ODESSA NATIONAL MEDICAL UNIVERSITY
Medical faculty
Department of Forensic Medicine

Course syllabus
Toxicological and forensic chemistry

Volume	3 ECTS credits, total – 90 academic hours Lectures – 20 academic hours, practical classes – 40 academic hours , SIW- 30 academic hours
Semester, academic year	VIII semester, 4th academic year
Days, time, month	Discipline is carried out according to the approved schedule, in the premises of the Department of Forensic Medicine
Teachers	Teachers of the Department of Forensic Medicine
Telephone njumber	(048) 723-76-90
E-mail	Larsonlarisa2@gmail.com
Workplace	Premises of the Department of Forensic Medicine
Consultations	Online consultations – microsoftteams

COMMUNICATION

Communication with students will be carried out by E-mail, Microsoft Teams, by phone, in the classroom on schedule.

COURSE ANNOTATION

The subject of study of the discipline is the theory and practice of forensic toxicology as a practical branch of medicine.

Prerequisites

The basis for mastering the discipline is the knowledge, skills and abilities acquired in the study of such disciplines as inorganic, organic, bioinorganic, bioorganic, analytical, pharmaceutical, biological, physical, colloidal chemistry, botany, pharmacology, pharmacognosy, pharmacotherapy, clinical pharmacy, medical and biological physics and technology of medicines. "Toxicological and forensic chemistry" is based on the knowledge of the above disciplines, and at the same time integrates with these disciplines.

Postrequisites

Toxicological and forensic chemistry as a discipline involves the study of the relationship with the following disciplines: anatomy, normal and pathological physiology, foreign languages.

Course purpose:

obtaining by the students of the necessary knowledge and on the base of the modern scientific concepts develop necessary theoretical knowledge in the branch of forensic and toxicological chemistry. Also develop an ability of chemical-expert thinking and ability and skills of the application of poisons' extraction from the biological objects, and detection and determination of xenobiotics and their metabolytes when performing of chemical-toxicologial or forensic-toxicological analyzes.

Tasks of the discipline:

- obtain the knowledge of the subject, tasks and main sections of toxicological and forensic chemistry, fields of its application, classification of poisons and poisoninings;

- obtain the knowledge of the classification of toxic substances by methods of their isolation from objects of biological origin;

- obtain the knowledge of the basic normative documents, which regulate forensic toxicological and chemical-toxicological analyzes;

- study safety techniques and rules of work in the chemical and toxicological (forensic toxicology) laboratory, theoretical bases of methods for the separation of toxic substances from a biologic material, their detection, identification and quantitative determination by the chemical and physico-chemical methods;

- obtain the knowledge of the ways of poison introduction inside the body and excretion from the body, its toxicokinetics, distribution in the body, preserving in the corps, influence of these processes on the results of the chemical and toxicological analysis;

Expected results:

As a result of studying the discipline the student must:

know:

subject, tasks and main sections of the discipline "Toxicological and Forensic Chemistry", areas of its application; basics of toxicology, toxicodynamics, toxicokinetics, toxicometry, types of toxic action and determination of toxic doses, features of chemical and toxicological analysis, the procedure and documentation of forensic toxicological (chemical and toxicological) examinations; general principles of interpretation of forensic toxicological research results.

be able to do:

perform preliminary tests (screening) of groups of toxic substances to detect them in the blood, urine, saliva, hair and other objects; to carry out TLC screening of medicinal substances in biological fluids; master the skills to draw up a plan of forensic toxicological analysis in the rapid diagnosis of acute poisoning; be able to isolate substances of these groups from objects of biological origin; be able to detect these substances using chemical, physicochemical and enzyme-linked immunosorbent assays; be able to predict the directions of metabolism in order to take measures to prevent the negative impact of "lethal" synthesis on the body of the victim; be able to predict the effect of poisons on the body in the somatogenous phase of poisoning and propose effective methods of detoxification of the body; be able to predict the impact of combined poisonings on the condition of the victim and on the course of chemical and toxicological research.

DESCRIPTION OF THE COURSE

The course will be presented in the form of lectures (20 hours), practical classes (40 hours), organization of independent work of students (30 hours)

Forms and methods of teaching:

1) lectures (topics of the lecture course reveal the problematic issues of the relevant sections of the discipline. Lecturers can use such options for lectures as educational, informational, lecture-visualization, lecture-discussion, lecture-consultation);

2) practical classes (during the practical class oral and written interviews, solving test tasks, solving situational problems are done);

3) independent work (SIW) with active consultation of the teacher (during independent work students master the material of the next practical lesson. At the consultations the student can get answers to complex questions of the topic).

Content of the discipline

Section 1. Organization of forensic medical examination and general principles of examination of the influence of environmental factors on the human body.

Topic 1. Theoretical bases of toxicological and forensic chemistry, toxicology, forensic toxicology, clinical toxocology.

Topic 2. Definition of the concepts of "poisoning" and "poison". General characteristics of poisonings (intoxications).

Topic 3. Characteristics of the factors determining development of acute poisonings. Clinical and laboratory diagnosis of poisoning (specific symptoms). Methods of detoxification organism.

Topic 4. Toxicokinetics. Distribution of poisonous substances in the organism

Topic 5. Metabolism of poisonous substances, its directions and dependence on the state of the organism.

Topic 6. Toxicodynamics of poisons, specific clinical symptoms of intoxication of the body.

Topic 7. Forensic toxicological and chemical toxicological analysis and their objects of research.

Topic 8. Acquaintance with safety and work in the laboratory. External inspection and preliminary tests of objects of research and drawing up of the plan of forensic toxicological research.

Topic 9. Theoretical bases of methods of isolation of toxic substances from biological material, their detection, identification and quantification using chemical and physico-chemical methods, as well as a combination of methods.

Topic 10. Interpretation of the results obtained during experimental forensic toxicological studies.

Topic 11. Medical care, methods of active and artificial detoxification, specific (antidote) therapy for acute intoxications.

Literature

1. Cazes J., Scott R.P.W. Chromatography Theory. - Avon, Connecticut: CRC Press, 2002. - 496 p.
2. Clark`s isolation and identification of drugs. – London: The Pharmaceutical Press, 1986. – 1224 p.
3. Handbook of Toxicology. 2 ed. / Edited by Derelanko M.J., Hollinger_M.A. - N.W.: CRC Press LLC, 2002 – 1380 p.
4. Lars Hagel, Günter Jagschies, Gail K. Sofer. Handbook of Process Chromatography, Second Edition: Development, Manufacturing, Validation and Economics. - Academic Press, 2007. – 384 p.
5. Poisoning and Drug Overdose. Fifth Edition / Edited by Kent R. Olson. - San Francisco: The McGraw-Hill Companies, 2007. – 1132 p.
6. Randall C. Baselt. Dispositionof Toxic Drugsand Chemicals in Man. – California, Foster City; Chemical Toxicology Institute, 2000. – 920 p.
7. Robert l. Grob, Eugene f. Barry. Modern practice of gas chromatography. Fourth edition. New Jersey: John Wiley & Sons, 2004. – P. 1048.
8. Scott R.P.W. Liquid Chromatography column theory. - New York: John Wiley & Sons, 2002. - 212 p.

Information resources

University websites and electronic resources of the Internet

EVALUATION

Current control: oral control, testing, assessment of practical skills, solving situational clinical problems, assessment of activity in the classroom.

Final control: oral differential test, testing.

Assessment of the ongoing learning activities:

When assessing the mastery of each topic, a student of higher education is given grades on a 4-point (traditional) scale ("2", "3", "4", "5").

1. **Evaluation of theoretical knowledge on the subject of the lesson:**
   - methods: survey, solving a situational clinical problem, tests
   - the maximum score is 5, the minimum score is 3, the unsatisfactory score IS 2 .
2. **Assessment of practical skills on the topic of the lesson:**
   - methods: assessment of the correctness of the performance of practical skills
   - the maximum score is 5, the minimum score is 3, the unsatisfactory score IS 2.

The grade for one practical session is the arithmetic average of all components and can only have a whole value (5, 4, 3, 2), which is rounded according to the statistical method.

Current assessment criteria for practical training:

Rating	Evaluation criteria
«5»	The student is fluent in the material, takes an active part in discussing and solving a situational clinical problem, confidently demonstrates practical skills during the examination of the victim or corpse and interpretation of clinical, laboratory and instrumental studies, expresses the opinion on the topic, demonstrates clinical thinking
«4»	The student is well versed in the material, participates in the discussion and solution of situational clinical problems, demonstrates practical skills during the examination of the victim or corpse and interpretation of clinical, laboratory and instrumental studies with some errors, expresses the opinion on the topic, demonstrates clinical thinking.
«3»	The student does not know enough material, insecurely participates in the discussion and solution of a situational clinical problem, demonstrates practical skills during the examination of the victim or corpse and interpretation of clinical, laboratory and instrumental studies with significant mistakes
«2»	The student does not know the material, does not participate in the discussion and solution of the situational clinical problem, does not demonstrate practical skills during the examination of the victim or corpse and the interpretation of clinical, laboratory and instrumental data.

The student is admitted to the differential test provided that the requirements of the curriculum are met and if he received at least 3.00 points for the current academic activity.

Evaluation of the independent work of a student of higher education. The independent work of a student of higher education, which is provided by the topic of the lesson along with the classroom work, is evaluated during the current control of the topic in the corresponding lesson. The mastery of topics that are assigned only to independent work is checked during the final control.

Evaluation of learning results during the final control (differential offset**)**

The content of the assessed activity	Amount
Answer to theoretical questions.	1
Answer to theoretical questions.	1
Solution of the calculation problem	1

Criteria for assessment the learning results of students in the differential test:

«5»	Put to a applicant who worked systematically during the semester, showed during the exam versatile and deep knowledge of the program material, is able to successfully perform the tasks provided by the program, mastered the content of basic and additional literature, realized the relationship of individual sections of the discipline, their importance for future profession. showed creative abilities in understanding and using educational material, showed the ability to independently update and replenish knowledge; level of competence - high (creative);
«4»	Put to a applicant who has shown full knowledge of the curriculum, successfully performs the tasks provided by the program, mastered the basic literature recommended by the program, showed a sufficient level of knowledge of the discipline and is able to independently update and update during further study and professional activities; level of competence - sufficient (constructive-variable)
«3»	Put to a applicant who has shown knowledge of the basic curriculum in the amount necessary for further study and further work in the profession, copes with the tasks provided by the program, made some mistakes in answering the exam and when performing exam tasks, but has the necessary knowledge to overcoming mistakes under the guidance of a research and teaching staff; level of competence - average (reproductive)
«2»	Put to a applicant who did not show sufficient knowledge of the basic curriculum, made fundamental mistakes in performing the tasks provided by the program, can not without the help of the teacher use the knowledge in further study, failed to master the skills of independent work; level of

	competence - low (receptive-productive)

Distribution of points received by students of higher education

The obtained average score for the academic discipline for applicants who have successfully mastered the work program of the academic discipline is converted from a traditional four-point scale to points on a 200-point scale, as shown in the table:

Conversion table of a traditional assessment into a multi-point scale

National assessment for discipline	The sum of points for the discipline
Excellent ("5")	185 - 200
Good ("4")	151 - 184
Satisfactory ("3")	120-150
Unsatisfactory ("2")	Below 120

Multi-point scale (200-point scale) characterizes the actual success of each applicant in mastering the educational component. The conversion of the traditional grade (average score for the academic discipline) into a 200-point grade is performed by the information and technical department of the University.

According to the obtained points on a 200-point scale, the achievements of the applicants are evaluated according to the ECTS rating scale. Further ranking according to the ECTS rating scale allows you to evaluate the achievements of students from the educational component who are studying in the same course of the same specialty, according to the points they received.

The ECTS scale is a relative-comparative rating, which establishes the applicant's belonging to the group of better or worse among the reference group of fellow students (faculty, specialty). An "A" grade on the ECTS scale cannot be equal to an "excellent" grade, a "B" grade to a "good" grade, etc. When converting from a multi-point scale, the limits of grades "A", "B", "C", "D", "E" according to the ECTS scale do not coincide with the limits of grades "5", "4", "3" according to the traditional scale. Acquirers who have received grades of "FX" and "F" ("2") are not included in the list of ranked acquirers. The grade "FX" is awarded to students who have obtained the minimum number of points for the current learning activity, but

who have not passed the final examination. A grade of "F" is given to students who have attended all classes in the discipline, but have not achieved a grade point average (3.00) for the current academic activity and are not admitted to the final examination.

Applicants who study in one course (one specialty), based on the number of points scored in the discipline, are ranked on the ECTS scale as follows:

Conversion of the traditional grade from the discipline and the sum of points on the ECTS scale

Evaluation on the ECTS scale	Statistical indicator
A	Top 10% achievers
B	The next 25% of earners
C	The next 30% of earners
D	The next 25% of earners
E	The next 10% of earners

Course Policy

Deadline and recompilation policy:

All missed classes must be completed.

Lectures are practiced by writing essays on the topic of the lesson. Practical classes are practiced according to the schedule of consultations.

Applicant do not have the right to rearrange the current satisfactory and unsatisfactory grades in order to increase the arithmetic mean of all current grades.

Applicant have the right during the semester to retake current unsatisfactory grades only in order to achieve an average current score of 3.00.

Academic Integrity Policy

Adherence to academic integrity by applicants provides:

- independent performance of educational tasks, tasks of current and final control of learning outcomes (for persons with special educational needs this requirement is applied taking into account their individual needs and opportunities);

- links to sources of information in the case of the use of ideas, developments, statements, information; - compliance with the law on copyright and related rights;

- providing reliable information about the results of their own (scientific, creative) activities, used research methods and sources of information. Unacceptable in educational activities for participants in the educational process are:

- the use of family or business ties to obtain a positive or higher assessment in the implementation of any form of control over learning outcomes or advantages in scientific work;

- use of prohibited auxiliary materials or technical means (cheat sheets, abstracts, headphones, telephones, smartphones, tablets, etc.) during control measures;

- passing the procedures of control of learning outcomes by fictitious persons. For violation of academic integrity, students may be held subject to the following academic liability:

- reduction of results of assessment of control work, examination, credit, etc.; - re-assessment (test, exam, test, etc.);

- appointment of additional control measures (additional individual tasks, tests, tests, etc.);

- re-passing the relevant educational component of the educational program; - conducting additional verification of other works by the infringer;

- deprivation of the right to participate in competitions for scholarships, grants, etc.;

- notification of the entity that finances the training (scientific research), the institution that issued the grant for training (research), potential employers, parents of the applicant for higher education about the violation;

- exclusion from the rating of applicants for an academic scholarship or accrual of penalty points in such a rating;

- deprivation of an academic scholarship; - deprivation of tuition benefits provided by the University;

- expulsions from the University.

Attendance and lateness policy

The applicant should not miss lectures and practical classes, the absence of valid reasons should be informed in advance to the teacher, delays are not desirable.

Mobile devices

It is not allowed to use a mobile phone, tablet or other mobile devices during the lesson (except in cases provided by the curriculum and guidelines of the teacher).

Behavior in the audience

Creative, business, friendly atmosphere.

1)