Council of the Faculty of Medicine, protocol No. 5 from 27.93.2024

Scientific Secretary of the Faculty of Medicine: ... (Chief Assist. Prof. R. Nenkova, PhD)

PROF. DR. ASSEN ZLATAROV UNIVERSITY - BURGAS MEDICAL FACULTY DEPARTMENT OF PHYSIOLOGY, PATHOPHYSIOLOGY, CHEMISTRY AND BIOCHEMISTRY

ounen "Ilpod. Irp Acen 3440 Approved by DEAN:

/Assoc. Prof. Rumyana Yankova, PhD/

SYLLABUS

Discipline:

RESEARCH METHODOLOGY

Specialty:

Professional field:

MEDICINE

7.1. Medicine

Educational and qualification MASTER degree:

Form of training:

REGULAR

Burgas, 2024

1

Total (academic hours):		90		ECTS:	3	
Auditorium classes	Non-	auditoriu classes	m	Auditorium ECTS	Non-auditorium ECTS	
45		45		1.5	1.5	
Type of Discipline:	Academic h /lectures +	ours per practices/	week:	Course:	Semester:	
Elective		1 +2		п	ш	
2. STUDY FO	RMS					
Auditorium classes:	Academic hours	ECTS	Non-auditorium classes:		Academic hours	ECTS
Lectures	15	0.75	Consul	tation	10	0.5
Practices	30	0.75	Individual work - Preparation of a com- munication on a scien- tific problem - Preparing a presenta- tion		20 15	0.5
3.EVALUATI	ON AND C	ONTR	OL			
Forms of evaluation	on and control				Relative s the total	hare in score
Sessional evaluation: exam				0.4		
Semester (ongoing) assessment:				0.6		
Forms of semester	r control:					
- Attendance at clas	sses				. 0.25	
- Ongoing testing before each practical lesson			0.25			
- Active participation in classes			0.25			
- Presentation on a scientific problem					0.25	

EXTRACTS FROM THE CURRICULUM

ANNOTATION of the discipline "Research Methodology"

Purpose of the course:

The course "Research Methodology" is pre-designed for the students of the specialty "Medicine", full-time form of study.

The aim of the Research Methodology course is to provide students with an understanding of how to participate in research projects, to encourage innovative thinking, and to acquire the skills to translate ideas into a well-structured and defensible research project.

Main tasks of the curriculum:

To be laid the foundations of the discipline "Research methodology", as follows: development of the methodology of scientific research and its non-information provision, the design and presentation of the research, development and funding of research projects as an opportunity to participate in student research sessions. The curriculum includes the problems of protection of scientific results as objects of intellectual property.

Preparation of a literature review, structuring of a scientific publication, report.

Structure of learning content:

- Research methodology
- Research technology

Teaching methods: traditional and innovative teaching methods, explanations, lectures, discussions, multimedia presentations, projects, teamwork, etc.

Forms of independent work: coursework, problems to be solved independently on seminar topics, solving tests, preparing presentations, abstracts/scientific reports, preparing scientific publications and projects.

Methods of evaluation: examination, lecture, final control - presentation of results of scientific research.

Prerequisites for students' basic knowledge and skills:

Students should have a good basic knowledge of Computer Science from high school.

Expected results:

Upon successful completion of the course, students must:

- Know the basic requirements of the normative documents regulating the procedures for developing and defending a scientific study.

- Be able to prepare materials for a report and presentation in the defense of their research.

- Prepare the results of their research for publication.

CURRICULUM CONTENT

LECTURES

Торіс	Hours
1. Research methodology. Nature of the scientific method and scientific research. Scientific ethics	1
2. The scientific theory. Scientific explanation and prediction	2
3. The problem of the universal scientific method, of the experimental repeatability of theory. Traditional concept of knowledge and scientific concept of knowledge	2
4. Developing the methodology of the research. Introduction to research methods	2
5. Aim, object and subject of the research	1
6. Study of scientific information	1
7. Formatting and presentation of a scientific paper	2
8. Development and funding of research projects	2
9. Scientific results as an object of intellectual property	1
10. Conditions for copyright in scientific results	1
Total:	15

SEMINARS AND EXERCISES

Торіс	Hours
1. Scientific results and scientific products. Main stages of scientific research	3
2. Scientific ethics. General concept of ethics, morality, applied ethics, professional ethics. Place of values in science, Ethics in science - values, norms, principles, practices, role of ethics in science. Typical ethical problems in science	3
3. Development of the methodology of scientific research. Selection of topic. For- mulation of the research problem. Significance. Relevance. Initial study of literature and factual sources. Working hypotheses. Probability of achieving new scientific and practical results	3
4. Aim, object and subject of the research. Characteristics of the research object. Selection of research methods. Development of a system of measures and indicators for analysis, evaluation and forecast of the object of study	3

5. Importance of the study of scientific information for scientific research. Working with catalogues and databases. Authoritative sources of scientific information. Results achieved and validated by the scientific community in a given field - review and summarize the achievements and contributions of other authors. Tracking the literature over time. Critical analysis of the literature. Publicly accessible information retrieval systems and databases on the Internet. The place of literature and data in research.	3
6. Formation and presentation of a scientific paper. Citation and bibliography archi- tecture. Formatting of the text - title and cover page, chapter and paragraph head- ings. Spacing, formulae, tables, diagrams, etc. Scientific and stylistic editing. Presentation of the scientific work	3
7. Mandatory attributes of a research project. Translating a research idea into a de- fensible research project proposal. Funding sources for research projects Establish- ing and managing a research team. Publication of project results in refereed scien- tific journals with impact factor	3
8. Scientific results as an object of intellectual property. Characteristics of scientific results determining the specificity of their ownership. Recognition of intellectual property rights over scientific results in international treaties and national legislation	3
9. Conditions for the emergence of copyright on scientific results. Content and duration of copyright. Author, authorship and co-authorship. Use of scientific results by the employer. Copyright contract and royalty. Free use of scientific results for academic other purposes	3
10. Presenting and defending a presentation on a scientific problem	3
Total:	30

BACKGROUND

for Research Methodology exam for students of the specialty "Medicine"

1. Research methodology. Nature of the scientific method and scientific research. Scientific ethics

2. Scientific theory and the problem of demarcation. Scientific explanation and prediction

3. The problem of the universal scientific method, the experimental repeatability of theory. Traditional concept of knowledge and scientific concept of knowledge

4. The development of the methodology of scientific inquiry. Introduction to research methods

5. Purpose, object and subject of scientific research

6. Study of scientific information

7. Formation and presentation of a scientific work

8. Developing and funding research projects

9. Scientific results as an object of intellectual property

10. Conditions for copyright in scientific results

BIBLIOGRAPHY

- Shanti Bhushan Mishra, Shashi Alok, Handbook of Research Methodology, 2017, Educreation, Delhi, ISBN: 978-1-5457-0340-3.
- Stuart MacDonald & Nicola Headlam, Research Methods Handbook, Centre for Local Economic Strategies Express Networks, Manchester M4 5DL, ISBN: 1870053656.
- Muhammad Mahboob Ali, Md. Kamrul Hossain, Instruction Manual: Research Methodology, volume 2, 2016, Office Manager, Institutional Quality Assurance Cell, Daffodil International University, ISBN: 978-984-34-1757-2.
- Muhammad Mahboob Ali, Md. Kamrul Hossain, Instruction Manual: Research Methodology, volume 2, 2016, Office Manager, Institutional Quality Assurance Cell, Daffodil International University, ISBN: 978-984-34-1757-2.

Students can use any other textbook in Research Methodology 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 Department

(Assoc. Prof. Yordan Georgiev, PhD)

Approved by a decision of the Faculty Council of the Medical Faculty, Protocol No. 3.1.15.02 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		orium
45	43	5		1.5	1.5		
Type of Discipline	Number of hour /lectures + pract	s per week: ical session/		Course:		Semeste	r:
Elective	1+	-2		П		3	
2. STUDY FOI	RMS						
Auditorium classes:	Academic hours	ECTS		Non-auditorium classes:	Aca hou	demic rs	ECTS
Lectures	15	0.50	Consultations			15	0,50
Seminars	15	0.50	Individual work			30	1,00
Practical lessons	15	0.50					
3. ASSESSMEN	NT AND CON	TROL					
Forms of assessment and control				Re tl	lative s he total	hare in 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:

 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

N⁰	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	Points (K ₂)					
Var	Variant 1 – Written exam on two questions from the examination questionnaire and interview						
1.	Question \mathbb{N}_2 1 – from section I of the conspectus (1 – 22 questions)50						
2.	Question \mathbb{N}_2 - from section II of the conspectus (23 - 45 questions)50						
Var	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:

Final Grade (**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	Poor (2)	Below average (3)	Good (4)	Very good (5)	Excellent (6)
system					

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

N⁰	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

N⁰	Торіс	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

- 1. Handbook of Marine Medicine 2018, First Edition. Military Medical Academy, 2018. Col. (or) prof. Dr. Hristo Bozov, dm. ISBN 978-619-7196-35-1, Pg. 1 468
- 2. Bozov H. Marine medicine in Bulgaria where and why? Collection of reports from the VII Conference of the "Bulgarian Association of Aviation, Marine and Space Medicine", Sofia 2008, 13-17.
- 3. Bozov H., Decompression sickness treatment tactics. News of the Union of Students Varna, "Medicine and Ecology" Series, 2/97, 1/98, 22-24.
- 4. Bozov H., Social adaptation of people affected by carbon monoxide and treated with hyperbolic oxygenation. Bulletin of the Union of Scientists Varna, "Medicine and Ecology" Series, 2/98, 1/99, 7-9.
- Bozov H., S. Alexandrov. Acute diving diseases epidemiological study for the period 1997-2000. Proceedings of the 4th National Conference on Aviation, Marine and Space Medicine, Varna 2001, 135-139.
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- Bozov H., Dankova P., Petrova M., Platikanov V., Yaneva M. Marine medicine a freely optional discipline in the curriculum of the Medical University "Prof. Dr. Paraskev Stoyanov" Varna. Aviation, Marine and Space Medicine, 2011, 2, 9-12.
- 9. Bozov H., Dankova P., Platikanov V., Yaneva M. Marine medicine as a free-but-elective discipline for medical students. Aviation, Marine and Space Medicine, 2011, 1, 45-48.
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Author:

(Prof. Dr. Hristo Bozov, MD)

Head of the Department:

(Assoc. Prof. N. Mirinchev)

The syllabus is approved by a decision of the Faculty Council of the Medical Faculty, Protocol $N_0 \dots 2024$

Secretary of the Council of the Medical Faculty:

(Chief Assist. Prof. Ruska Nenkova, PhD)



DEPARTMENT "PHYSIOLOGY, PATHOPHYSIOLOGY, CHEMISTRY AND BIOCHEMISTRY"

APPROVED BY! DEAN: / Prof. Rumyana Yankova, PhD/

SYLLABUS

Discipline: REPRODUCTIVE HEALTH

Specialty: MEDICINE

Professional field: 7.1. Medicine

Educational and MASTER qualification degree:

Form of training: REGULAR

Burgas, 2024

EXTRACTS FROM THE CURRICULUM

1. GENERAL PARAMETERS OF THE DISCIPLINE							
Total		90 ECTS :		3		3	
(academic ho	hours):			Auditorium	Nor	Non auditarium	
classes	Non-aud	itorium class	ses	FCTS	INOI	FC	IIIOFIUIII TS
45		45		15		1	5
Type of	Academic	hours ner w	eek	1.0			
discipline:	(lecture	es + practices	5	Course:		Seme	ester:
Elective		1+2		II		I	II
2. STUDY FO	RMS				-		
Auditorium classes	Academic hours	ECTS	ECTS Non-auditorium classes		Acader hour	nic s	ECTS
Lectures	15	0.75		Consultation	10		0.50
Seminars	30	0.75	Individual work - Preparation of presentation - Preparation of scientific communication		5 30		0.25 0.75
3. EVALUAT	ION ANI) CONTR	OL				
Form of evaluation and control				Относ обш	сите. (ата	лен дял в оценка	
Sessional evaluation: Exam						0.	4
Semester (ongoing) assessment:						0.	6
Forms of semester control:							
- Attendance of classes					0.25		25
- Ongoing testing before practical lesson					0.25		25
- Active participation in classes					0.25		
- Presentation on scientific problem						0.25	

ANOTATION OF DISCIPLINE "REPRODUCTIVE HEALTH"

Purpose of the course:

The course "Reproductive health" is designed for the specialty "Medicine", full-time form of study.

The aim of this course is to create holistic point of view on human sexuality and sexual and reproductive health, including its medico-biological, psycho-social and legal aspects.

Main tasks of the curriculum:

To create theoretical background of understanding human sexuality and sexual and reproductive health.

To form professional skills and values, linked with different aspects of sexual and reproductive health in the field of diagnostic process, therapeutic opportunities, promotion legislation and social policy.

To assist in building of personal qualities and competences in students, giving them abilities for successful dealing with most common problems and challenges, concerning sexual and reproductive health.

Structure of learning content:

- Basics of reproductive biology
- Physiology of male and female reproductive systems
- Main factors in sexual and reproductive health
- Clinical aspects of infertility
- Assessment and treatment approaches in dealing with reproductive problems

• Understanding complexities of interpersonal relationships in sexual couple and its challenges

• Perceiving a human reproduction as whole process, linked with bio-medical, psychosocial, cultural and political aspects

Teaching methods:

- Theoretical presentation of materials (lecturing)-
- Discussions
- Presentation of materials,
- prepared from students.
- Educational simulation of problem situation from practice

Forms of in depended work:

Preparation of task works on specific topics

Methods of assessment:

Assessment of work in class Assessment of learning tasks Assessment of written materials on examen

Prerequisites of student's basic knowledge and skills:

Student are expected to have basic knowledge in Biology, Anatomy, Physiology, Urology and Gynecology.

Expected results:

After finishing the course students are expected to have:

- Knowledge about sexual and reproductive health
- Skills and competences in clinical aspects of reproductive problems
- Understanding social, legal and political aspects of human reproduction
- Counseling skills in assessing and dealing of sexual problems and fertility problems

CURRICULLUM CONTENT

LECTURES

MEN'S REPRODUCTIVE HEALTH	
Lecturer: Prof. Petia Tzvetkova, DSci	
Торіс	hours
1. Spermatogenesis and spermiogenesis. Sperm - carrier of genetic information. Sperm' morphology and ultrastructure. Sperm's metabolism, bioenergy and kinetic. Ejaculate – physicochemical composition and environment of mature spermatozoa.	3
2. Biological and clinical factors and etiology of male reproductive health. Clinical integrity of male infertility.	2
WOMAN'S REPRODUCTIVE HEALTH	
Lecturer: Dr. Zlatko Kirovakov	
Торіс	hours
1. Factors of women's reproductive health. Sterility and infertility in women. Etiology, Prevention	2
2. Treatment and prevention of sterility. Reproductive failures. Prevention.	3
SEXUAL HEALTH	
Lecturer: Assoc. Prof. Dr. Rumen Bostandjiev, PhD	
Торіс	hours
 Meaning and role of sexuality in human life and in life of human society. Sexuality and health, personal development and professional realization. Sexual activities in context of family life, national tradition and prosperity. Sexology – integrative science for human sexuality. Basic theory of 	3 3
 sexuality – Theory of Bostandjiev-Geodakian. Development of interaction between man and woman in human society 3.Sexual response in man and woman. Double control system in regulation of sexual reactions. Classification of sexual dysfunctions 	3
 4. Sexual problems in man – diagnosis, etiology, treatment 5. Sexual problems in woman – diagnosis, etiology, treatment. Basics of couple and family therapy. Integrative and interdisciplinary approach to sexual 	3 3
problems Total:	15

SEMINARS AND PRACTISES

Торіс					
MEN'S REPRODUCTIVE HEALTH					
Lecturer: Prof. Petia Tzvetkova, DSci					
Торіс	hours				
1. Physiology of male sexual system. Endocrine regulation of spermatogenesis. Methods of investigation (seminar).	2				
2. Assessment of male fertility	3				
3. Family fertility. Безплодие в семейството. Standard for barren marriage. Classification of the concept of infertility. Frequency of fertility problems in the family.	3				
4. Reproductive health and demographic policy. Reproductive health and legal legislation.	2				
WOMAN'S REPRODUCTIVE HEALTH					
Lecturer: Dr. Zlatko Kirovakov					
1. Anatomy and physiology of the female reproductive system. Normal menstrual cycle. Ovogenesis.	2				
2. Basics of Assisted Reproductive Technologies - History of assisted reproduction. A routine option for the prevention of sterility	3				
3. Sexually - transmissible infections of the genital system. Prevention of sexual and reproductive health.	2				
4. Family planning. Basics of contraception.	2				
5. Seminar	1				
SEXUAL HEALTH					
Lecturer: Assoc. Prof. Dr. Rumen Bostandjiev, PhD					
1. Sexual desire and problems in sexual desire – therapeutic opportunities	1				
2.Difficulties in obtaining and sustaining erection. Erectile dysfunction – illness or situational process. Strategy in diagnosis and treatment.	1				
3. Problems in control of ejaculation. Neuro-physiological and psychological background.	1				
4. Sexual problems in woman – case studies	1				
5. Problems in sexual orientation and sexual identity. Gender dysphoria and other sexual problems in childhood	1				
6. Sexual violence and domestic aggression	1				
7.Sexually explicit materials and its influence on sexual development of children and sexual functioning of adults.	1				
8. Family life and sex. Fidelity and infidelity, consensual nonmonogamy,	1				
9. Conditions for flourishing sexual life – creation of satisfying intimate relation as artistic lifelong task.	1				
10. Colloquium	1				
Total:	30				

BACKGRAUN FOR EXAMIN FOR STUDENTS OF THE DISCIPLINE "REPRODUCTIVE AND SEXUAL HEALTH"

- 1. Endocrine regulation of spermatogenesis. Methods of investigations.
- 2. Male sexual system physiology.
- 3. Spermatozoa as a carrier of genetic information. Morphological and ultrastructure of sperm. Kinetics and metabolism of sperm.
- 4. Ejaculate physics and chemical characteristic.
- 5. Epidemiology and etiology of male infertility.
- 6. Clinical integrity of male infertility. Diagnostic assessment of impaired male fertility.
- 7. Holistic understanding of human sexuality and its problems
- 8. Sexology and Sexual Medicine different aspects of sexual health
- 9. Sexual response in female and female
- 10. Sexual problems in male and female
- 11. Therapeutic approaches in treatment of sexual problems in couples and families

BYBLIOGRAPHY

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3. GL Machen, JI Sandlow. Causes of male infertility. Male Infertility: Contemporary Clinical, 2020 – Springer

4. S Du Plessis, A Agarwal, E Sabanegh Male infertility, 2014, Springer

5. Balfour, A. M. (2012). *How couple relationshops shape our world*. London: Karnac.

6. Bancroft, J. (1989). *Human Sexuality and its Problems*. Edinburgh London Melbourne and New York: Curchill Livingstone.

7. Finkel, E. (2019). All or Noting Mariages. New York: Adventure Works.

8. Fisher, H. (1992). Anatomy of Love. New York: The Random House Publishing Group.

The students can use any other textbooks of reproductive and sexual health

COMPILED BY:

(Prof., DSci Petia Tzvetkova)

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(Dr. Zlatko Kirovakov)

Head of Department

(Assoc. Prof., PhD Yordan Georgiev)

Approved by of a decision of the Faculty Council of the Medical Faculty, Protocol \mathbb{N}_{2}

Secretary of the Faculty Council:

(Ch. Ass., PhD Ruska Nenkova)

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:

Specialty:

Professional field:

Educational qualification degree:

Form of training:

CHEMICAL ASPECTS OF NATURAL REMEDIES AND TREATMENTS

MEDICINE

7.1. Medicine

Master's degree

Full-time

EXTRACT FROM THE CURRICULUM

Total (Academic hours):		90		ECTS		3
Auditorium classes	Non-a	Non-auditorium classes		Auditorium ECTS	Non-auditorium ECTS	
45		45		1.5	1.5	
Type of discipline	Academic / /lectures +	hours per practices/	week:	Course:	Semester:	
Mandatory		1+2		п	ш	
2. STUDY FO	RMS					1
Auditorium classes:	Academic hours	ECTS	Non- class	-auditorium es:	Academic hours	ECTS
Lectures	15	0.75	Cons	sultation	10	0.5
Seminars	15		Individual work			
Practices	15	0.75	- Prep proto - Prep exam	paration of ocols paring for the	5 30	0.25 0.75
3. EVALUATI	ON AND	CONTR	OL			
Forms of evaluatio	n and contro	I.			Relative sh total s	are in the core
Sessional evaluatio	n: 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 protoco	ols				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
 Mud and lye therapy – chemical composition and action of healing mud and lye. 	2
 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. <i>Practical session</i> . Field work on sampling with medicinal mud and lye. Visiting and studying sites with medicinal mud and lye – Pomorie/Lake Atanasovsko, Burgas.	3

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

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.

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Compiled by:

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Approved by a decision of the Council of the Department of Physiology, Pathophysiology, Chemistry and Biochemistry, Protocol $N_2/10/03/2024$

Head of Department:

(Assoc. Prof. Yordan Georgiev, PhD)

Approved by a decision of the Faculty Council of the Medical Faculty, Protocol № (2/2009 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!

September Tipod, & p Aceu Itan

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

Total (academic h	ours).	90		ECTS:		3	
Auditorium Nor classes		1-auditorium classes		Auditorium ECTS	Non-auditorium ECTS		
45		45		1.5	1.5		
Type of Discipline:	Academic h /lectures + j	ours per practices/	week:	Course:	Semeste	Semester:	
Elective		1 + 2		п	3rd	3rd	
2. STUDY FO	RMS				in the second		
Auditorium classes:	Academic hours	ECTS	Non-au classes	uditorium :	Academic hours	ECTS	
Lectures	15	0.5	Consu	Itation	10	0.3	
Seminars	eminars150.5Individual work:Practices150.5- working with specialized scientific literature to prepare for seminars; - preparation for practical exercises and protocols from them; - preparation of a report and presentation on a scientific problem; - Preparation for the fi- nal exam	3	0.1				
Practices		0.5	semina - prepa practic	urs; uration for al exercises and ols from them;	3	0.1	
			- prepa and pr	aration of a report esentation on a fic problem:	9	0.3	
			- Prepara nal exam	aration for the fi- am	20	0.7	
3.EVALUAT	ION AND C	CONTR	OL				
Forms of evaluat	ion and contro	1			Relative the tota	share in l score	
Sessional evaluat	tion: exam				0.	4	
Semester (ongoin	ng) assessment:				0.	6	
Forms of semeste	er control:						
- Attendance and	active participat	tion during	g classes		0.	2	
- Preparation for e	each exercise an	d seminar			0.	2	
 Preparation of p Working with so presentation on a 	rotocols of prac cientific literatu scientific proble	re, prepari em	ing a rep	ort and presenting a	i 0.1	15	

EXTRACTS FROM THE CURRICULUM

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:

- 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;
- 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;
- 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

Торіс	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 Med- icine	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 en- zyme glycosylation genes and clinical significance of enzymes involved in the gly- cosylation process	1
3. Low molecular weight carbohydrates Structural diversity in low molecular weight carbohydrates. Classification of mono- saccharides - orders of aldoses and ketoses. Conformational models and optical isomerism in monosaccharides. Formation and features of the glycosidic bond. Re- ducing and non-reducing sugars. Main representatives of disaccharides and oligo- saccharides 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 glycosa- minoglycans (hyaluronic acid, heparin, chondroitin sulfate, dermatan sulfate, kera- tan sulfate) in humans and animals. Catabolism of polysaccharides and glycosa- minoglycans in the human body. Disorders in the metabolism of glycogen and gly- cosaminoglycans	2
5. Polysaccharides from medicinal plants, fungi, microorganisms, algae, and arthropods Structural features and biological activity of homo- and heteropolysaccharides valu- able for humans from medicinal plants (pectins, hemicelluloses), fungi (β -glucans, fucogalactans, glucomannans), microorganisms (dextrans, pullulans, curdlans, xan- thans, mannans), algae (alginates, agarose, fucoidans, carrageenans, ulvans, galac- tans), and arthropods (chitin). Possibilities for metabolizing water-soluble and in- soluble dietary fibers in the human body. Perspectives in the involvement of poly- saccharides in the supplementary therapy in the treatment of cardiovascular, onco- logical, 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 metabo- lism of proteoglycans in atherosclerosis, diabetes, oncological, renal, and musculo- skeletal diseases	1
7. Glycoproteins in humans and animals Structural features of N- and O-linked glycans in glycoproteins. Biological func- tions of glycoproteins in man. Role of sialic acid in viral infections. Formation of	2

advanced glycation end products in hyperglycemia and subsequent pathophysiologi- cal consequences. Hexosamine pathway in diabetes and other diseases	
8. Glycolipids	
Classification and structural features of glycolipids. Biological functions of glycoli- pids. Disorders of glycolipid metabolism in oncological and neurodegenerative dis- eases	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. Bi- omedical 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 bioin- formatic 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

Торіс	Hours
1. Low molecular carbohydrates Seminar: Structural diversity in carbohydrates. Classification of monosaccharides - aldoses and ketoses. Conformational models and optical isomerism in monosaccha- rides. 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 mush- rooms. Possibilities for metabolizing water-soluble and insoluble dietary fibers in the human body. Prospects for the involvement of polysaccharides in the supple- mentary therapy in the treatment of cardiovascular, oncological, and chronic in- flammatory diseases	3

od of Blumenkrantz & Asboe-Hansen	
3. Polysaccharides from microorganisms, algae, and arthropods Seminar: Isolation, purification, structural features and biological activity of valua- ole 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 poly- saccharides 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 sul- fate, dermatan sulfate, keratan sulfate) in humans. Degradation of polysaccharides and glycosaminoglycans in the human body. Disorders in the metabolism of glyco- gen 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	3
 Practice: Determination of the degree of glycation of bovine aroundin 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 glycosyl-	3
ation in congenital diseases <i>Practice:</i> Determination of the amino acid composition of biologically active gly-	

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

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
- 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

- Glycolipids. Classification and structural features of glycolipids. Biological functions of glycolipids. Disorders of glycolipid metabolism in oncological and neurodegenerative diseases
- 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
- Cellular recognition of carbohydrate-containing metabolites. Classification of glycanbinding 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
- 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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 Georgiev, Y.N., Ognyanov, M.H., Denev, P.N., Kratchanova, M.G. Chapter X. Perspective therapeutic effects of immunomodulating acidic herbal heteropolysaccharides and their complexes in functional and dietary nutrition. In: Holban, A.M., Grumezescu, A.M. (Eds.), Handbook of Food Bioengineering, Therapeutic Foods, Section 3: Medical Impact. Elsevier, Cambridge, 2018, pp. 285–327. <u>https://doi.org/10.1016/B978-0-12-811517-6.00010-6</u>.

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

Compiled by:

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Approved by a decision of the Council of the Department of Physiology, Pathophysiology, Chemistry and Biochemistry, Protocol No8/09.07.2024.

Head of Department

(Assoc. Prof. Yordan Georgiev, PhD)

Approved by a decision of the Faculty Council of the Medical Faculty, Protocol N_{\odot} . N_{\odot} . 11.07.2024.

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

(Chief assist. Prof. Ruska Nenkova, PhD)

Page 10 of 10