Azerbaijan Medical University

SYLLABUS
on Organic Chemistry
subject

"**CONFİRM**"

"Head of General and
Toxicolojical Chemistry
Department"
Garayev E.A.
Signature _____

CODE OF THE SUBJECT:	İPF – B06
TYPE OF SUBJECT:	Compulsory
TRAINING SEMESTER:	III and IV semesters
CREDİT:	5 and 5 credits
TRAINING FORM:	full time
TRAINING LANGUAGE:	Azerbaijan, russian, english
LECTURERS:	ass.prof. Rasulov N.Sh. ass.prof. Hasanov F.P. ass. Badalova K.K. ass. Zeynalova G.R/
Contact number of department:	(012) 597-44-98
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PREREQUİSİTES:

The course, which is necessary for the preliminary course of study: general chemistry, inorganic chemistry.

COREQUİSİTES:

At the same time, it is necessary to teach other disciplines: analytical chemistry, physical and colloidal chemistry.

TRAINING PROGRAM:

The curriculum on the subject "Organic chemistry" for the bachelor's degree in pharmaceutical specialty was approved by the decision of the Meeting of the Scientific and Methodological Council of the Ministry of Education of the Republic of Azerbaijan "Chemistry and Chemical Technology" dated 18 April 2018 (Protocol No. 7).

TRAINING PLAN:

According to the curriculum approved by the rector of the Azerbaijan Medical University, prof. G.Ch.Garaybeyli, organic chemistry on the pharmacy speciality, taught on the credit system, is taught as a compulsory and consistent subject for 2 semesters (III and IV): 75 hours in the III semester (14 hour lectures, 61 hours practical trainings), 75 hours in the IV semester (14 hours lectures, 61 hours practical trainings). The duration of the two semesters study is 15 weeks.

COURSE DESCRİPTİON:

The classification of a large number of organic compounds, modern mechanisms of main transformation of organic compounds, the purification and analysis of organic substances, composition, structure, properties and using in medicine of organic compounds, presented in the body and outside the body are widely explained in this subject. In addition, detailed information on the use of organic substances in the life activity of the living organisms and the application of a large number of agents as a medicinal product is given in subject.

COURSE PURPOSE:

It aims to provide students with knowledge about the theoretical basics of organic chemistry and to develop practical skills, as well as provide a better and easier access to specialized subjects (biological chemistry, pharmaceutical chemistry and toxicological chemistry) to be taught as a basic subject in the future.

COURSE RESULTS:

After completing of organic chemistry subject, the students must know the purification and analyze methods of organic matters, synthesize and implement physical-chemical analysis methods of compounds belonging to any class.

NOTE:

If no minimum score of 17 points is collected in the exam, the points collected until the exam will not be collected. Points collected until the exam and exam are summed up and the final amount is evaluated as follows:

A - “Excellence” - 91 – 100 points
B - “Very good” - 81 – 90 points
C - “Good” - 71 – 80 points
D - “Sufficient” - 61 – 70 points
E - “Satisfactory” - 51 – 60 points

F - “Insufficient” - less than 51 points

FREE WORK:

10 free work tasks are given for each semester. Performance of each exercise is 1 point.

The work must be in writing form, in the form of word file, size 1-2 pages (front 12). Free works can also be readily accessible.

Plagiarism is unacceptable because every free task is a collection of individual ideas.

Free works topics and deadline dates (fall semester)

№	**Topics**	**Final date**
1Üzvi	Interaction of atoms in organic molecules. Formation of reaction centers.	5th week
2.	The mechanism of organic reactions. Radicals, electrophilic and nucleophilic reagents.	6th week
3Ster	Stereoisomers. Enantiomers and diasdiastereomers.	7th week
4.	The research of organic compounds. Spectroscopy.	8th week
5.	Hydrocarbons. (Alkanes, cycloalkanes, alkenes, alkadyenes, alkynes and arenes). Mechanism of electrophilic substitution reactions in arenes.	9th week
6.	Amines. General information about biogen amines. Role of amines in medicine.	10th week
7.	Preparation and properties of alcohols and phenols. The mechanism of nucleophilic addition reactions in aldehydes and ketons.	12th week
8.	The main derivatives of organic acids and role in organism.	13th week
9.	Heterofunctional compounds. The role in living organism and in pharmacy.	14th week
10.	Role of oxi- and oxoacids in living organism.	15th week
Free works topics and deadline dates (spring semester)		
1.	The role of five-membered heterocyclic compounds in pharmacy.	5th week
2.	Mechanism of electrophilic and nucleophilic substitution reactions in six-membered heterocyclic compounds	6th week
3.	The main derivatives of condensed heterocyclic compounds and their role in pharmacy.	7th week
4.	α-Amino acids. Peptids and proteins. The main representatives and role in medicine.	8th week
5.	Carbohydrats. Stereoisomerism.	9th week
6.	Nucleic acids and role in living organism.	10th week
7.	Hydrolisable lipids. Classification of complex lipids.	11th week
8.	Terpenes and terpenoids, role in pharmacy.	12th week
9.	Not hydrolisable lipids. Role of stereoids in pharmacy.	13th week
10.	Alkaloids. Classification and role in pharmacy.	14th week

The free work provided after the deadline will be ignored regardless of the cause. The results of the free work are recorded in the journal.

Thematic plan of lectures on organic chemistry
(fall semester)

№	Topic name	hour
1.	Classification of organic compounds. Structure of organic compounds and chemical bonds. The mechanism of organic reactions.	2
2.	Identification of the structure of organic compounds by spectral methods. Chromatography.	2
3.	Hydrocarbons. Alkanes, cycloalkanes. Alkenes, alkadienes, alkynes. Arenes.	2
4.	Mono- and polyfunctional compounds.Halogen derivatives of hydrocarbons. Nitrogen-organic compounds. Alcohols and phenols. Aldehydes and ketones.	2
5.	Organic acids. Ethers and esters.	2
6.	Heterofunctional compounds. Aminoalcohols and aminophenols. Hydroxyacids.	2
7.	Hydroxyacids and oxoacids.	2

Thematic plan of practical training on organic chemistry
(fall semester)

№	Topic name	Saat
1.	Rules in the laboratory of organic chemistry. Safety equipment. Chemical vessels and equipment.	4
1	Rules in the laboratory of organic chemistry. Safety precautions. Chemical vessels and equipments.	4
2	Interference of atoms in organic molecules. Chemical bonds. Electron effects. Acidity and basicity in organic compounds. Simple and fractional distillation.	4
3	Stereoisomers. Configurations and conformation. Enantiomers and diastereomers. Spectroscopy. Determination of the radiation coefficient and the melting point.	4
4	Hydrocarbons. Alkanes, cycloalkanes. Alkenes, alkadienes and alkynes. Arenes. Preparation of ethylene and acetylene. Qualitative reactions on double and triple bonds.	4
5	Colloqium №1. The obtaining of ethylbromide. The reaction of glycerole with $(CuOH)_2$	2 2

6	Mono-and polifunctional organic compounds. Halogen derivatives of hydrocarbons. Alcohols and phenols. Reaction of glycerol with copper-2-hydroxide	4
7	Nitrogen-organic compounds. Aldehydes and ketones. Qualitative reactions of primary and secondary amines.	4
8	Monobasic saturated and unsaturated acids. Synthesis of benzoic acid.	4
9	Dibasic saturated and unsaturated acids. Ethers and esters. Preparation of ethyl ether of benzoic acid.	4
10	Colloqium №2. Qualitative reactions for amino alcohols	2 2
11	Heterofunctional compounds. Aminoalcohols and aminophenols. Qualitative reactions of aminoalcohols.	4
12	Oxyacids. Syntesis of allyl ether of salysilic acid.	4
13	Phenol acids. Qualitative determination of functional groups in salicylic acid.	4
14	Oxoacids.	4
15	Syntesis of allyl salicylate Colloqium №3.	3 2

Thematic plan of lectures on organic chemistry
(spring semester)

№	Topic name	Hour
1.	Five-membered heterocyclic compounds with one and two heteroatoms. Six-membered heterocyclic compounds with one heteatom.	2
2.	Six-membered heterocyclic compounds with two heteroatoms. Condensed 5- and 6-membered heterocyclic compounds. Flavanoids.	2
3.	Nitrogen containing biheterocyclic compounds. Alkaloids.	2
4.	Biopolymers. Aminoacids, peptides and proteins.	2
5.	Carbohydrates. Nucleic acids.	2
6.	Undergoing to hydrolysis lipids.Simple and complex lipids.	2
7.	Not undergoing to hydrolysis lipids. Mono-, sesquiterpenes. Steroids.	2

Thematic plan of practical training on organic chemistry
(spring semester)

№	Topic name	hour
1.	Five-membered heterocyclic compounds with one and two heteroatoms**.** Laboratory work: 1. Getting furfural from dry wood shavings and reaction with aniline.	4
2.	Six-membered heterocyclic compounds with one and two heteroatoms. Laboratory work: 1. Synthesis of nicotinic acid. 2. Qualitative analysis of vitamin PP.	4
3.	Condensed heterocyclic 5- and 6- membered heterocyclic compounds. Laboratory work: reducing ability of uric acid.	4
4.	Nitrogen containing biheterocyclic compounds Alkaloids, classification, characteristic reactions, analysis on thin layer chomatography (TLC) method	4
5.	**Colloqium №1.** Laboratory work: 1. Getting nicotine from tobacco by extraction. 2. Getting caffeine from tea and its characteristic reaction, TLC analysis.	2 2
6.	Aminoacids. Laboratory work: 1. The reaction of glycine with copper carbonate, TLC analysis.. 2. Color reaction to cysteine.	4
7.	Peptides and proteins. Laboratory work: 1. Biuret's reaction to peptide bond in egg protein. 2. Denaturation of egg protein.	4
8.	Monosaccharides. Laboratory work: 1. Determination of hydroxyl groups in D-glucose. 2. Oxidation of monosaccharides with bromine water.	4
9.	Di- and polysaccharides.	4
10.	**Colloqium №2.** Laboratory work: 1. The reducing ability of lactose. 2. Qualitative reaction to starch.	2 2
11.	Nucleic acids. Laboratory work: 1. Separation of nucleoproteins from yeast. 2. Hydrolysis of nucleoproteins	4
12.	Undergoing to hydrolysis lipids. Laboratory work: 1. The reaction of lipid hydrolysis. 2. Salt reaction of soap with sodium chloride.	4
13.	Mono-, sesqui- and diterpenes. Laboratory work: 1. The addition of bromine to pinene. 2. Oxidation of pinene by potassium permanganate.	4
14.	Steroids. TLC analysis of steroid saponin – Tribestan.	4
15.	Laboratory work: 1. Hydrolysis of cardiac glycosides. **Colloqium №3.**	3

Tests on subject are prepared electronically and posted on the official website of the university www.amu.edu.az

CALENDAR-THEMATİC PLAN

The calendar-subject plan of the lecture and workshop lectures on the subject is drawn, the subject is distributed to teachers, and one copy is stored in the list of the department's documents.

EVALUATION:

Collecting 100 points to collect credits on the subject will be as follows:
50 points– untill exam
Including:
10 points – lesson attendance
10 points – free work
30 points – from seminar lessons.

Colloquium will be performed 4 times during the semester (minimum 4). In the journal, 0 (zero) points will be marked unless participation in the colloquium.

50 points – collecting at exam.

Examination will be held at the virtual test center by test method. The test will consist of 25 questions. Each question is a 2 points. The answering questions will delete the scores of correct answers.

References:

1. Namiq Rəsulov, Kəmalə Bədəlova. “Üzvi kimyadan laboratoriya işləri” Dərs vəsaiti. Bakı-2019.
2. Faiq Həsənov: Bioüzvi kimya, dərslik. Bakı, 2014, 575 səh.
3. M. Mövsümzadə.”Üzvi kimya”, dərslik. Bakı, 1988, 411 səh.
4. Q.B. İskəndərov, N.Ş. Rəsulov “Alkaloidlər və izoprenoidlər” Tədris metodik işləmə. Bakı, 2000.
5. N.Ş. Rəsulov, Ü.Ə.Həsənova. Bəzi azotlu, kükürdün və fosforlu üzvi birləşmələr. (dərs vəsaiti). Bakı, 2000
6. N.Ş. Rəsulov, Ü.Ə. Həsənova. Oksobirləşmələr. (dərs vəsaiti). Bakı, 2000
7. N.Ş. Rəsulov, Ü.Ə. Həsənova. Üzvi birləşmələrin adlandırılması və fəza quruluşu. (dərs vəsaiti).
8. N.Ş. Rəsulov, Ü.Ə. Həsənov. Bəzi mono-, poli- və heterofunksional üzvi birləşmələr. (dərs vəsaiti). Bakı, 2013
9. Ş.F. Qarayev, U.B. İmaşov., G.M. Talibov. Üzvi kimya. (dərslik). Bakı, 2003

Course work

Course work is not foreseen in this subject.

Experience

There is no production experience in this subject.

Prepared: **ass.prof. Rasulov N.Sh.**